# International specification for technical publications

**utilizing**
**a common source database**

**Issue 4.0, 2008-08-01**
**Completely revised**

AIR TRANSPORT ASSOCIATION

ASD AeroSpace and Defence Industries Association of Europe

AIA AEROSPACE INDUSTRIES ASSOCIATION

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# Highlights

## *Issue 4.0*

The listed changes are introduced in Issue 4.0, dated 2008-08-01, of the publication.

Issue 4.0 is a complete revision of the specification, so no change marks appear.

Table 1 summarizes the changes that have been made from Issue 3.0. These changes have been grouped under 18 topics to make it easier to find them. The topics are:

1 identification and status section

2 steps and paragraphs

3 warnings, cautions, and notes

4 hotspots

5 process data module

6 publication module

7 references

8 information codes

9 IPD data module

10 preliminary requirements

11 BREX data module

12 schema cleanup

13 technical information repository data module

14 schedule data module

15 checklist data module

16 training

17 comment schema

18 miscellaneous.

**Note**

Some CPFs affect multiple topics. They have been listed only under their principal topic, however.

*Table 1 Summary of changes*

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| **Identification and status section** | | **Chaps 3, 4, 5, 6, 7** |
| 1. Changed the order of children in element <dmAddress> | 2004-051DE | 3.5, 3.6, 3.7, 3.9.3, 3.9.5.1, 3.9.5.2.1, 3.9.5.2.1.1, 3.9.5.2.1.10, 3.9.5.2.1.2, 3.9.5.2.1.3, 3.9.5.2.1.4, 3.9.5.2.1.5, 3.9.5.2.1.6, |
| 2. Removed element <age> and element <avee> | 2004-051DE | |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| 3. Changed attribute `inWork` from optional to required | 2006-044US) | 3.9.5.2.1.7, 3.9.5.2.1.8, 3.9.5.2.1.9, 3.9.5.2.2, 3.9.5.2.3, 3.9.5.2.4, 3.9.5.2.5, 3.9.5.2.6, 3.9.5.2.7, 3.9.5.2.9.2, 3.9.5.2.9.3, 3.9.5.2.9.4, 3.9.5.2.9.5, 3.9.5.2.9.6, 3.9.5.2.9.7, 3.9.5.2.9.8, 3.9.5.2.9.9, 3.9.5.2.9.10, 3.9.5.2.9.11, 3.9.5.2.9.12, 3.9.5.2.9.13, 3.9.5.2.10, 3.9.5.2.11.1, 3.9.5.2.11.2, 3.9.5.2.11.3, 3.9.5.2.11.4, 3.9.5.2.11.5, 3.9.5.2.11.8, 3.9.5.2.11.9, 3.9.5.2.12, 3.9.5.3, 3.9.5.3.1, 3.9.5.3.2, 4.2, 4.5.1, 4.6, 4.7, 4.8, 4.9.1, 4.9.3, 4.9.4, 4.12, 5.2.1.4, 5.2.1.16, 5.3.1.1, 6.2.1, 6.2.2, 7.3.1.1, 7.3.1.4, 7.3.3, 7.4.1.1, 7.4.1.2, 7.4.2.1, 7.5.1, 7.5.2.1, 7.5.3, 7.6.1, 7.7.1, 7.7.2, 7.7.3 |
| 4. Restricted the definition of <`applic`> in this section to allow only inline referencing using the attribute `applicRefId` | 2006-056SE | |
| 5. Added element <`supersedure`> | 2006-069US | |
| 6. Changed use of element <`copyright`> to optional | 2007-009SE | |
| 7. Added element <`productSafety`> and attribute `safetyLabel` | 2007-045AA | |
| 8. Added the optional element <`logo`> | 2007-091SE | |
| 9. Deleted the element <`dmSize`> | 2008-001FR | |
| **Steps and paragraphs** | | **Chaps 3, 6, 7** |
| 1. Introduced recursive elements (<`proceduralStep`> and <`levelledPara`>) | 2004-060US | 3.9.3, 3.9.5.2.1, 3.9.5.2.1.1, 3.9.5.2.1.3, 3.9.5.2.1.5, 3.9.5.2.1.10, 3.9.5.2.2, 3.9.5.2.3, 3.9.5.2.4, 3.9.5.2.6, 3.9.5.2.7, 3.9.5.2.10, 3.9.5.3, 3.9.6.1, 6.2.2, 6.2.3.4, 6.3.1, 7.3.1.1, 7.6.1, 7.7.1 |
| 2. Added definition list headers | 2006-099US | |
| 3. Changed narrative to be consistent with schema (titles on descriptive paragraphs and list display) | 2006-030GB | |
| 4. Included security attributes on elements which render as paragraphs | 2006-068US | |
| 5. Added new attributes `itemCharacteristic`, `crewStepCondition` and `partCharacteristic` (also affects crew data module) | 2006-101US | |
| 6. Added attribute `keepWithNext` | 2006-102US | |
| 7. Clarified paragraph content per data module type | 2007-021SE | |
| **Warning, cautions and notes** | | **Chaps 3, 6, 7** |
| 1. Added reusable warnings and cautions collection | 2004-067SE | 3.9.3, 3.9.5.2.1.1, 3.9.5.2.1.3, 3.9.5.2.1.6, 3.9.5.2.1.9, 3.9.5.2.1.10, 3.9.5.2.3, 3.9.5.2.4, 3.9.5.2.6, 6.2.2, 6.6.2, 7.3.1.1 |
| 2. Added new element <`warningAndCautionPara`> to enforce existing narrative | 2006-066US | |
| 3. Changed to display order to optional | 2006-067US | |
| 4. Changed to allow restricted lists in notes | 2007-051AA | |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| **Hotspots** | | **Chaps 3, 7** |
| 1. Added element <`internalRef`> to the element <`catalogSeqNumber`> in order to allow hotspot management in IPD data module | 2005-010FR | 3.9.5.2.7, 7.3.1.1 |
| **Process data module** | | **Chaps 3, 7** |
| 1. Included supporting information with dialog (on node) | 2006-005US | 3.9.5.2.1.9, 3.9.5.2.3, 3.9.5.2.10, 3.9.5.3, 6.2.3.3, 7.3.1.1, 7.6.1 |
| 2. Added <`assertion`> to note conditions in state tables | 2006-041US | |
| 3. Added unary operators | 2006-065US | |
| 4. Loosened restrictions on figure placement | 2006-090US | |
| **Publication module** | | **Chap 4** |
| 1. Changed <`pmEntryTitle`> to optional | 2006-010SE | 4.9.1 |
| 2. Added attribute `pmEntryType` with project configurable values | 2006-084US | |
| **References** | | **Chaps 3, 7** |
| 1. Removed attributes `pretext` and `posttext` | 2007-013SE | 3.9.5.2.1.1, 3.9.5.2.1.2, 3.9.5.1, 3.9.6.1, 7.3.1.1, 7.3.1.4 |
| 2. Modified structure and added support for element <`reasonForUpdate`> | 2007-062AA | |
| **Information codes** | | **Chap 8** |
| 1. Added 31 Information Codes (IC)s for US Army | 2006-088US | 8.4.1, 8.4.2 |
| 2. Defined information code 217 | 2006-105DE | |
| 3. Defined information code 227 | 2006-106DE | |
| 4. Defined information code 236 | 2006-107DE | |
| 5. Defined information code 237 | 2006-108DE | |
| 6. Defined information code 297 | 2006-109DE | |
| 7. Defined information code 28, modified information code 800 | 2007-071SE | |
| 8. Defined information code 961 | 2007-072SE | |
| 9. Amended and extended description of information code 230 | 2007-109DE | |
| **IPD data module** | | **Chaps 3, 7** |
| 1. Added element <`descrForItem`> and attribute `descrForItemCode` | 2006-077US | 3.9.5.2.7, 3.9.6.1, 7.3.1.1 |
| **Preliminary requirements** | | **Chaps 3, 6** |
| 1. Added support for required technical information, number of personnel required and environmental conditions | 2006-075US | 3.9.5.2.1.1.3, 3.9.5.2.1.1.7, 3.9.5.2.1.1.8, 3.9.5.2.1.1.9, 3.9.5.2.1.2, 3.9.5.2.1.9, 3.9.5.2.3, |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| 2. Restructured preliminary requirements, mainly element <productionMaintData> | 2007-019SE | 3.9.5.2.5, 3.9.6.1, 6.2.2, 6.2.3.3 |
| 3. Added optional element <shortName> under element <supportEquipDescr> | 2007-020SE | |
| 4. Added attribute unitOfMeasure to element <estimatedTime> | 2007-100DE | |
| **BREX data module** | | **Chaps 4, 7** |
| 1. Added layered BREX, pattern value support, etc. | 2006-045SE<br>2007-101SE | 4.10, 4.10.2, 4.10.3, 7.3.1.1 |
| **Schema cleanup** | | **Chaps 3, 4, 5, 6, 7** |
| Rules were established for maintaining the schemas in the areas of:<br>– naming XML objects<br>– when to use an element versus an attribute<br>– grouping objects into (reusable) groups<br>– when redefinitions are allowed<br>– element content models<br>– use of typing and patterns<br>– reference/link structures<br>– data dictionary<br>The schemas were modified to ensure conformance with the defined rules. The specific changes were fully documented in CPFs and are detailed below. | | 3.3, 3.5, 3.7, 3.9.3, 3.9.5, 3.9.5.1, 3.9.5.2.1.1, 3.9.5.2.1.2, 3.9.5.2.1.3, 3.9.5.2.1.4, 3.9.5.2.1.5, 3.9.5.2.1.7, 3.9.5.2.1.8, 3.9.5.2.1.9, 3.9.5.2.1.10, 3.9.5.2.2, 3.9.5.2.3, 3.9.5.2.4, 3.9.5.2.5, 3.9.5.2.6, 3.9.5.2.9.2, 3.9.5.2.9.3, 3.9.5.2.9.4, 3.9.5.2.9.5, 3.9.5.2.9.6, 3.9.5.2.9.7, 3.9.5.2.9.8, 3.9.5.2.9.9, 3.9.5.2.9.10, 3.9.5.2.9.11, 3.9.5.2.9.12, 3.9.5.2.9.13, 3.9.5.2.10, 3.9.5.2.11.1, 3.9.5.2.11.2, 3.9.5.2.11.3, 3.9.5.2.11.4, 3.9.5.2.11.5, 3.9.5.2.11.6, 3.9.5.2.11.7, 3.9.5.2.11.8, 3.9.5.2.11.9, 3.9.5.2.12, 3.9.5.3, 3.9.5.3.1, 3.9.5.3.2, 3.9.5.3.3, 3.9.6.1, 4.3, 4.3.9, 4.5.1, 4.6, 4.7, 4.9.2, 4.9.3, 4.9.4, 4.10.2, 4.12, 5.2.1.4, 5.2.1.20, 5.3.1.1, 5.3.1.3, 6.2.2, 6.2.3.3, 6.2.3.4, 7.3.1.1, 7.3.1.4, 7.3.2, 7.3.3, 7.4.1.1, 7.4.3, 7.5.2.1, 7.5.3, 7.6.1, 7.7.1, 7.7.4, 7.8<br>**Note**<br>CPF 2006-046SE affected the majority of the specification |
| 1. Harmonized elements between data modules, added element wrappers for easier presentation, renamed elements and attributes and restructured many elements | 2006-046SE | |
| 2. Added wrapper for legend items | 2006-078US | |
| 3. Renamed element <closetxt> to <closeRqmts> | 2007-014SE | |
| 4. Restored List of Applicable Publications (LOAP) | 2007-016SE | |
| 5. Removed element <entfield> | 2007-024SE | |
| 6. Updated text in example elements <indexValue> and <indexLength> | 2007-042US | |
| 7. Deleted the <remove> element from the unary operations table | 2007-043US | |
| 8. Harmonized change markup | 2007-077S1 | |
| 9. Converted expression operators into attribute types | 2007-094S1 | |
| 10. Renamed attributes to be context-specific | 2007-096SE | |
| 11. Harmonized reference structures | 2007-097SE | |
| 12. Harmonized the identification of objects | 2007-098SE | |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| 13. Harmonized required item consistency in preliminary requirements | 2007-099SE | |
| 14. Added values to attribute `thresholdUnitOfMeasure` | 2007-107AA | |
| 15. Restructured <`responsiblePartnerCompany`> and <`originator`> | 2007-108S1 | |
| 16. Redefined <`proceduralStep`> to require a title or paragraph structure so as to eliminate the possibility of creating an empty step | 2007-111S1 | |
| 17. Harmonized the use of ranges in element <`objectValue`> (BREX data module) | 2007-112S1 | |
| 18. Harmonized the use of Booleans and flags | 2007-113S1 | |
| **Technical information repository data module** | | **Chaps 3, 4, 7, 8** |
| 1. Added support for physical/functional breakdowns | 2006-053AA | 3.9.5.2.1.7, 3.9.5.2.1.10, 3.9.5.2.11, 3.9.5.2.11.1, 3.9.5.2.11.2, 3.9.5.2.11.6, 3.9.5.2.11.7, 3.9.5.2.11.9, 3.9.5.2.11.10, 3.9.5.2.11.12, 3.9.5.3, 3.9.6.1, 4.3.2, 4.13.1, 4.13.2, 7.3.1.1, 7.3.1.4, 8.4.1, 8.4.2 |
| 2. Added extra support for organization information | 2006-055AA | |
| 3. Added support for reuse of controls and indicators | 2006-060US | |
| 4. Added support for maintenance level | 2006-079US | |
| **Schedule data module** | | **Chaps 3, 5, 6, 7** |
| 1. Added element <`maintAllocation`> | 2006-095US | 3.9.5.2.1.9, 3.9.5.2.1.12, 3.9.5.2.3, 3.9.5.2.4, 3.9.5.2.5, 3.9.6.1, 5.2.1.6, 6.2.3.3, 7.3.1.1, 7.3.1.4 |
| 2. Added element <`commonInfo`> (also added to procedural data module and fault data module) | 2006-100US | |
| 3. Changed element <`fec`> to <`sourceType`>. Added project configurable tables for source criticality and source type code attributes | 2007-047AA | |
| 4. Modified <`task`> element to include <`taskTitle`>, <`taskDescr`> and <`taskMarker`> | 2007-068AA | |
| 5. Added support for airplane tasks | 2007-069AA | |
| 6. Harmonized the values for attribute `limitTypeValue` in schema and narrative | 2007-095SE | |
| 7. Defined relationship between maintenance requirements | 2007-106AA | |
| **Checklist data module** | | **Chaps 1, 3, 5, 7, 9** |
| 1. Added new data module to support checklists | 2007-078US | 1.2, 3.3, 3.9.5.2, 3.9.5.2.1, 3.9.5.2.14, 3.9.6.1, 5.2.1.21, 7.3.1.1, 9.2 |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| **Training** | | **Chaps 1, 3, 4, 5, 7, 8, 9** |
| 1. Added new data modules to support training content<br>2. Added optional learn code attributes to element <dmCode> | 2007-037US<br>2007-038US<br>2007-040US<br>2007-041US | 1.2, 3.9, 3.9.5.1, 3.9.5.2.13, 3.9.5.2.13.1, 3.9.5.2.13.2, 3.9.5.2.13.3, 3.9.5.2.13.4, 3.9.5.2.13.5, 3.9.7, 4.1, 4.3, 4.3.8, 4.3.9, 4.3.10, 4.3.11, 4.9, 4.9.1, 4.9.2, 4.9.3, 4.9.4, 4.9.5, 4.14, 5.2.1.19, 5.3.1.1, 7.3.1.1, 7.3.1.3, 7.5.1, 7.5.2.1, 7.5.4, 7.7.4, 8, 8.1, 8.2, 8.3, 8.4, 8.5, 8.5.1, 8.5.2, 9.2 |
| **Comment schema** | | **Chap 4** |
| 1. Loosened restrictions on module use | 2007-046AA | 4.6 |
| **Miscellaneous** | | **Chaps 1, 3, 4, 5, 6, 7, 8, 9** |
| 1. Clarified the use of "Not given" vs. "NOT GIVEN"<br>2. Repeated information regarding extended or qualified information name<br>3. Changed CSN presentation<br>4. Changed conflicting names so that schemas and specification coincide<br>5. Loosened drawing reference requirements, language consistency, and consistency for specific information code use in paragraphs | 2006-011GB<br>2006-23GB<br>2006-32SE<br>2006-036US<br>2006-051AA | 1.3, 1.5, 3.4, 3.9.1, 3.9.2.1, 3.9.2.2, 3.9.2.3, 3.9.5, 3.9.5.1, 3.9.5.2.1.2, 3.9.5.2.1.6, 3.9.5.2.1.9, 3.9.5.2.5, 3.9.5.2.7, 3.9.6.1, 4.3.3, 4.3.9, 4.3.11, 4.4, 4.5.1, 4.6, 4.9.1, 5.2.1.6, 5.2.2.2, 5.2.2.3, 5.3.1.1, 6.1, 6.2, 6.2.1, 6.2.2, 6.2.3.3, 6.3, 6.3.1, 6.4, 7.3.3, 7.5.1, 8.1, 8.2.1, 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, 8.2.7, 8.2.8, 8.3, 8.3.1.18, 8.4, 8.4.1, 8.4.2, 9.2 |
| 6. Changed foldout restrictions for paper | 2006-058US | **Note**<br>Both CPF 2007-048DE and CPF 2007-070US affected the majority of the specification |
| 7. Loosened restriction on the use of "End of data module" | 2006-061US | |
| 8. Increased flexibility for standard of measurement | 2006-073US | |
| 9. Added support for double-column presentation | 2006-074US | |
| 10. Loosened restrictions on minimum font size | 2006-080US | |
| 11. Loosened restrictions on page number presentation | 2006-082US | |
| 12. Modified ICN for human readability | 2007-017SE | |
| 13. Loosened restrictions on illustration heights | 2007-018SE | |
| 14. Changed wording from "self-standing" to "self-contained" | 2007-022SE | |
| 15. Included support for submarine zoning | 2007-031US | |
| 16. Loosened restrictions on LOAP | 2007-034DE | |
| 17. Inserted missing range narrative for attribute `installationLocationType` | 2007-035DE | |
| 18. Amended Yes/No dialog options | 2007-044US | |
| 19. Added support for business rule categories and layers | 2007-048DE | |

| Change(s) to | CPF(s) | Chapter(s) affected |
|---|---|---|
| 20. Defined paper sizes more accurately | 2007-049US | |
| 21. Corrected data module code example | 2007-052S1 | |
| 22. Corrected table explanation | 2007-053S1 | |
| 23. Included technical information repository data module in <dmRef> usage exceptions | 2007-063AA | |
| 24. Deleted maintenance plan definitions to loosen restrictions | 2007-064AA | |
| 25. Harmonized the use of "must" | 2007-070US | |
| 26. Modified CPF process | 2007-080S1 | |
| 27. Harmonized the term "multimedia" to permit generic use | 2007-081S1 | |
| 28. Corrected narrative references to multimedia | 2007-082S1 | |
| 29. Corrected several typographical errors | 2007-086US | |
| 30. Modified content to be more human-readable | 2007-087US | |
| 31. Harmonized the use of various terms | 2007-089US | |
| 32. Harmonized the use of the attribute issueType with the narrative | 2007-090S1 | |
| 33. Included a 37-character data module code example | 2007-103SE | |
| 34. Corrected referenced International Electrotechnical Commission (IEC) Publication | 2008-002AA | |

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The listed documents are included in Issue 4.0, dated 2008-08-01, of this publication.


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# Chapter 1

## *Introduction to the specification*

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# Chapter 1.1

## *Purpose*

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## 1 General

This chapter gives a basic overview of the S1000D purpose including the history of the development.

## 2 Purpose

S1000D is an international specification for the procurement and production of technical publications. While the title restricts its use to technical publications, it has been found through application that the principles of the specification can be applied to non-technical publications.

This specification was initially developed by the AeroSpace and Defence Industries Association of Europe (ASD). This issue has been jointly produced by ASD, the Aerospace Industries Association of America (AIA), and the Air Transport Assosiation of America (ATA) together with their customers. These form the S1000D Council and the S1000D Steering Committee to establish standards for documentation agreed by the participating parties.

From Issue 2, the scope has been extended to include land and sea specific applications. The specification can now also be used for the support of any type of equipment including both military and civil products. All items in this specification will be referred to as "the Product".

### 2.1 Background

The concept of this specification was originated in the aerospace field within ASD in early 1980s. At that time, most civil airline projects were being documented in accordance with the ATA 100 specification. Military projects in Europe were supported by documentation produced to various national military specifications, although some attempts of rationalization had been made in certain collaborative projects. Thus, by comparison, the situation for the support of civil aircraft was the more stable and manageable. The multiplicity of existing military procedures

and the continual introduction of new procedures were producing ever greater problems and increased costs for industry and its military customers, as both became more reliant upon the use of complex computer-based systems in the field of technical publication support activities.

This situation, added to the increasing number of collaborative projects and the necessity to recognize the developments in Integrated Logistics Support (ILS) and in information technology, prompted the Customer and Product Support Committee (CPSC) of ASD to establish a Documentation Working Group (DWG). This DWG consisted of European industry representatives tasked to report on current documentation practices and to recommend a unified method of documentation for air vehicle projects.

The DWG recognized that the only internationally accepted specification in the aerospace field, although not formal recognized as an international standard, was ATA 100. It was therefore decided to attempt to harmonize civil and military documentation using ATA 100 as a source document. Many national military specifications used by the participant nations have their roots in the United States (US) Mil Specs and these were therefore to be considered. The DWG invited the nations to provide military representatives who would participate in its activities and established a subsidiary, which was designated the Augmented Documentation Working Group (ADWG).

This group realized that their attempts to harmonize specifications and to establish commonality wherever possible had the following major advantages:

- cost saving on information generation - avoidance of duplications
- more economic support planning
- cheaper deliverable publications
- uniformity of standard for participants in the project
- standard format for data exchange to exploit future developments
- enhanced inter-operability
- improved opportunity for clarity - use of ASD Simplified Technical English (ASD-STE100)
- easier and cheaper translation also possible because of ASD-STE100

The ADWG established task groups which undertook studies of specific areas to enable the development of the CSDB proposals which are contained in this specification. The final task was the incorporation of these international CSDB proposals into this publications specification which has been agreed by the participating nations.

The ADWG was later renamed Technical Publication Specification Maintenance Group (TPSMG). Their duties have now been taken over by the S1000D Council and the S1000D Steering Committee, which have the full responsibility of maintaining the specification. The S1000D Council and the S1000D Steering Committee includes members from ministries and industry.

To take care of the rapid development of information technology a group of specialists, the Electronic Publications Working Group (EPWG) support the S1000D Steering Committee.

In 2003, a Memorandum of Understanding (MOU) was signed between ASD and AIA establishing the parameters for an agreement between the two organizations harmonizing US and European guidance related to technical publications data.

In 2004, the ASD signed an MOU with ADL. The two organizations are working together to harmonize the requirements of the SCO Reference Model (SCORM).

In 2005, a MOU was signed between ASD, AIA and ATA in order to promote common, interoperable, international technical publication data in the Aerospace and Defense industries and to work in concert on the joint development and maintenance of the S1000D.

In 2007, the MOU between ASD, AIA and ATA has been renewed to enable the three organizations to jointly further develop, maintain and promote the S1000D in the international arena.

# Chapter 1.2

## *Scope*

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## 1 General

This chapter gives a basic overview of the S1000D scope. Refer to Fig 1.

S1000D is designed for use in civil aviation, European defense, and the United States (US) military applications (when used in conjunction with applicable business rules, as required, within the hierarchy of these organizations).

## 2 Scope

S1000D covers the planning and management, production, exchange, distribution and use of technical documentation that support the life cycle of any civil or military project. Projects include air, land and sea vehicles or equipments (hereafter known as the Product).

The specification adopts International Standards Organization (ISO), Continuous Acquisition and Life-cycle Support (CALS) and World Wide Web Consortium (W3C) standards, in which information is generated in a neutral format. This means that it can be implemented on different and often disparate systems. Neutrality, added to the concept of modularization, makes the specification applicable to the wider international community.

Information produced in accordance with S1000D is created in a modular form, called a "data module". A data module is defined as "the smallest self-contained information unit within a technical publication".

A data module contains the following information:

- An identification and status section with all management information
- A content section

The data module can support the following types of content and constructs:

- Applicability cross-reference information
- Business rules information
- Conditional cross-reference information
- Container information
- Crew/operator information
- Descriptive information
- Fault information
- IPD information
- Maintenance checklists and inspections
- Maintenance planning information
- Procedural information
- Process information
- Products cross-reference information
- Technical repository information
- Training information
- Wiring data information
- Wiring data description information

All data modules applicable to the Product are gathered and managed in a database, which is hereafter referred to as the CSDB.

A benefit of the CSDB is to enable production of platform-independent output in either page-oriented or IETP.

Data managed in S1000D is not duplicated in the CSDB. Data modules enable data to be stored once and used for multiple outputs. A single change to an individual data module can update multiple outputs and multiple deliveries.

Other benefits of using S1000D are:

- It is based on international neutral standards.
- It reduces maintenance costs for technical information.
- It transforms data into configuration items.
- It allows subsets of information to be generated to meet specific user needs.
- It facilitates the transfer of information and electronic output between disparate systems.
- Many different output forms can be generated from the same base data thus ensuring safety of data and that every user regardless of output form is getting the same message.
- The S1000D data module concept can be applied to legacy data.
- It is non-proprietary and allows neutral delivery of data and management of data.
- The specification incorporates the planning and management, production, exchange, distribution and use of data in electronic form for different types of output (from page oriented to IETP) as shown in Fig 1.

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*Fig 1 S1000D scope*

More information on S1000D and ASD publications can be found at www.s1000d.org and www.asd-europe.org, respectively.

# Chapter 1.3

## *How to use the specification*

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| Chap 3 | Information generation |
| Chap 3.2 | Information generation - Data modules |
| Chap 3.3 | Information generation - Information sets |
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| Chap 4.7 | Information management - Version control of data modules |
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| Chap 4.9 | Information management - Publication and SCORM content package management |
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| Chap 4.13.2 | Optimizing and reuse - Technical information repository data module |
| Chap 4.14 | Information management - Applicability |
| Chap 5 | Information sets and publications |
| Chap 5.2 | Information sets and publications - Information sets |
| Chap 5.3 | Information sets and publications - Publications |
| Chap 6 | Information presentation/use |
| Chap 6.2 | Information presentation/use - Page-oriented publications |
| Chap 6.3 | Information presentation/use - Interactive electronic technical publications |
| Chap 6.4 | Information presentation/use - Functionality |
| Chap 7 | Information processing |
| Chap 8 | Standard numbering systems, information codes and learn codes |
| Chap 8.2 | SNS information and learn codes - Maintained SNS - General |

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| Chap 8.5 | SNS information and learn codes - Learn codes |
| Chap 9 | Terms and data dictionary |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |
| Chap 9.3 | Terms and data dictionary - Data dictionary |

# 1 General

This chapter gives an overview of:

- the content of the specification
- the basic production and delivery methods

and the fundamental reading rules.

# 2 Field of application

S1000D is an international specification, which is designed to cover technical publication and training activities in support of any platform, system or equipment project (air, sea, land vehicle, equipment or facilities, civil or military).

All aspects of technical publication from information generation, exchange and management within the CSDB to publication generation and the commenting process are described.

# 3 Basic definitions

| | |
|---|---|
| the Product | Any platform, system or equipment (air, sea, land vehicle, equipment or facility, civil or military) |
| project | The task to develop, maintain and dispose of the Product |

# 4 Self-contained vs repository-dependent data modules

There are two basic methods of production (authoring) and delivery (publishing) of data modules and publications:

- not using technical information repository data modules
- using technical information repository data modules, refer to Chap 4.13 and Chap 4.13.2

Not using technical information repository data modules is the "traditional way" to produce and deliver self-contained data modules.

The method of using technical information repository data modules supports optimizing and reuse of data during production. The delivery from production environment using repository data modules can be done in two ways:

- Self-contained data modules

  Data from the repository data modules are included (not linked) in the data modules to be delivered to the customer or end-user.

**Note**

Only a limited set of data from the repository data modules can be included in the data modules.

**Note**

The technical information repository data modules can still be delivered together with the self-contained data modules as the repository data modules include useful additional/detailed information which can not be accommodated in the data modules.

– Repository-dependent data modules

  Data from the repository data modules are not included in the data modules prior to delivery to the customer or end-user (or an IETP application). The customer, end-user of the IETP application, has to resolve any links before use or during use of the IETP viewer/browser.

The authoring rules differ between the two methods which are explained in the authoring chapters. Refer to Chap 3.9.5.2.1. When using technical information repository data modules certain information does not require authoring but would require referencing (linking) to the appropriate technical information repository. For example, the name of support equipment is not entered by the author, but referenced (linked) to a technical information repository data module.

# 5 Reading conventions

Throughout the S1000D specific conventions are used to aid common understanding and to minimize duplication. These conventions are:

| | |
|---|---|
| Available for projects | Information codes and attribute values that are available for projects or organizations to give their own specific definitions. |
| Not available for projects | SNS, information codes and attribute values that are not available for projects or organizations to give their own specific definitions. Projects or organizations can apply for formal definitions by the normal CPF process. |
| M | Mandatory<br>The affected markup element must be presented in the data module and the required entries in the construct must be populated. |
| O | Optional<br>The affected markup element and its associated population can be omitted if a project or organization wishes. |
| C | Conditional<br>The affected markup element is mandatory if its parent element is used. The parent element, or a parent element above that, is optional and can be omitted. |
| (D) | Default value<br>The affected markup value is the default value. |
| must | Mandatory to follow the given rules. |
| name | The name of a "thing" such as a part, a component, an assembly. Sometimes called description, nomenclature or designation. Name is used consistently throughout S1000D. |
| can, could | Options to be followed by project or organization decision |

# 6 Acronyms

Throughout the S1000D common acronyms are used to aid understanding and to minimize duplication. These acronyms are:

| | |
|---|---|
| 2D | Two Dimensional |
| 3D | Three Dimensional |
| ADL | Advanced Distributed Learning |
| ASD | European Aerospace and Defense Industries |
| ATA | Air Transport Association |
| BREX | Business Rules EXchange |
| CAGE | Commercial And Government Entity |
| CGM | Computer Graphics Metafile |
| CPF | Change Proposal Form |
| CSDB | Common Source DataBase |
| CSN | Catalog Sequence Number |
| ICN | Information control number |
| IETP | Interactive Electronic Technical Publication |
| IPD | Illustrated Parts Data |
| LMS | Learning Management System |
| LOAP | List of Applicable Publications |
| LOM | Learning Object Model |
| LSA | Logistic Support Analysis |
| PDF | Portable Document Format |
| PLCS | Product Life Cycle Support |
| QA | Quality Assurance |
| SCO | Shareable Content Object |
| SCORM | Sharable Content Object Reference Model |
| SNS | Standard Numbering System |
| XML | Extensible Markup Language |

A list of all acronyms is in Chap 9.2.

# 7 Organization of S1000D

S1000D is organized into nine chapters, which are described briefly below.

*Table 2 S1000D structure overview*

| Chapter | Title | Description |
|---|---|---|
| Chap 1 | Introduction to the specification | History and scope of the specification |
| Chap 2 | Documentation process | Overview of the documentation process and relation with other specifications |
| Chap 3 | Information generation | General rules which apply to technical publications that are produced on the basis of data modules and CSDB concepts |
| Chap 4 | Information management | Data module structure, rules for interchange and updating of data modules. Concepts for using BREX, process data modules, master - customized data modules, applicability and optimizing and reuse of information. |
| Chap 5 | Information sets and publications | Common and specific requirements for information sets and publications |
| Chap 6 | Information presentation/use | Information presentation and functionality for page oriented publications, and IETP |
| Chap 7 | Information processing | Information for the information systems specialists, including Schemas, graphic and notation specifications, resources, resolutions and interchange conventions |
| Chap 8 | SNS, information and learn codes | Description of the numbering systems and the information codes |
| Chap 9 | Terms and data dictionary | Glossary of terms and abbreviations and data dictionaries |

## 7.1 General breakdown of chapters

In general, all chapters are structured as follows:

- At the beginning of the chapter, there is a table of references that occur in the chapter.
- Para 1 gives a general introduction.
- Para 2 is the main body of the chapter. The main body can be split into several main content paragraphs.
- Para 3 gives the business rules decisions. If there are no business rules decision then the markup examples are given in Para 3.
- Para 4 gives the markup examples, if any. Short/simple examples can also be found in the main body paragraphs.

## 7.2 Chap 1 - Introduction to the specification

This chapter provides general information about the specification. The scope of the specification, how to use it, how to tailor it and the way to address change request are explained.

## 7.3 Chap 2 - Documentation process

Chapter 2 explains the generic documentation process. It provides an overview of the documentation process including the use of information technology and the relation to other

processes and specifications as for instance S2000M and PLCS. Through the process diagram, a reference to the corresponding chapters is also defined.

## 7.4 Chap 3 - Information generation

This chapter provides general rules which apply to technical publications that are produced on the basis of data modules and CSDB concepts. This chapter is primarily in support of authors and illustrators.

All data modules have a basic structure which is defined in Chap 3.2.

Information sets are used to establish the required scope of the information and data module coding strategy. The use of these information sets is fully defined in Chap 3.3.

The rules for zoning and access are given in Chap 3.4.

The issues surrounding the updating of data modules are explained in Chap 3.5.

The rules for the allocation for the protective marking of data modules that reflects their security classification, etc are detailed in Chap 3.6.

During the development and update of data modules/publications, QA procedures are required to ensure that the contents of the data modules/publications are adequate and technically accurate. Details of these procedures are given in Chap 3.7.

In order to reflect the potential breakdown of equipments, rules for disassembly are detailed in Chap 3.8.

All data modules are produced in accordance with structural rules. Authoring rules for text, illustrations and multimedia, together with front matter and warnings, cautions and notes, reinforces these structural rules which are supported by specific guidance for authoring data modules including the learning content types. These rules are given in Chap 3.9.

In all cases, the rules given in all chapters in this specification take precedence over the Schemas.

**Note**

The Schemas, in some constructs, allow more than is given in the narrative of the specification due to simplified Schema design and reduced maintenance.

## 7.5 Chap 4 - Information management

The data module code structure, rules for interchange and updating of data modules are presented. This chapter is provided in support of the project data module, illustration, publication and SCORM content package management.

Information management comprises the addressing, storage and handling of information objects such as data modules (Chap 4.2), illustrations and publications to enable the production and use of common technical documentation within a project.

This chapter contains the required information to establish an information database, called the CSDB (Chap 4.2), to interchange the data (Chap 4.8) and to handle publications and SCORM content packages derived from the CSDB (Chap 4.9).

It also gives details about the coding of data modules (Chap 4.3) and their associated illustrations and multimedia information (Chap 4.4). It describes data module lists (Chap 4.5) used for planning, management and control of CSDB content, and defines the handling of comments on data modules and publications (Chap 4.6). The means to enable version control (Chap 4.7) and interchange of data modules are also described in this chapter.

BREX (Chap 4.10) and use of the process data module is explained (Chap 4.11).

Managing multi-customer environment is described in the master-customized concept (Chap 4.12).

The chapter also includes the concept of optimizing and reuse of data (Chap 4.13). Optimizing and reuse includes handling of significant data within a data module and a mechanism to group properties related to different technical information types with the aim to reduce redundant information and to increase support consistency (the technical information repository data module concept). A production management mechanism to associate several data modules representing the same data with different product configuration (the container data module concept) is also described.

An applicability model is presented which can be used at many different levels, from simple to very complex. The model is capable of supporting from a static textual output to a dynamic output that is filtered for the actual configuration of the product instance. An overview and functional capabilities of the applicability model are explained (Chap 4.14).

## 7.6 Chap 5 - Information sets and publications

This chapter contains common and specific requirements for information sets and publications, necessary to operate and maintain the Product. This chapter is primarily provided for project publication procurement, management, authors and illustrators.

An information set is the required information needed in a defined scope and depth (author's view), in the form of data modules, managed in the CSDB.

A publication is the compilation and publishing of information for a customer (user's view). This can be an IETP, a paper publication compiled from data modules or a publication with legacy data. It can be a subset of or equal to an information set, but it can also be a superset of several information sets or parts of them.

The List of Applicable Publications (LOAP) lists the required publications for a customer project.

Requirements for information sets are given in Chap 5.2 and for publications in Chap 5.3.

## 7.7 Chap 6 - Information presentation/use

This chapter provides information presentation and use rules for page-oriented publications (Chap 6.2), and IETP (Chap 6.3). The functionality matrix for page oriented publications, both paper and screen based, together with the display of information in a non-linear fashion, are explained in Chap 6.4. This chapter is mainly provided in support of project publication procurement, management, authors, illustrators and information technology specialists.

## 7.8 Chap 7 - Information processing

This chapter describes the technical aspects of the Schemas, graphics and notations together with information interchange, resolution of resources and software requirements.

## 7.9 Chap 8 - SNS, information codes and learn codes

This chapter gives a description of a common SNS and the information codes used in the data module code.

The S1000D maintained set of SNSs is given in Chap 8.2 for air vehicles, engines and equipment, tactical missiles, support equipment general land and general sea Product.

Chap 8.3 refers to examples of SNS (eg power provision, artillery radar, software, medical and technical publication projects). These example SNS are given on the S1000D website (www.s1000d.org).

The detailed definitions of the information codes are given in Chap 8.4 and the learn codes are given in Chap 8.5.

## 7.10 Chap 9 - Terms and data dictionary

This chapter provides a glossary of terms, abbreviations and acronyms used within S1000D (Chap 9.2). The definitions for XML data elements are given in Chap 9.3.

# Chapter 1.4

## *How to tailor for a specific project*

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| Chap 2.5.1 | Business rules - Categories and layers |
| Chap 2.5.2 | Business rules - Generation and use |
| Chap 3 | Information generation |
| Chap 4 | Information management |
| Chap 7 | Information processing |

## 1 General

This chapter gives a basic introduction to business rules and where to find information to tailor S1000D for a specific project or organization.

## 2 Content

This specification has been produced to cater for many different types of products. Therefore, to make it suitable for a given project or organization, some aspects of tailoring will be required. It is recommended that the tailored version of this specification is referred to in the project's contractual documentation. This tailoring must not affect the XML Schemas or its basic philosophies but must be restricted to tailoring within the narrative specification.

Project business rules must be agreed between parties to document the details of the agreed tailoring of this specification. These rules must cover the requirements for optional elements, their population from specific data sources, and the use of specific values.

Chap 2.5 defines the term "business rules" and describes standardization of the business rules scope within S1000D. Chap 2.5.1 groups various business rules into categories and introduces the construct of business rules layers, which describes various organizational and project levels at which business rules are produced. Chap 2.5.2 addresses the mechanisms of business rules generation and use.

Chap 4 includes a description of the BREX mechanism provided to record and exchange specific business rules between parties involved in a project.

Chap 3 thru Chap 7 give guidance on the project specific business rules decisions.

# Chapter 1.5

## *Request for change*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

Proposals to amend S1000D must be submitted in the full knowledge that all users, both military and industrial, can be affected by changes to the specification, and will be accepted only under international agreement.

The maintenance of this specification is vested in the S1000D Steering Committee who will obtain agreement from the participating organizations prior to publication of changes. The S1000D Steering Committee considers change proposals at each meeting and may ratify them for incorporation in the specification. The S1000D Steering Committee also decides when changes will be published in S1000D.

Any queries or proposals relating to changes to the specification must be addressed to the S1000D Steering Committee using the online CPF facility which can be found at www.s1000d.org.

Proposals from the S1000D member nations and organizations must follow the process outlined below.

Copies of the specification can be obtained at www.s1000d.org.

# 2 Online change proposals

## 2.1 Convention

The online change proposal facility uses two conventions for CPF, which are explained in detail on the web site:

| | |
|---|---|
| Proposal | A CPF that is in draft |
| CPF | A CPF that is formally submitted to the S1000D Steering Committee |

## 2.2 Tiers

There are two tiers to the online CPF facility. These are explained in detail on the web site. The lower tier is used for drafting proposals and the upper tier is used for S1000D Steering Committee review of formal CPFs. The upper tier is available for public view, so that members can see what changes are being proposed.

## 2.3 Groups

Access to the lower tier is obtained by being a member of a group. Groups are made up by nation and organization and comprise their members. A CPF can only be submitted by these groups. It is possible to be a member of more than one group. See your national or organizational representative, which are listed on the web site, to become a member of a group.

## 2.4 Roles

Within each group, only the administrator role can promote a draft CPF to a formal status of "New" for the S1000D Steering Committee to review.

## 2.5 CPF cycle

### 2.5.1 Creation

There is a process that is explained in detail on the web site. This creates the proposal in the national or organizational lower tier.

### 2.5.2 Workflow

There are two types of workflow:

- Pre-submittal
- S1000D Steering Committee

#### 2.5.2.1 Pre-submittal workflow

The pre-submittal is where draft proposals are developed. Group administrators can set pre-submittal statuses to suit their own group's workflow.

#### 2.5.2.2 S1000D Steering Committee workflow

The S1000D Steering Committee workflow moves through the statuses that are defined on the website.

# Chapter 2

## *Documentation process*

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| Chap 2.2 | Documentation process - Use of standards | S1000D-A-02-02-0000-00A-040A-A |
| Chap 2.3 | Documentation process - Relations to other processes and standards | S1000D-A-02-03-0000-00A-040A-A |
| Chap 2.4 | Documentation process - Implementation guide | S1000D-A-02-04-0000-00A-040A-A |
| Chap 2.5 | Documentation process - Business rules | S1000D-A-02-05-0000-00A-040A-A |
| Chap 2.5.1 | Business rules - Categories and layers | S1000D-A-02-05-0100-00A-040A-A |
| Chap 2.5.2 | Business rules - Generation and use | S1000D-A-02-05-0200-00A-040A-A |

# Chapter 2.1

## *Documentation process - Overview*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
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| None | |

## 1 General

To assist with the S1000D process, a basic overview which shows where specific chapters are relevant is given.

## 2 Process

The basic process is shown in Fig 1. This is a basic representation that does not detail all the supplier/customer interfaces or CSDB status checking.

ICN-A-020100-A-U8025-00081-A-02-1

*Fig 1 Basic S1000D process*

# Chapter 2.2

## *Documentation process - Use of standards*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

Table 2 lists a description of the standards and specifications that are referenced in S1000D.

## 2 Referenced standards and specifications

*Table 2 Referenced standards and specifications*

| Number | Title | Issue/Version |
|---|---|---|
| Adobe TIFF 6.0 | Tagged Image File Format | Revision 6.0, June 1992 |
| S2000M | International specification for materiel management - Integrated data processing for military equipment | 4.0, 2005 |
| ASD-STE100™ | Simplified Technical English® (ASD-STE100) | Issue 4, Jan 2007 |
| CompuServe GIF 89a | Graphics Interchange Format | Version 89a, 1990 |
| IEC 60617 | Graphical symbols for diagrams | Ed. 1.0 b:2001 |
| ISO 1000 | ISO 1000:1992 SI units and recommendations for the use of their multiples and of certain other units | 1992<br>Amd 1:1998 |
| ISO 10303<br>AP 239 | STEP - Standard for Product data representation and exchange. Application Protocol (AP)239 - Product Life Cycle Support (PLCS) | Latest |

| Number | Title | Issue/Version |
|---|---|---|
| ISO/IEC 10918 | Information technology - Digital compression and coding of continuous-tone still images (JPEG) | 1994, 1995, 1997, 1999 |
| ISO/IEC 15948:2003 (E) | Information technology - Computer graphics and image processing - Portable Network Graphics (PNG): Functional specification | 2003 |
| ISO 31-0 | Quantities and units - Part 0: General principles | 1992/Amd.2:2005(E) |
| ISO 31 (parts 1 to 10, 12 and 13) | Quantities and units - Amendment 1 to parts 1 to 10, 12 and 13 of International Standard ISO 31:1992 | 1992/Amd.1:1998(E) |
| ISO 31-11 | Quantities and units - Part 11: Mathematical signs and symbols for use in the physical sciences and technology | 1992(E) |
| ISO 3166-1 | Codes for the representation of names of countries and their subdivisions - Part 1: Country codes | 1997 |
| ISO 6093 | Information processing - Representation of the numerical values in character strings for information interchange | 1985 |
| ISO 639-1 | Codes for the representation of names of languages - Part 1: Alpha-2 code | 2002 |
| ISO 8601 | Data elements and interchange formats - Information interchange - Representation of dates and times | 2000 |
| ISO/IEC 8632 | Information technology - Computer Graphics - Metafile for the storage and transfer of picture description information (CGM) | 1999 |
| MIL-PRF-28002C | Raster Graphics Representation in Binary Format, Requirements for: CCITT Gr 4 (Comité Consultatif International du Téléphonique et Télégraphique, Groupe 4)<br>**Note**<br>CCITT has changed its name to "International Telecommunications Union Telecommunication Standardization Sector", or "(ITU)-T" | 1997 |
| MSG-3 | Operator/Manufacturer Scheduled Maintenance Development | Revision 2007.1 |
| PDF Reference | Adobe Portable Document Format | Version 1.3 or later |
| REC-(PNG)-20031110 | W3C Recommendation: Portable Network Graphics (PNG) Specification (Second Edition) | 2003 (Second Edition) |
| REC-rdf-syntax-grammar-20040210 | W3C Recommendation: RDF/XML Syntax Specification (Revised) | 2004 |
| REC-webcgm20-20070130 | W3C Recommendation: WebCGM 2.0 | Version 2.0 |
| WebCGM20-errata | WebCGM 2.0 Recommendation Errata | 2007 |
| REC-xlink-20010627 | W3C Recommendation: XML Linking Language (XLink) | Version 1.0 |

| Number | Title | Issue/Version |
|---|---|---|
| REC-xml-20060816 | W3C Recommendation: Extensible Markup Language (XML) 1.0 (Fourth Edition) | 1.0 (Fourth Edition) |
| REC-xmlbase-20010627 | W3C Recommendation: XML Base | 2001 |
| REC-xml-names-20060816 | W3C Recommendation: Namespaces in XML 1.0 (Second Edition) | 2006 (Second Edition) |
| REC-xmlschema-1-20041028 | W3C Recommendation: XML Schema Part 1: Structures Second Edition | 2004 (Second Edition) |
| REC-xmlschema-2-20041028 | W3C Recommendation: XML Schema Part 2: Datatypes Second Edition | 2004 (Second Edition) |
| REC-xml-stylesheet-19990629 | W3C Recommendation: Associating Style Sheets with XML documents | Version 1.0 |
| REC-xpath20-20070123 | W3C Recommendation: XML Path Language (XPath) 2.0 | Version 2.0 |
| REC-xptr-element-20030325 | W3C Recommendation: XPointer element() Scheme | 2003 |
| REC-xptr-framework-20030325 | W3C Recommendation: XPointer Framework | 2003 |
| REC-xptr-xmlns-20030325 | W3C Recommendation: XPointer xmlns() Scheme | 2003 |
| REC-xsl11-20061205 | W3C Recommendation: Extensible Stylesheet Language (XSL) | Version 1.1 |
| REC-xslt20-20070123 | W3C Recommendation: XSL Transformations (XSLT) Version 2.0 | Version 2.0 |
| RFC-2483-January 1999 | IETF Recommendation: URI Resolution Services Necessary for Uniform Resource Name (URN) Resolution | 1999 |
| RFC-3986-January 2005 | IETF Recommendation: Uniform Resource Identifiers (URI) Generic Syntax | 2005 |
| RFC-3987-January 2005 | IETF Recommendation: Internationalized Resource Identifiers (IRIs) | 2005 |
| RFC-5013-August 2007 | IETF Recommendation: The Dublin Core Metadata Element Set | 2007 |
| STANAG Number 3430 | North Atlantic Treaty Organisation (NATO) Standardisation Agreement for Air vehicle cross-servicing guide | Edition 7 |

# Chapter 2.3

## *Documentation process - Relations to other processes and standards*

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| Chap 3.9.5.2.13 | Content section - Learning data module |
| Chap 5.3.1.3 | Common requirements - Illustrated parts data |
| ISO 10303 AP 239 - PLCS | STEP - Standard for Product data representation and exchange. Application Protocol AP239 – Product Life Cycle Support (PLCS) |
| S2000M | International specification S2000M for materiel management - Integrated data processing for military equipment |
| SCORM | SCORM 2004 3rd Edition Version 1.0 |

## 1 General

This chapter describes the relationship between the S1000D process and processes from other specifications and standards, eg S2000M, ISO 10303 AP 239 (PLCS).

## 2 S2000M

Both S1000D and S2000M use the same rules for model identification coding. They also both use the same illustration rules as defined in Chap 3.9.2.

There are two methods for producing IPD, historically known as the Illustrated Parts Catalog (IPC):

- the "traditional" method (ie compilation by authors from parts source data or generated/supported from project specific parts databases)
- the extraction from an S2000M database

These are described in detail in Chap 5.3.1.3.

# 3 ISO 10303 AP 239 - PLCS

A set of data exchange specifications to establish the relationship between S1000D and PLCS is under development.

Information about PLCS can be found at www.oasis-open.org.

# 4 SCORM

The relationship between S1000D and SCORM has been established so that training content can be developed using the data module concepts of S1000D. Specifically, a new data module type has been added to capture the five different learning information types (refer to Chap 3.9.5.2.13). Also, to provide the link to the SCORM LMS, connectivity is provided thru the LOM in the new SCORM content package module.

Information about SCORM can be found at www.adlnet.gov.

# Chapter 2.4

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| Chap No./Document No. | Title |
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| None | |

## 1 General

An implementation guide will offer guidance for S1000D implementation in its various facets.

The implementation guide will be included in a future issue of this specification.

# Chapter 2.5

## *Documentation process - Business rules*

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## 1 General

The goal of this chapter is to categorize various types of information contained in business rules specified by a project or an organization. This chapter also addresses the standardization of S1000D business rules generation and use within an S1000D project.

Chap 2.5.1 introduces and explains business rules categories and layers.

Chap 2.5.2 describes the methods for business rules generation and use.

## 2 Business rules

### 2.1 Definition

Business rules are decisions that are made by a project or an organization on how to implement S1000D. Business rules cover all aspects of S1000D and are not limited to authoring or illustrating. They can also address issues that are not defined in S1000D such as rules related to how S1000D interfaces with other standards, specifications and business processes that are related to its implementation.

### 2.2 Business rules decision points

Throughout the specification, in particular the authoring chapters, business rule decision points have, wherever possible, been identified. However, in many cases, they have been marked as "None identified". Projects and organizations must still decide for themselves whether certain business rules decisions must be made in these cases.

# Chapter 2.5.1

## *Business rules - Categories and layers*

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# 1 General

This chapter introduces the concepts of business rule categories and layers that exist in S1000D.

Grouping business rules into categories will help projects and organizations to differentiate between, and understand, the relevance of various business rules, as well as to be able to group them in certain classes. This classification is made to help standardize business rules scope.

S1000D recognizes that a number of decisions related to its implementation are made not only on a project level but often also on an organizational level (eg national Ministries or Departments of Defense (MoD or DoD), international consortia such as Civil Aviation Working Group (CAWG), etc). The structure and content of business rules between projects and various organizations can differ considerably.

In support of the business rule categories, a layered model of business rules is introduced.

Introduction of the layered model implies that business rules can be written not only for a project but also for an organization. Various layers of business rules can also be arranged in a certain hierarchy that is appropriate for the implementation. Each layer of this hierarchy represents one of the business rules decisions to be made by a project or an organization.

It is possible that business rules on different layers contain redundant and/or conflicting business rules. Additionally, the layered structure of business rules usually has a tree-like structure rather than a one-dimensional layered form. Any change in a higher level business

rule required by a lower level of the business rules hierarchy can be in conflict with the related business rules of the other layers. Para 5 of this chapter points out various conflicting aspects in business rules creation and provides guidance as well as recommendations to avoid these conflicts.

# 2 Business rule categories

A business rule category is a unique grouping that describes rules applicable to product definition, maintenance philosophy, concepts of operation, security, business processes, data creation, data exchange, data integrity, data output and/or legacy data conversion, management, handling and other issues.

Ten different business rule categories have been identified. These categories are defined to ensure that business rules developers consider all major business rules decisions within S1000D. Each sample business rule is assigned to one business rule category. Some business rules can belong to one or more categories. Apart from that, the business rule categories cannot be considered in isolation from each other. They relate to and complement each other (eg data exchange, data integrity and management business rule categories as shown in Para 2.8, as well as data creation and data output business rule categories as shown in Para 2.10). The business rule categories are identified in Fig 1.

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*Fig 1 Business rule categories*

The examples given after the definitions of each business rule category in Para 2.1 thru Para 2.10 are not exhaustive and are only intended to provide the reader with a guide how these categories of rules can be covered. The word "must" means in this example that a certain business rule must be followed only by this particular example project or organization.

## 2.1 Business rule category 1: General business rules

### 2.1.1 Definition

General business rules cover all decisions made by a project or an organization that are not covered by any of the specific business rule categories below. They serve as overall decisions for the implementation of S1000D.

These decisions include but are not limited to:

- decision on which issue of S1000D to be implemented
- identification of the parts of S1000D to be used and implemented in the project
- definition of terms used throughout the project, so there is a clear understanding of their meanings

### 2.1.2 Examples

- **Decision example on an organizational level:** The technical documentation of all new vehicles must be produced to S1000D Issue 2.1 and higher.
- **Decision example on a project level:** The whole technical documentation in this project must be realized on the basis of S1000D Issue 2.1. Exceptions/Additions: Authoring rules for wiring will be adopted from S1000D Issue 2.2. Layout rules will be implemented on the basis of S1000D Issue 2.3, …

## 2.2 Business rule category 2: Product definition business rules

### 2.2.1 Definition

Product definition business rules cover the data module coding strategy related to how the Product is broken down (eg physical or functional). Included is the definition of the model identification codes to be used in the Product and its subsystems. Supplier subsystems and identifications also need to be considered.

The project specific SNS is defined normally in conjunction with the product breakdown structures defined by engineering or design. The SNS specification is a set of information that is produced to detail these rules.

Applicability rules are also defined in this category.

To summarize, the product definition business rules include but are not limited to:

- model identification codes for the Product and its subsystems and components
- system difference code
- material item category code
- SNS specification (decision on which SNS scheme to be chosen or defined)
- disassembly code
- disassembly code variant
- applicability rules

### 2.2.2 Examples

- The rules for the data module coding strategy related to the product breakdown are defined in the project BREX data module.
- The permissible model identification codes for this project are "1B" for airframe, "E2" for engine.
- A list of SNS together with technical names and data module types is given in Data Module Code (DMC)-(XXXX).
- The rules for applicability are as follows:
  - The model of bicycle must be "Brook trekker" or "Mountain storm".
  - The version of bicycle must be "Mk1" or "Mk9"...
  - The serial number must be "001" thru "999".

## 2.3 Business rule category 3: Maintenance philosophy and concepts of operation business rules

### 2.3.1 Definition

Maintenance philosophy and concepts of operation business rules cover the types of information that a project or an organization requires. They include for example a list or detailed

specification[1] of chosen information sets, an information codes specification which details the information codes, and information names that describe the data module content.

A definition of the required item location codes is also included.

The maintenance philosophy and concepts of operation business rules are determined by the contract (eg is first, second and third maintenance level information to be delivered?)

Definition of these rules must be performed in conjunction with operation, maintainability, repair and other aspects of LSA.

The data module coding strategy for the definition of information codes, information code variants and item location codes is included in this category. This ensures that the information codes, information code variants and item location codes match with the product definitions for each level within the breakdown of the technical documentation decided upon within the general business rules category (BR category 1).

Training and skill levels are also defined or identified by this category.

To summarize, the maintenance philosophy and concepts of operation business rules include but are not limited to:

- list of relevant information sets given in Chap 5 or modified information sets
- detailed specifications of project specific information sets
- list or (detailed) specification of information codes and information names to be used in the project
- item location codes to be used
- specification of the depth of information to be delivered iaw the maintenance level
- matching the information codes and item location codes to the breakdown part of the data module code as defined within the product definition business rules (BR category 2)
- decision on how to apply information code variants
- training and skill levels

### 2.3.2 Examples

- A list of allowed information codes together with information names and data module types is given in…
- The mapping between the breakdown part of the data module code (model identification code, system difference code, SNS, disassembly code and disassembly code variant) and the information part (information code, item code variant and item location code) of the data module code as well as the data module types is given in…

## 2.4 Business rule category 4: Security business rules

### 2.4.1 Definition

Security business rules cover all security issues. They include security classifications, copyright markings, use or disclosure restrictions, destruction instructions and any other data restrictions.

There are also issues concerning data creation access. For example in multi-partner projects, the Product is broken down into areas of responsibility. It is possible that the organization of the multiple partners means that write access can be provided only to the design authority of a data module.

The rules concerning data access during production must be considered here (eg who is allowed to edit a data module or an illustration?). It is important that these rules are established first. These rules do not explain job roles, positions and accountability/responsibility but define which roles have what rights with respect to viewing, creating and modifying data.

[1] It is up to the project or the organization to decide where within this BR category the detailed information is maintained.

Special consideration must be given to national security restrictions.

The creation of security business rules is performed using the project security instructions.

To summarize, the security business rules include but are not limited to:

- security classifications and the definitions of their use
- copyright markings
- use of disclosure
- destruction instructions and suitable methods
- national security restrictions
- specific project security instructions (if available)
- other restrictions
- specification of access to various "classes" of data modules

### 2.4.2 Examples

- The values of the security classification attribute and their interpretation are listed in Table…
- (LP) Compressor data modules must always be North Atlantic Treaty Organization (NATO) Restricted…
- Inline security markings must not be used.
- Only (XXX) authors are allowed to edit / view data modules with responsible partner company (YYYYY) when they are located in the Peterborough office.
- Data modules marked NATO Restricted must not be exchanged with XXXX.

## 2.5 Business rule category 5: Business process business rules

### 2.5.1 Definition

Business process business rules cover how technical publications development is coordinated with other disciplines within an organization or within the project level at that organization or the project as a whole. For example, they describe the rules and relationships with LSA, S2000M compliant initial provisioning, engineering/design and training (eg SCORM conformance).

The rules for QA must be considered as well as the interaction between the organization, its partners and suppliers.

When there is a requirement to produce training content using S1000D, rules must be established that satisfy both the content development needs of instructional designers (on the learning side) and the authors (on the maintenance and operation side) who support a common system.

In addition, business rules and processes must be established to ensure that instructional designers and technical writers collaborate to preplan for reusable content.

These rules also take into account the data module coding strategy to achieve:

- the optimal reusable data granularity for screen presentation in learning products and the system maintenance philosophy for presentation in IETP
- the development of maintenance, operational and learning content for use in interactive multimedia and simulations
- the process of developing the appropriate amount of data modules that meet the intended need of a SCO in SCORM
- the relationship between data module/publication module codes and the requirements for learning content registration

To summarize, the business process business rules include but are not limited to:

- input and output definition of other disciplines into technical publications
- order of project hierarchy for deliverables and input from subcontractors

- agreed workflow procedures between Original Equipment Manufacturer(OEM), subcontractor and customer
- approved integration methods with external systems (eg logistic databases)
- verification rules with respect to interaction between the organization, its partners and suppliers related to QA
- preplanning, reusability and interoperability rules

**2.5.2 Examples**

- When mapping LSA task codes to data module codes, the following rules apply…
- Graphics extracted from the Computer Aided Design System (CADS) must use these parameters for use in publications...
- When a data module is ready for exchange, it must receive a verification certificate from engineering. After this is received, mark the data module as first verified...
- When the customer supplies a verification certificate, increment the issue number of the data module with issue type "status" and set QA to second verified.
- The data module is ready for QA at this specific point and these are the steps to be followed for verification.
- Initial provisioning data must be coded in conformance with S2000M version…
- The values of the following elements and attributes in the IPD Schema must be imported from S2000M version X.X, Chapter 1 Initial Provisioning.
- Training data modules must use only the following learn codes…

## 2.6 Business rule category 6: Data creation business rules

Data creation business rules give information about the creation of text, illustrations and multimedia objects.

The data creation business rules include:

- rules for creating textual data
- rules for creating graphics, 3D content and multimedia objects

### 2.6.1 Business rule category 6a: Data creation business rules - Text

2.6.1.1 Definition

Text creation business rules consist of rules and guidelines (including terminology rules such as language and dictionaries, and the order of preference) for maximizing the amount of reuse that can be achieved within technical publications, and between technical publications and supporting training content.

Text creation business rules provide rules and guidance how the technical and learning content is to be developed. They also specify eg the use of dictionaries, how numbers must be expressed, how the author must refer to technical terms, how multimedia, maintenance, operational and learning content is to support IETP and training, and the establishment and use of a terminology database.

Markup business rules provide information about which markup elements and attributes must be used and populated. These rules are often project or organization specific.

To summarize, the data creation business rules for text include but are not limited to:

- writing rules (including terminology rules, use of dictionaries, rules for numbers, etc)
- markup rules
- requirements for text incorporation in multimedia objects

2.6.1.2 Examples

- The Simplified Technical English (STE) dictionary, ASD-STE100, must be used.
- The list of technical terms is given in…
- All fault data modules must have their fault codes listed in the fault code index.

- Data module titles must be in title case.
- Names used in the list of support equipment, list of spares and list of supplies must be the full name as specified in the S2000M database. When referring to these tools, spares or supplies in the procedure, use the corresponding name.
- The applicability block markup requirements are…
- The element `<techStandard>` must not be used.

### 2.6.2 Business rule category 6b: Data creation business rules - Illustrations and multimedia

2.6.2.1 Definition

Illustration and multimedia creation business rules cover the creation of illustrations and multimedia objects. They are divided into style, detail and data format.

Data style rules for illustrations and multimedia objects govern characteristics such as illustration sizes, use of color, line weights, fonts, projection methods (isometric or trimetric), etc.

The rules for illustrations cover for example the use of hotspots.

Data format rules cover the formats in which the information must be stored. For a CGM illustration, this will cover the elements that are permitted (eg coordinate types, polylines, restricted text). For raster images it can include the resolution and orientation. It is often difficult to separate style from format.

To summarize, the data creation business rules for illustrations and multimedia objects include but are not limited to:

- graphic style rules
- interactivity detail rules
- multimedia format rules
- linking rules

2.6.2.2 Examples

- The rules for 2D are…
- The rules for 3D are…
- Trimetric projection must be used for…
- Photographs are permitted for...
- Joint Photographic Experts Group (JPEG) format must be used for…
- The image size must be…
- Raster image resolution must be a minimum of 300dpi…
- Simulations will be produced in Flash™…

## 2.7 Business rule category 7: Data exchange business rules

### 2.7.1 Definition

The rules for how data must be exchanged between partners and customers are covered in business rule category 7. This includes for example the use of data dispatch notes and how data module requirement lists as well as CSDB status lists are used. The rules in this category include how the S1000D file based transfer protocol is used, the frequency of data exchanges, if unverified data are exchanged, the rules for data module and graphic issue numbers, and the acceptance and rejection criteria.

To summarize, the data exchange business rules include but are not limited to:

- rules for use of data dispatch notes
- rules for the use of data module requirements lists
- rules for CSDB status lists
- rules for the usage of the file based transfer protocol
- agreement on the frequency of data exchanges
- rules for data module issue numbers

- rules for information objects coded with an ICN
- agreed criteria for acceptance and rejection

### 2.7.2 Examples

- Data must be exchanged using the S1000D file based transfer method.
- Comments and data module lists must be exchanged in separate packages.
- The data dispatch note must conform to the following business rules…
- Data module deliveries will occur once per calendar month.
- Following each exchange, a CSDB status list must be produced and verified before any further exchanges can occur. The business rules for CSDB status lists are...
- The exchange of unverified information is not allowed.

## 2.8 Business rule category 8: Data integrity and management business rules

### 2.8.1 Definition

Data integrity and management business rules enforce the referential integrity within the CSDB. Closely coupled with the data exchange business rules (refer to Para 2.7), they cover how data is managed by both the creator and the customer.

If necessary, this category can include rules defining processes for submission and acceptance of non-compliant data when suppliers are unable to produce S1000D compliant data.

The workflow business rules (both internal and external) and the rules for QA are also covered in this category. These are also connected to the data exchange business rules.

To summarize, the data integrity and management business rules include but are not limited to:

- workflow business rules (both internal and external)
- QA business rules

### 2.8.2 Examples

- Gaps in data module issue numbers are not allowed.
- No data modules will be accepted unless all referenced illustrations are contained in the exchange package.
- All data modules and graphics must pass the business rules criteria before they can be accepted.

## 2.9 Business rule category 9: Legacy data conversion, management and handling business rules

### 2.9.1 Definition

Legacy data conversion, management and handling business rules are quite separate from the other categories outlined above and can be considered (to some extent) as being outside of the scope of S1000D. They cover rules for converting data from say, an ATA iSpec 2200 project, to data modules and will vary from project to project depending on the format of the source data (word processor, paper, Standard Generalized Markup Language (SGML)), and how the target data modules must be treated.

To summarize, the legacy data conversion business rules include but are not limited to:

- conversion rules (including mapping between elements and attributes of source and target specifications)
- rules for inclusion of legacy information in a technical publication

### 2.9.2 Examples

- Maintenance handbooks will be converted into data modules using the descriptive and procedural schemas.
- The following ICN codes apply to the operator’s handbook No. (XXXXX)…

## 2.10 Business rule category 10: Data output business rules

### 2.10.1 Definition

Data output business rules specify the output formats for S1000D data. These formats can include page-oriented (eg paper) formats, IETP formats, multimedia formats and SCORM formats. The decision regarding which portion of the data will be published in what formats must be agreed and written within these business rules.

These rules include details on how to style element and attribute content. The data creation business rules (especially for text, business rule category 6a) are strongly related to this business rule category. For example, the authors need to know to which elements there is generated text in order to avoid authoring redundancies and inconsistencies after publication generation.

Where required, a project functionality matrix is created according to the recommendations given by the S1000D functionality matrix (refer to Chap 6.4). Decisions made in completing a project functionality matrix will have direct impact on data output rules.

To summarize, data output business rules include but are not limited to:

- decisions regarding which portion must be in paper (or page-oriented) and which in IETP
- presentation rules for paper (or page-oriented) and IETP output
- decisions regarding which data modules will be output in SCORM format
- decisions regarding which data modules will be output in simulations
- look and feel business rules

### 2.10.2 Examples

- The S1000D standard page-oriented layout in Chap 6.2 must be used for page-oriented presentations.
- For hardcopies printed from the IETP, the following time expiry message must be printed on the top of each page: XXXXXXX as shown in YYYYY.
- All learning data modules will be output in SCORM format.
- Maintenance data will be incorporated into system simulations.
- Warnings must be according to the symbolic warning type described in Chap 6.2.2.
- Random list item elements that have prefix pfxxx must have a 26pt bullet character (•) printed before the item or the first bullet of the item.
- The page size for printed output is A4 and A3 for foldouts.

# 3 Sequence of business rules generation

An exact timeline for project business rules production can be defined only by a project or an organization (by the latter often only to some extent). This specification can only give an example for the sequence of business rules elaboration. Fig 2 presents such an example.

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*Fig 2 Example sequence of business rules production relative to the business rule categories*

Fig 2 illustrates the example sequence of the business rules generation process in relation to business rule categories. It neither implies when business rules are generated nor does it indicate when authoring of technical data begins. These issues will be discussed in more detail in the implementation guide (refer to Chap 2.4).

At this point, it is important to emphasize that it is up to the project or the organization to decide when to produce a certain category of business rules. In general, the following recommendation applies:

– the more thorough the business rule planning before contracting and content development, the more successful the implementation

In practice, various experiences have been gathered:

– thorough contracts that include required project business rule decisions on model identification codes, on SNS structures
– brief contracts for technical documentation claiming only S1000D conformance and leaving many decisions up to a later stage in the project (eg authoring)

The success of both depends on the communication and agreement practices between the project partners.

It is also important to stress the dynamic life of business rules. They must be reviewed on a regular basis throughout the lifecycle of a Product and must be updated accordingly.

Another important issue is that some business rules and parts of them can only be written after the acquisition process is completed. This is not only limited to acquisition but also changes throughout the lifecycle.

# 4 Business rules layers

## 4.1 Definition

A business rules layer indicates the level of stakeholders within the hierarchy to which the business rules apply.

## 4.2 Business rules layered model

The layering of business rules can be shown as a layered model with each layer ‘inheriting’, ‘extending’ and ‘profiling’ the upper layer. Fig 3 shows a general view of the layered model. Layers two to N vary in accordance with the organization and/or project structure. The core of the uppermost layer of the model is always represented by S1000D itself. Progressing through the "lower" layers, the number of business rules grows and the number of decision points remaining decreases. The reason for this is that an organization and/or a project inherits all business rules from the upper layer and decides which of the remaining decision points are relevant at their level. The goal is to have all decisions made prior to reaching the author's level and at the very least to keep any decisions at the author's level to a minimum.

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*Fig 3 The layered business rules model*

The project or the organization can add or define their own decision points at their layer.

Every available decision point must be considered at each layer.

Fig 4 and Fig 5 show examples of the layered business rules model for a defense and a civil aviation project, respectively.

In the example of Fig 4 the organization (department) level is below national defense business rules (eg business rules of Air Force, Army and Navy organizations or departments). The "lowest" layer (in this example the authors’ business rules) must only contain minimum open decision points.

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*Fig 4 Example of a six-layered defense business rules model*

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*Fig 5 Example of a three-layered civil business rules model*

The civil aviation business rule layer is used to define a comprehensive set of business rules that will remain consistent across all civil aviation industry applications. The project layer is used to define project specific business rules not previously covered.

Layering is only one dimension of the business rules "cascading" structure. An alternative representation of business rules is a tree-like structure. Fig 6 presents an example of such a tree-like business rules structure. Along the "vertical" axis in this figure, the layering as shown above can be easily recognized. Across the figure, "branches" representing various "parallel" departments/organizations (in Fig 6: Army, Navy and Air Force) with their own projects situated at the same level with their "counterparts" but having different "commitments", can be clearly seen. All of them inherit business rules of the upper level and make their own independent decisions on the remaining decision points. Although these business rules seem to be perfectly

independent from each other at a first glance, a change of national MoD/DoD rules, for example raised by one of the departments, will require review and agreement by the other departments.

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*Fig 6 Example of a defense tree-like business rules model*

# 5 Resolving conflicting business rules

As described above in Para 4, the business rules in the lower ("children") layers must adopt or must be conformant to the business rules of the higher (their "parent") layer. This can for example cause a problem when the same technical data are delivered to more than one customer. In some cases, due to conflicting business rules, data modules must be rewritten, filtered or processed to make the data module variants conform to the rules demanded by each customer (refer to Chap 4.12).

Consider the national defense layer shown in Fig 4. For a multi-national project, it is most likely that the business rules demanded by each nation are different to various other nations' DoDs/MoDs. In other words, there is again a "tree"-like business rules structure with "branches" situated at the same layer but having separate business rules definitions for this particular layer. This kind of situation can demand a potential rewrite of information. The amount of the information to be rewritten can be considerable. In order to avoid or diminish this effect, common areas between national business rules are recommended to be considered and harmonized/brought into consensus for a given project before any authoring commences.

Similar problems can occur in the project layers when the same Product is used in different projects (refer to Fig 7 for an example). Consider an engine that is used in different airframes where one airframe manufacturer imposes different rules than another. Another example is when a given Product is used for both civil and military use, which can mean data rewrites. A consensus/harmonization to minimize data rewrites for a given project is vital.

Before any authoring or implementation of S1000D begins on a project, all stakeholders who have their own business rules must reach consensus on the business rules to be deployed for that project.

This has adverse affects on costs and data redundancy. Business rule developers must keep this in mind. Lower layers (if available) must be taken in consideration while producing business rules at a given layer. If possible, participants from all layers must be involved in the production of the business rules. Developers of business rules must carefully consider the impact on reuse between projects and the potential for multiple customers and users of project data.

As a minimum requirement, the higher layers are responsible for informing the lower layers on their business rules. For example, organizations must provide information to projects, which organizational business rules must be followed and which decision points are up to the projects.

When projects are presented with conflicting business rules from multiple customers or parent organizations, projects must resolve these conflicts. These conflicts must be resolved by:

- coordinating a change or waiver to the conflicting rules with one or more of the customers or parent organizations
- producing data modules to comply with each set of rules

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*Fig 7 Example of business rules conflicts*

# Chapter 2.5.2

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## 1 General

This chapter will give definitions for methods of business rules generation and use.

The S1000D business rules generation and use concept will be included in a future issue of this specification.

# Chapter 3

## *Information generation*

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# Chapter 3.1

## *Information generation - Introduction*

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| Chap 3.6 | Information generation - Security and data restrictions |
| Chap 3.7 | Information generation - Quality assurance |
| Chap 3.8 | Information generation - Disassembly principles |
| Chap 3.9 | Information generation - Authoring |
| Chap 4.2 | Information management - Common source database |
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## 1 General

This chapter provides an introduction to the chapters that describe how information is generated in an S1000D project.

## 2 Content

Information required to support the Product must be produced, as discrete pieces of information called data modules, and stored in a CSDB as described in Chap 4.2.

This chapter provides general rules, which apply to technical information produced in that manner.

All data modules have a basic structure which is fully defined in Chap 3.2.

Information sets are used to establish the required scope of the information and data module coding strategy. The use of information sets is fully defined in Chap 3.3. Depth of information is defined as a combination of the breakdown (as represented by the SNS and disassembly code and described in Chap 4.3.3 and Chap 4.3.4) and the requirements of the Product maintenance policy.

For the purposes of dividing the Product into zones for maintenance and detailing access, the rules are given in Chap 3.4.

The issues surrounding the updating of data modules are explained in Chap 3.5.

The rules for the allocation for the protective marking of data modules that reflects their security classification, etc are detailed in Chap 3.6.

During the development and update of data modules/publications, QA procedures are required to ensure that the contents of the data modules are adequate and technically accurate. Details of these procedures are given in Chap 3.7.

Data modules must reflect the breakdown of the Product. The initial breakdown is described by the SNS. Further disassembly is then as detailed in Chap 3.8.

All data modules are produced in accordance with structural rules. These are reinforced by writing and illustration rules, together with front matter and warnings, cautions and notes. The rules are supported by specific guidance for authoring data modules. These rules are given in Chap 3.9.

# Chapter 3.2

## *Information generation - Data modules*

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| Chap 3.9.5.2.1 | Content section - Common constructs |
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| Chap 3.9.5.3 | Data modules - Applicability |

## 1 General

This chapter explains the general structure of a data module. There are a number of data module types, which are appropriate for use in the production of all technical information required in operation and maintenance of the Product.

## 2 Basic structure

All data modules have a basic structure, which is comprised of two sections:

- identification and status section, which is defined in Chap 3.9.5.1
- content section, which is defined in Chap 3.9.5.2

## 2.1 Identification and status section

The identification and status section is the first part of a data module.

It contains identification data (eg data module code, title, issue number, issue date, language) and status data (eg security classification, responsible partner company and originator, applicability, technical standard, QA status, skill, reason for update). Specific details are given in Chap 3.9.5.1.

The identification and status section provides data that can be used for:

- management of the data module within the CSDB
- management of the use of applicability
- management of the quality control process
- management and control of retrieval functions
- automatic compilation of sets or subsets of information
- general information for users accessing the CSDB

### 2.1.1 Applicability

The overall applicability for an entire data module is captured in the identification and status section and is explained in Chap 3.9.5.3.

### 2.1.2 Security classification

The general rules for security classifications are explained in Chap 3.6. The detailed application of security classifications for an entire data module is captured in the identification and status section and is explained in Chap 3.9.5.1.

### 2.1.3 Quality assurance

The process for QA is explained in Chap 3.7.

### 2.1.4 Reason for update

The reason for update of a data module can be captured in the identification and status section. The reason for update is a summary of the changes, and/or reasons for change, made within the data module and is explained in Chap 3.9.5.1.

## 2.2 Content section

The content section is the second part of a data module. It contains the text and illustrations that is presented to the user. The different types of the content section and their use are described in Chap 3.9.5.2.

### 2.2.1 Applicability

The inline applicability can be allocated to defined elements within the content section and is explained in Chap 3.9.5.3.

### 2.2.2 Security classification

The inline security classification can be allocated to defined elements within the content section and is explained in Chap 3.9.5.2.1.

### 2.2.3 Reason for change

Within the content section, changes can be identified and this can include the reason for change. Details of how to apply change is explained in Chap 3.9.5.2.1.1.

# Chapter 3.3

## *Information generation - Information sets*

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| Chap 5.2.2 | Information sets - Air specific information sets |
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# 1 General

The complete production process involves agreeing the purpose, scope and depth of the technical information, establishing the business rules for data module coding, generating a data module requirements list, producing and publishing the data modules. Information sets are provided to assist the generation part of the process.

# 2 Information sets

These define the purpose, scope and depth of the technical information that is to be produced for operation and maintenance of the Product and subsequently establishing the basic data module requirement list. The content of information sets is described in Chap 5.2. They can also be used for the definition of the publications that are generated as the final deliverable, as described in Chap 5.3.

## 2.1 Common information sets

A number of information sets are considered to be appropriate for use on the Product. These information sets are shown in Table 2 and explained in Chap 5.2.1.

*Table 2 Common information sets*

| Information set | Chapter |
|---|---|
| Crew/Operator information | Chap 5.2.1.1 |

| Information set | Chapter |
|---|---|
| Description and operation | Chap 5.2.1.2 |
| Maintenance procedures | Chap 5.2.1.3.1 |
| Fault isolation | Chap 5.2.1.3.2 |
| Non-destructive testing | Chap 5.2.1.3.3 |
| Corrosion control | Chap 5.2.1.3.4 |
| Storage | Chap 5.2.1.3.5 |
| Wiring data | Chap 5.2.1.4 |
| Illustrated parts data | Chap 5.2.1.5 |
| Maintenance planning information | Chap 5.2.1.6 |
| Mass and balance information | Chap 5.2.1.7 |
| Recovery information | Chap 5.2.1.8 |
| Equipment information | Chap 5.2.1.9 |
| Weapon loading information | Chap 5.2.1.10 |
| Cargo loading information | Chap 5.2.1.11 |
| Stores loading information | Chap 5.2.1.12 |
| Role change information | Chap 5.2.1.13 |
| Battle damage assessment and repair information | Chap 5.2.1.14 |
| Illustrated tool and support equipment information | Chap 5.2.1.15 |
| Service bulletins | Chap 5.2.1.16 |
| Material data | Chap 5.2.1.17 |
| Common information and data | Chap 5.2.1.18 |
| Training | Chap 5.2.1.19 |
| List of applicable publications | Chap 5.2.1.20 |
| Maintenance checklists and inspections | Chap 5.2.1.21 |

## 2.2 Information sets for air systems

The additional specific information sets for air systems are given in Chap 5.2.2.

## 2.3 Information sets for land and sea systems

Since the range of the Product within land/sea systems is so varied, it is impracticable to define one suite of information sets that is appropriate to all land/sea systems. Therefore, for land/sea systems, the project or the organization must define the information sets that are appropriate to their projects. However, to assist with this, a suite of information sets has been provided which can be used. In either case, the project specific information sets must be agreed between the customer and the contractor.

The concepts for the additional information sets for land/sea systems are given in Chap 5.2.3.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Definitions of information sets**. The project or the organization must decide on which information sets are used and the definition of their content. Refer to Para 2 and Chap 5.2.

**Agreement on project specific information sets**. The project or the organization must agree with the customer on the project specific information sets. Refer to Para 2.

# Chapter 3.4

## *Information generation - Zoning and access*

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# 1 General

To help in locating the Product equipments, assemblies, access doors and panels, ports, etc within data modules and identifying locations for maintenance planning, the Product is divided into areas and sub-areas known as zones.

It can be noted that when zoning and access information is a requirement for data modules, the principles and requirements as provided in this chapter must be used by the Product contractor's design authorities in the design stage of the project.

Zoning and access identification systems can vary between types of the Product, due to different manufacturing build systems.

# 2 Zoning requirements

The zoning identification system must be simple, logical in arrangement and suitable for inclusion in data processing systems.

A zone is identified by a standard number consisting of three digits. The first digit is used to indicate the major structural area of the Product. The second digit indicates zones and on which side of the center line (if any) the zone is located. Odd digits apply to left side facing forward, even digits to right side. Zones which are situated over the center line can be allocated numbers which are odd or even. The third digit is used to indicate sub-zones.

Fuselages/hull zones must be allocated longitudinally from forward to aft. Vertical allocation is for the Product with a floor as separation between upper and lower compartments upwards or downwards from that floor and for other types of the Product from the top to the bottom.

Major structural components such as entrance doors, cargo doors, landing gear, landing gear doors, control surfaces, etc must have individual zone numbers.

Wherever possible, the boundaries of zones can be related to actual physical boundaries of compartments or components such as wing spars, ribs, fuselage/hull frames, turrets, bulkheads or longerons, areas of skin or control surface edges. Internal boundaries based on structural components are generally more valuable.

Compatibility must be maintained between all versions of the Product wherever possible. Major changes in construction will necessitate the allocation of new zone numbers specific to the version.

Zone charts and diagrams must clearly indicate zone boundaries and their station numbers. A physical description of the zone boundaries must be provided.

Zoning allocation in the fuselage/hull must not divide major compartments, which are separately zoned.

Zone boundaries must embrace related structures such as door frames. A door frame for a specific door must not be divided between zones.

Doors such as cabin doors, cargo doors and main landing gear doors are themselves zones.

## 2.1 Zoning of air systems

### 2.1.1 Air-specific zoning requirements

Wing zones must be allocated from the root to the tip and from the forward to aft. This method of allocation is also to apply to horizontal and vertical stabilizers and to all auxiliary stabilizers and strakes.

Wing leading and trailing edges, wheel wells, fuel tanks, accessory (mission equipment) compartments, the flight compartment/cockpit, toilets, galleys and other possible areas of congestion during maintenance must be suitably zoned to define the work area.

Areas between aerodynamic components and the fuselage, enclosed by fillets, must be considered fuselage zones.

When the air vehicle design incorporates a center wing, which is located within, or is integral with, the fuselage, the center wing must be considered a fuselage zone.

### 2.1.2 Zone identification

As already indicated, within the requirements of zoning, different zone identification systems can be applied. The following examples of zoning systems are typical for a transport air vehicle (Method A), for a fighter air vehicle (Method B), and for a helicopter (Method C).

#### 2.1.2.1 Method A

Method A is shown in Fig 1. The major areas must be identified as shown in Table 2.

*Table 2 Major areas (zones) - Method A*

| Major area (zone) (Standard number grouping) | Area |
|---|---|
| 100 | Lower half of fuselage, below the main cabin deck rearward to the aft pressure bulkhead |
| 200 | Upper half of fuselage, above the main cabin deck rearwards to the aft pressure bulkhead |
| 300 | Empennage |
| 400 | Power plants and engine pylons |
| 500 | Left wing |
| 600 | Right wing |
| 700 | Landing gear and associated doors |
| 800 | Doors (load carrying, pressure barrier or latching) |
| 900 | Reserved for major differences in models, versions or series of the same air vehicle type not covered by the standard number groupings |

Zones in major areas (eg 200, 300) must be subdivided into zones using the second element digit of the standard number grouping. As an example, Zone 300 can be subdivided as shown in Table 3.

*Table 3 Major sub-zones*

| Major zone | Major sub-zone | Area |
|---|---|---|
| 300 | | Empennage |
| | 310 | - Fuselage aft of the pressure bulkhead |
| | 320 | - Right vertical stabilizer and rudder |
| | 330 | - Left vertical stabilizer and rudder |
| | 340 | - Right horizontal stabilizer and elevator |

| Major zone | Major sub-zone | Area |
|---|---|---|
| | 350 | - Left horizontal stabilizer and elevator |

The major sub-zones must be subdivided into zones using the third element digit. A possible subdivision of a major sub-zone is given in Table 4.

*Table 4 Zone No.*

| Major sub-zone | Zone No. | Area |
|---|---|---|
| 320 | | Right vertical stabilizer and rudder |
| | 321 | - Right vertical stabilizer leading edge |
| | 322 | - Right vertical stabilizer auxiliary spar to front spar |
| | 323 | - Right vertical stabilizer front spar to rear spar |
| | 324 | - Lower rudder |
| | 326 | - Upper rudder |
| | 327 | - Right vertical stabilizer tip |

Major zone 100 fuselage under floor
Major zone 200 fuselage above floor
Major zone 300 empennage
Major zone 400 power plants and pylons
Major zone 500 left wing
Major zone 600 right wing
Major zone 700 landing gear and landing gear doors
Major zone 800 doors (passenger/crew, baggage and emergency)

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*Fig 1 Example of zoning a transport air vehicle (Method A)*

2.1.2.2 Method B

Method B is shown in Fig 2. The major areas must be identified as follows:

*Table 5 Major areas (zones) - Method B*

| Major area (zone) (Standard number grouping) | Area |
|---|---|
| 100 | Front fuselage |
| 200 | Center fuselage |
| 300 | Rear fuselage |
| 400 | Wings |
| 500 | Tail (empennage) unit |
| 600 | Pylons/Stubwings |
| 700 | Canards/Strakes |
| 800 | Doors (load carrying, pressure barrier or latching) |
| 900 | Reserved for major differences in models, versions or series of the same air vehicle type not covered by the standard number groupings |

Zones in major areas (eg 200, 300) must be subdivided into zones using the second element digit of the standard number grouping. As an example, Zone 100 can be subdivided as follows:

*Table 6 Major sub-zones*

| Major zone | Major sub-zone | Area |
|---|---|---|
| 100 | | Front fuselage |
| | 110 | - Radar bay |
| | 120 | - Forward equipment and IFR probe compartment |
| | 130 | - Front cockpit |
| | 140 | - Rear cockpit |
| | 150 | - Nose wheel compartment |
| | 160 | - Ventral bay |
| | 170 | - Left hand side compartment |
| | 180 | - Right hand side compartment |
| | 190 | - Rear compartment and tank |

The major sub-zones must be subdivided into zones using the third element digit. A possible subdivision of a major sub-zone is given below:

*Table 7 Zone No.*

| Major sub-zone | Zone No. | Area |
|---|---|---|
| 120 | | Forward equipment and IFR probe compartment |
| | 121 | - Electronic rack 1 |
| | 122 | - Electronic rack 2 |
| | 123 | - Electronic rack 4 |

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*Fig 2 Example of zoning a fighter air vehicle (Method B)*

2.1.2.3 Method C

Method C is shown in Fig 3. The major areas must be identified as follows:

*Table 8 Major areas (zones) - Method C*

| Major area (zone) (Standard number grouping) | Area |
|---|---|
| 100 | Fuselage |
| 200 | Cockpit |
| 300 | Aft section |
| 400 | Power plants, transmissions and rotors |
| 500 | Left (multipurpose) wing |
| 600 | Right (multipurpose) wing |
| 700 | Landing gear |
| 800 | Specific Mission equipment |
| 900 | Reserved for major differences in models, versions or series of the same air vehicle type not covered by the standard number groupings |

Zones in major areas (eg 200, 300) must be subdivided into zones using the second element digit of the standard number grouping. As an example, Zone 300 can be subdivided as follows:

*Table 9 Major sub-zone*

| Major zone | Major sub-zones | Area |
|---|---|---|
| 300 | | Aft section |
| | 310 | - Empennage structure with vertical wing |
| | 320 | - Rear vertical fin, tail and tail wheel fairing |
| | 330 | - Left horizontal stabilizer with horizontal stabilizer fin |
| | 340 | - Right horizontal stabilizer with horizontal stabilizer fin |
| | 350 | - Upper vertical fin |

The major sub-zones must be subdivided into zones using the third element digit. A possible subdivision of a major sub-zone is given below:

*Table 10 Zone No.*

| Major sub-zone | Zone No. | Area |
|---|---|---|
| 320 | | Rear vertical fin, tail and tail wheel fairing |
| | 321 | - Right vertical fin leading edge |

| Major sub-zone | Zone No. | Area |
|---|---|---|
| | 322 | - Right vertical tail fairing |
| | 323 | - Right vertical tail wheel fairing |

The zoning arrangements must permit definition of a work task or inspection area. The zone identifications can be applied to external inspections to define the limit of area to be inspected.

Example:

- Zone 300 - Inspect external structure (Empennage)
- Zone 320 - Inspect external structure (Right vertical stabilizer and rudder)
- Zone 321 - Inspect external structure (Right vertical stabilizer leading edge)

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*Fig 3 Example of zoning a helicopter (Method C)*

## 2.2 Zoning of land systems

The requirements for the zoning of are the same as the general requirements given at Para 2.

### 2.2.1 Example of zoning a land vehicle

2.2.1.1 Major zones

Major zones must be allocated to major physical structures, bulkheads, etc and numbered using the left hand digit of the zone identification number (100, 200, 300, etc) as illustrated in the example at Table 11 and Fig 4 and Fig 5, below:

*Table 11 Major zone identification numbers*

| Major zone | Area |
|---|---|
| 100 | Turret |
| 200 | Elevating mass assembly |
| 300 | Hull aft of fighting compartment bulkhead |
| 400 | Hull fwd of fighting compartment bulkhead |
| 500 | Left track, drive and suspension |
| 600 | Right track, drive and suspension |

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*Fig 4 Example of zoning a combat vehicle (major zones) - 1*

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*Fig 5 Example of zoning a combat vehicle (major zones) - 2*

2.2.1.2 Sub-zones

Major zone areas (100, 200, 300, etc) must be subdivided into sub-zones using the second digit of the allotted zone number (10, 20, 30, etc) as shown in the example at Table 12 and Fig 6, below.

*Table 12 Sub-zone identification numbers*

| Major zone | Sub-zone | Area |
|---|---|---|
| 100 | | Turret |
| | 110 | Turret front right side, external |
| | 120 | Turret front left side, external |
| | 130 | Turret rear right side, external |
| | 140 | Turret rear left side, external |
| | 150 | Turret front right side, internal |
| | 160 | Turret front left side, internal |
| | 170 | Turret rear right side, internal |
| | 180 | Turret rear left side, internal |

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*Fig 6 Example of zoning a combat vehicle (sub-zones)*

2.2.1.3 Zones

Sub-zone areas (10, 20, 30, etc), where necessary, must be further subdivided into zones using the first digit of the allotted zone number (1, 2, 3, etc) as detailed in the example at Table 13 and Fig 7, below.

*Table 13 Zone identification numbers*

| Major zone | Sub-zone | Zone | Zone area |
|---|---|---|---|
| 400 | | | Power pack |
| | 410 | | Power pack compartment |
| | | 411 | Coolant pump bulkhead |
| | | 412 | Starter motor bulkhead |

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*Fig 7 Example of zoning a combat vehicle (zones)*

**2.2.2 Example of zoning a ground based facility**

2.2.2.1 Major zones

Major zones must be allocated to major physical structures, buildings, etc and numbered using the left hand digit of the zone identification number (100, 200, 300, etc) as detailed in Table 14 and Fig 8.

*Table 14 Major zone identification number*

| Major zone | Area |
|---|---|
| 100 | Antenna |
| 200 | Transmit subsystem cabin |
| 300 | Receive subsystem cabin |
| 400 | Communications subsystem cabin |

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*Fig 8 Example of zoning a satellite communications facility (major zones)*

2.2.2.2 Sub-zones

Major zone areas must be subdivided into sub-zones using the second digit of the allotted zone number as detailed in the example at Table 15 and Fig 9.

*Table 15 Sub-zone identification number*

| Major zone | Sub-zone | Area |
|---|---|---|
| 400 | | Communications subsystem cabin |
| | 410 | Equipment suite 1 |
| | 420 | Equipment suite 2 |

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*Fig 9 Example of zoning a satellite communications facility (sub-zones)*

2.2.2.3 Zones

Sub-zone areas, where necessary, must be further subdivided into zones using the first digit of the allotted zone number (1000, 2000, 3000, etc) as shown in Table 16 and Fig 10.

*Table 16 Zone Identification Numbers*

| Sub-zone | Zone No. | Area |
|---|---|---|
| 410 | | |
| | 411 | Equipment suite 1, rack 1 |
| | 412 | Equipment suite 1, rack 2 |
| | 413 | Equipment suite 1, rack 3 |
| | 414 | Equipment suite 1, rack 4 |
| | 415 | Equipment suite 1, rack 5 |

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*Fig 10 Example of zoning a satellite communications facility (zones)*

## 2.3 Identification of access points

### 2.3.1 General

Typical access points are: doors, panels, hatches, fillets, fairings, internal floor and ceiling panels, cargo hold linings, etc. If an access point has an identifier on it, this must be used to identify it in data modules.

**Note**

Not all Products have identifiers on the actual access points. If not, they must be assigned a number in data modules.

### 2.3.2 Diagrams and tables

Access identification diagrams must be given in the data modules, which clearly illustrate the position of access points on the Product. Associated tables giving the access point identifier (cross-referenced to the access diagram), and the Product indicate an access point that gives access to (if applicable), can also be a requirement. These tables can be prepared using the descriptive data module type.

### 2.3.3 Access points numbering requirements

Access points must be numbered in association with the Product zoning system.

Letters I and O must not be used in letter suffix or preceding letter coding sequence.

Blow out doors and tank vents are not normally assigned specific access points identifiers.

Access points in the fuselage center line must be coded with left hand designators.

Access points in vertical stabilizer or rudder must be coded from bottom to top.

Access points which are situated in more than one zone must be allocated the zone number of the lowest zone involved.

If a small access point is located in a larger access point, the larger point must be coded first.

An access point on a zone boundary eg a bulkhead must be allocated the zone number of the side of the bulkhead from which the door or panel is removed.

### 2.3.4 Identifying access points for air systems

As already indicated, different access point numbering systems can be applied. The two following methods are given as examples. Method One is typical for a transport air vehicle (Reference Method A for zoning) and Method Two for a fighter air vehicle (Reference Method B for zoning). For a helicopter either Method One or Method Two can be used.

#### 2.3.4.1 Method One

Method is shown in Fig 11. The identifier is built up using the three-digit number of the zone in which the access point is located, followed by a basic two letter suffix and an additional third suffix letter as necessary.

The first of the two suffix letters is the primary identifier and is allocated in a logical sequence, ie inboard to outboard, or forward to aft, beginning with "A" in each zone.

The second suffix letter is the locator, which differentiates the access provision in relation to the zone in the air vehicle, if required.

Example:

- T - Top
- B - Bottom
- L - Left hand
- R - Right hand
- Z - Internal

A third suffix letter can be used to further identify floor, wall or ceiling panels.

Example:

- F and G* Floor panels
- W and X* Wall or side panels
- C and D* Ceiling panels

* When the F, W or C combinations have been used the letters G, X and D will be used to replace them.

Access points located symmetrically on opposite side of the air vehicle must be assigned the same letter designators, even though the zone numbers can be different (eg 521 CB for the left wing, 621CB for the right wing).

Fig 11 shows an example of a code applied to a left hand floor panel located in Zone 215.

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*Fig 11 Access code - Method One*

This is panel A in the left side of the floor of Zone 215, upper fuselage.

Table 17 Examples of access codes - Method One shows further examples of access codes using only two suffix letters.

*Table 17 Examples of access codes - Method One*

| Panel No Zone | Suffix | |
|---|---|---|
| 521 | AT | Panel A in Zone 521 Top (of the wing) |
| 521 | CB | Panel C in Zone 521 Bottom (of the wing) |
| 321 | AL | Panel A in Zone 321 Left side (vertical stabilizer) |
| 321 | AZ | Panel Z in Zone 321 Interior (vertical stabilizer) |

Belly Faring - Access Provision on left side
Zones 147, 191, 193, 195, 197

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*Fig 12 Example access point location diagram transport air vehicle (Method One) (Sheet 1 of 2)*

Access panels left wing lower trailing edge

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*Fig 12 Example access point location diagram transport air vehicle (Method One) (Sheet 2 of 2)*

2.3.4.2 Method Two

Method Two is shown in Fig 13. The identifier is built up using:

- a letter
- a three-digit number
- a second letter

The first letter indicates where the access point is located:

- T - Top (for body and upper surface of the wing)
- B - Bottom (for body and lower surface of the wing)
- L - Left Hand
- R - Right Hand

The three-digit number is the zone identifier in which the access point is located.

The second letter identifies each individual access point in the zone. This letter is allocated in a logical sequence, ie inboard to outboard, or forward to aft, beginning with "A" in each zone.

**Note**

In some cases, the access point (like a panel) can be located in another larger one (a bay door, for instance). In these cases, it is recommended to use letters starting from "S" for these secondary access points.

Fig 13 shows an example of a code applied to a panel located on top of the right hand wing.

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*Fig 13 Access code - Method Two*

Table 18 shows further examples of access codes for Method Two.

*Table 18 Examples of access codes - Method Two*

| Panel No. Prefix | Zone | Suffix | |
|---|---|---|---|
| T | 123 | A | Panel A in Zone 123<br>(at the top of the front fuselage) |

| Panel No. Prefix | Zone | Suffix | |
|---|---|---|---|
| T | 123 | B | Panel B in Zone 123<br>(at the top of the front fuselage) |
| B | 422 | B | Panel B in Zone 422<br>(at the bottom of the right hand wing) |
| L | 231 | A | Panel A in Zone 231<br>(left hand in the central part of the fuselage) |
| L | 231 | S | Panel S in Zone 231<br>(left hand in the central part of the fuselage, access located in a major one) |

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*Fig 14 Example access point location diagram fighter air vehicle (Method Two)*

## 2.4 Engine zones and identification of engine-mounted airborne equipment and access ports

### 2.4.1 General

The identification of engine zones, engine-mounted airborne equipments and engine access ports must be included in engine and engine-related data modules/technical publications. All appropriate data modules/technical publications must contain specific statements on how engine zones, engine-mounted airborne equipments and access ports can be easily identified. These statements must be included in the data modules/technical publications containing description and operation. Illustrations or tables must be used where necessary to give the locations.

### 2.4.2 Requirements

The main areas of the engine must be indicated by name based on their function eg combustion chamber, low-pressure turbine etc.

Main bearings must be numbered sequentially by location. These numbers can then be used to identify the bearings, their associated housings, seal or other ancillary items.

Location references such as left, right, clockwise, counterclockwise, upper, lower, apply to the engine as viewed from the aft (exhaust) end with the engine in its normally installed position.

Location of engine-mounted equipment/items, interior access ports combustion chambers (turbines), and cylinders (piston engines), must be identified by location and clock position (eg diffuser case, three o'clock).

## 2.5 Identifying access points for land systems

Access points must be numbered in association with the zoning system detailed above. The access point identifier must consist of the three-digit zone number followed by a three-letter access reference (letters I and O must not be used).

### 2.5.1 Access identifier

The access identifier must comprise up to three characters to indicate primary, secondary and minor access points. Each character of the access reference number must be allocated in a logical sequence (eg front to back, left to right, clockwise, etc), beginning with "A" in each zone to identify discrete access points. The first character must indicate main or primary access points/panels. Where a secondary access panel is mounted within a primary access panel, it must be designated using the second character of the access reference number. Minor access points within a secondary access panel must be indicated using the third character of the access identifier. An example of the application of access codes is shown at Fig 15.

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*Fig 15 Example of access codes for a combat vehicle*

**2.5.2 Location references**

Location references such as "left", "right", "clockwise", "upper", etc must apply to the system, as viewed from the rear of the platform, in the normal direction of travel. The position of mounted equipment/items, etc must be identified by location and "clock position" (eg crank case, three o'clock).

**2.5.3 Example of access for a ground based facility**

2.5.3.1 Access

For electronic installations and assemblies (eg radio room, computer centre, portable radio, etc), access points must be numbered in association with the zoning system detailed above. The access point identifier must consist of the zone number followed by a three-letter access reference (letters I and O must not be used). For smaller electronic assemblies (eg circuit boards), the access code can be used to provide a location matrix, with the horizontal axis numbered from 1 to 99 as the first two characters of the location code and the vertical axis lettered from A to Z as the third character of the access code.

2.5.3.2 Location reference

Location references such as "left", "right", "clockwise", "upper", etc must be applied as viewed from the front of the system, from an operator's viewpoint. For large fixed systems, location references must use points of the compass (eg South West) and floors (eg Ground Floor). Positioning of mounted equipment/items, etc can be identified by location and "clock position" (eg on/off switch, four o'clock). For location references on circuit boards and diagrams, the representation must be such that the main signal/data flow is from left to right.

## 2.6 Zoning and access for sea systems

**2.6.1 General**

It can be noted that there are significant differences between the zoning and access identification systems to be used on surface vessels and submarines.

The specific method of applying zoning and access to surface ships and submarines must be decided on an individual platform basis, following these general rules.

### 2.6.2 Zoning and access - General

Separate systems for zoning and access allocations must be used for surface ships and submarines.

On surface ships, the term zoning must be associated with the Nuclear, Biological, Chemical Damage (NBCD) control function where areas are defined and equipped during the ship build stage to limit the effects of fire, flooding, contamination or other damage. The aim is to divide the ship into self-contained survival zones.

In submarines, the term zoning must associated with the Damage Control Headquarters (DCHQ) considerations used in the identification of compartments and access points. The aim is to divide the submarine into a number of zones with water-tight boundaries between them.

### 2.6.3 Location markings

In surface ships, a system of location markings based on three-dimensional geographic co-ordinates must be used to identify compartments and access arrangements. For submarines the location markings must be based on the deck, bulkhead and frame numbers, and on the names of the compartments.

## 2.7 Zoning and access - Surface vessels

### 2.7.1 Zoning

Zoning is employed to help avoid the loss of an important system capability through the effects of fire, flooding, the spread of toxic gases or damage caused by a consequence of an attack resulting in the spread of primary and secondary weapon effects.

Zoning is achieved by selecting main transverse bulkheads which continue up beyond the weather-deck/forecastle/flight deck to the uppermost decks in the superstructure. These bulkheads must be designated zone boundaries and are coincident with the main watertight bulkheads (which reach up to No 1 deck) and continue up through the superstructure as fire bulkheads.

In consideration of zoning for NBCD purposes, zones must be sufficiently self-contained to operate for continuous periods of up to 12 hours with the zone boundaries closed down. For this, each zone is normally provided with autonomous systems for the following:

- Electrical power generation (with fuel supply)
- Electrical power distribution
- Chilled water and weapon cooling systems
- Fire pumps and firefighting arrangements
- Flood and firefighting water removal and draining
- Internal communications
- Machinery and damage surveillance and control
- Smoke containment and removal
- Ventilation, air conditioning and a chilled water distribution system
- Collective NBCD protection and air filtration
- Emergency support for the crew
- Compressed air distribution

The number, autonomy, size and arrangement of zones in any ship, depends on operational, technical and financial considerations. At the design phase, the operational value of the greater degree of protection provided by a larger number of zones is balanced against the cost of the additional subdivision required to support them. The requirement for personnel and environment support systems to cross zone boundaries is also a factor in deciding how zoning must be arranged.

**2.7.2 Access points**

Access points on the hull of a vessel are, by their nature, limited and therefore do not need specific identification. Within the compartments of a vessel, equipment is not generally hidden behind panels and thus locations must be identified by their relation to appropriate Frame / Frames within a compartment.

**2.7.3 Location markings**

Location markings must be used to uniquely identify all watertight compartments, trunks, doors and hatches and other fittings which can affect the watertight or gastight integrity of the ship. The marking system must include the non-watertight compartments that are important or are in frequent use.

Location markings must provide a means of indicating any position rapidly and without ambiguity. They must provide a system whereby the position of any incident, such as fire or damage, can be accurately identified. The system shown in Fig 16 thru Fig 19 is logical and can be applied to any ship regardless of size and complexity of subdivision.

2.7.3.1 Deck numbering

The subdivision of a surface vessel must be achieved by the use of decks to divide the ship horizontally from the weather-deck/forecastle/flight deck (No. 1 deck) to the inner bottom and the superstructure. Main transverse bulkheads are used to divide the vessel lengthways into main sections. A main transverse bulkhead is defined as a bulkhead that is continuous from the keel to the underside of the weather-deck/forecastle/flight deck.

Decks must be numbered consecutively downwards to the outer bottom starting with the weather-deck/forecastle/flight deck as No. 1 deck. Decks above the weather-deck/forecastle/flight deck must be numbered commencing with No. 01, 02 and so on consecutively upwards.

2.7.3.2 Ship sections

Main sections formed by transverse watertight bulkheads must be identified by characters from the phonetic alphabet starting with A, B, C, etc from forward to aft.

**Note**

To avoid confusion, I and O are not to be used.

Watertight compartments formed by transverse bulkheads within these main section compartments, must be given suffixes starting A, B, C, etc from forward, or Z, Y, X, etc from aft, as well as the marking of the main section.

2.7.3.3 Longitudinal bulkheads

Where longitudinal bulkheads divide a main section compartment, positions relative to the centre line of the vessel must be identified using a numbering system from the centre line outwards, with even numbers (2, 4, 6, etc) to port and odd numbers (1, 3, 5, etc) to starboard. Access points must also be identified in a manner which complements the location system.

2.7.3.4 Doors and hatches

Doors must generally bear the marking of the compartment to which they give access. Hatches must bear the numbers of the decks in which they are cut, followed by the horizontal co-ordinates of the compartments to which they give access eg Hatch 5DY is in deck No. 5 and gives access to compartment 6DY. Where two or more doors or hatches (cut in the same deck) give access to the same compartment they must be distinguished with the words PORT (or STARBOARD) and/or FORWARD (or AFT) in abbreviated form after the marking. As an example, hatch “5DY Stbd” is the starboard hatch of a pair giving access to compartment 6DY.

**2.7.4 Coding of equipment items**

Location coding of equipment items inside compartments must follow the practices described at Para 2.7.3.

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*Fig 16 Surface ships - Decks and main sections*

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*Fig 17 Surface ships - Compartment references*

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*Fig 18 Surface ships - Compartments with trunk*

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*Fig 19 Surface ships - Doors and hatches*

2.7.4.1 Zoning and access marking examples

The following give examples of the rules and practices to be followed in marking the various types of zoning and access markings.

*2.7.4.1.1 Compartment markings*

Fig 17 and Fig 18 show typical identifications for various ships compartments. The specific rules to be followed are given below.

- Compartment location marking positions: These must be placed to be visible from all entrances. If this is not possible with a single mark, the marking must be repeated to enable identification from all entrances. The markings must be made up in accordance with the following rules.
- First character (Number): Deck number. Decks must be numbered 1, 2, 3, etc downwards from No 1 deck (forecastle, weather-deck or flight deck), and 01, 02, 03 decks above No. 1 deck.
- Second character (Letter): Section. Sections are the overall lengths between the main transverse bulkheads. They must be lettered A, B, C, etc. from forward to aft. (I and O are not to be used).
- Third character (Letter): Compartment, fwd/aft position. Compartments are the enclosed divisions within sections. They must be lettered A, B, C, etc from the forward end of the section, or Z, Y, X, etc. from the aft end of the section. The size of the lettering must be reduced from the first two characters.
- Fourth character (Number): Compartment, athwart-ships position. Position of compartment from centerline. They must be numbered 1, 3, 5, etc to starboard and 2, 4, 6, etc to port. A compartment on the centerline must be numbered 0.
- Suffix (Numbers): Internal watertight compartments. Suffix -00 used for a single compartment. Suffixes -100, -200, etc for two or more contained compartments. Odd numbers to starboard, even numbers to port.

Marking examples: 2BA3 indicates a compartment on No 2 deck at the forward end of B section. It is the second compartment to starboard of the centerline. An internal watertight

compartment inside the main compartment must be marked as 2BA3-00. Two internal compartments must be marked 2BA3-100 and 2BA3-200.

*2.7.4.1.2 Door markings*

Fig 19 shows the marking methods that must be used on doors. The specific rules that must be followed are given below.

- Door marking position: Both sides, upper corner or hinged edge.
- Door marking rules: Doors must bear the marking of the compartment to which they give access. If a compartment has two doors, they must be marked PORT, STBD or FWD, AFT as appropriate.
- Doors in main transverse bulkheads separating lettered sections: These must have the deck number and both section letters in alphabetical order.

Marking examples: Marking 2PB indicates a door giving access to compartment 2PB. Marking 2D/E indicates a door connecting D and E sections on No. 2 deck.

*2.7.4.1.3 Hatch markings*

Fig 19 shows the marking methods that must be used on hatches. The specific rules that must be followed are given below.

- Hatch marking position: Near corner on hinged side.
- First character(s) (Number): Deck in which hatch is cut.
- Remaining characters (letters and numbers): to give fore/aft and athwart-ships position of compartment to which the hatch gives access. The section letter must be the same size as the deck number. The remaining characters must be of reduced size.
- Where two hatches give access to the same compartment, the markings must be qualified by PORT/STBD or FWD/AFT.

Marking example: Marking 2DA1 indicates a hatch on No. 2 deck giving access to a No. 3 deck compartment in fore/aft section D and compartment co-ordinates A1.

*2.7.4.1.4 Fixed manholes*

The marking must show the compartment to which a manhole gives access. Manholes in hatches must not be marked and must be referred to as Manhole in Hatch 6GZ4.

Marking example: Marking 6GZ4 indicates a manhole giving access to compartment 6GZ4.

*2.7.4.1.5 Trunks*

Trunks must be marked on each separate section of the trunk.

The trunk must carry the deck number of the top hatch or door, plus the marking of the compartment at the bottom of the trunk.

Each hatch in a trunk and each intermediate door must have its own deck number, plus the marking of the compartment at the bottom of the trunk. The word TRUNK must be marked on all hatches and doors giving access to the trunk.

Marking example: Marking 1/5DA indicates a trunk running from No. 1 deck thru No. 5 deck, compartment 5DA.

*2.7.4.1.6 Frame station numbers*

Frame stations must be numbered at main transverse bulkheads and also must be marked as needed in conspicuous positions on bulkheads.

Marking example: 17 indicates a main transverse bulkhead at the seventeenth frame section from the foremost frame.

*2.7.4.1.7 Other side markings*

Must be marked on bulkheads forming perimeter of dangerous compartments eg magazines, machinery spaces and flammable stores. Also, in multiple section ships, these must be marked on the main bulkheads below the lowest communications deck.

Marking example: MAGAZINE OS indicates a bulkhead surrounding a compartment containing a magazine.

*2.7.4.1.8 Compartments below*

Must be marked as needed above hatchways to indicate compartments gained thereby. Instead of the marking COMPARTMENTS BELOW, an arrow can be used if desired.

Marking example: COMPARTMENTS BELOW.

*2.7.4.1.9 Temperature monitoring marks*

Marking must be applied to external boundaries of high-risk (fire, explosion, etc) compartments.

## 2.8 Zoning and access - Submarines

### 2.8.1 Zoning

Submarines must be subdivided into a number of zones with water-tight boundaries between them. The following rules must be applied:

- Smoke-tight boundaries must be positioned between each high fire risk area and each high value compartment eg operations rooms, computer rooms, navigational equipment compartments, etc.
- Decks must be continuous to smoke-tight boundaries.
- Where smoke-tight boundaries cross passageways, smoke curtains must be fitted.
- Where a hatch or main watertight door forms part of a smoke-tight boundary, a smoke curtain must be fitted to allow a fire to be fought with an open door/hatch.

### 2.8.2 Access

Access points on the hull of a submarine are by their nature limited and therefore do not need specific identification. Within the compartments of a submarine, equipment is not generally hidden behind panels and thus locations must be identified by their relation to appropriate frame numbers within a compartment.

### 2.8.3 Location markings

The identification of locations in submarines is necessarily different to that of surface vessels, mainly due to their design and size. The training programs for submarine crews differ from surface ship practice to accommodate this. Submarines do not have the NBCD requirements that apply to surface vessels, and zoning must be determined around the DCHQ practices. Also, stability considerations mean that submarines do not have watertight longitudinal divisions.

The system of determining and identifying compartment and access point locations in submarines must be defined by the deck, bulkhead, frame-numbers, and whether the location is to port or starboard of, or on the centerline of the submarine.

Physical markings other than for bulkheads and frames must not be made within submarines. A location defined from bulkheads and frames must guide personnel to close proximity of a specified location. To support this, submarine training requires that crews have a degree of familiarity with the layout of a submarine in order that they are able to determine their position from their surroundings and are able to identify which compartments surround their present position.

### 2.8.4 Coding for inside compartments

Location coding inside compartments must follow the practices described in Para 2.7.3 for equipment items.

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*Fig 20 Submarines - Zoning and access*

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of zoning and access**. The project or the organization must decide whether to use the zoning rules or not. Refer to Para 2.

**Methods for zoning air systems**. The project or the organization must decide which method of zoning to use. Refer to Para 2.1.

**General identification of access points**. The project or the organization must determine the identification system for those access points that do not have identifiers. Refer to Para 2.3.

**Identifying access points for air systems**. The project or the organization must decide which method of identification to use. Refer to Para 2.3.4.

**Methods for zoning and access for surface ships and submarines systems**. The project or the organization must decide which method of zoning and access to use. Refer to Para 2.6.

# Chapter 3.5

## *Information generation - Updating data modules*

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## 1 General

There are rules governing the information required to update and release data modules. Different methods are used to indicate the different types of update. Apart from new data modules, there are five different types of update:

- status
- changed

- revised
- deleted
- reinstated, of which there are three types:
  - status
  - changed
  - revised

**Note:**

The rules in this chapter also apply to publication modules and SCORM content package modules.

# 2 Updating data modules

## 2.1 Frequency of update

The frequency of updating will be decided by the project or organization.

Data modules can be updated to include eg:

- material not available at the initial issue of the data modules
- use of new materiel
- use of new consumables
- new information gained through operational experience
- changes resulting from technical publications improvement reports
- changes to software
- modifications/alterations, Service Bulletins, special technical instructions and similar documents
- changes as a result of QA checks
- changes as a result of the electronic review function
- other data needing to be added or revised

For a detailed explanation of how the use of technical information repository data modules affect the update process of data modules. Refer to Chap 4.13.2.

## 2.2 Use of change marks and highlights

Data modules that are of type "changed" (refer to Para 2.5) or "reinstated and changed" (refer to Para 2.8) have changes marked with change mark elements and attributes. The precise rules for applying these elements and attributes are given in Chap 3.9.5.2.1.1.

Changes that change the content of elements use the change markup within those elements. Refer to Chap 3.9.5.2.1.1.

For the detailed descriptions of and rules for the use of the elements and attributes that indicate changes. Refer to Chap 3.9.5.2.1.1.

The reasons for any changes to a data module are summarized and recorded in the identification and status section. This text is used for creation of the front matter data module called Highlights.

## 2.3 Use of issue and inwork numbers

### 2.3.1 Issue numbers

For every release of a data module, the issue number must be incremented by one. For a detailed description of the elements and attributes for issue information, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

### 2.3.2 Inwork numbers

The ability to track drafting of changed information during the information generation process is facilitated by the use of an inwork number. The process of drafting is indicated by incrementing

the inwork number. For a detailed description of the elements and attributes for issue information, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

## 2.4 New data modules

New data modules must have their issue information set as described in Chap 3.9.5.1.

## 2.5 Change of a data module

A change is that form of updating a data module which affects only parts of an existing data module. A change can affect the content section or can be required solely to update an element or attribute in the identification and status section, eg the applicability or to give the new QA status. For a detailed description of the elements and attributes of issue information and their use for indicating a change in the content and/or identification and status section, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

## 2.6 Issue of a revised data module

A revised data module is one which has been completely reworked. For a detailed description of the elements and attributes of issue information and their use for indicating a revision of a data module, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

## 2.7 Deletion of a data module

A deletion of a data module may be necessary, eg whenever a described configuration no longer exists. In such case the data module is retained in the CSDB and marked as deleted, rather than physically being deleted. For a detailed description of the elements and attributes of issue information and their use for indicating a deletion of a data module, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

## 2.8 Reinstating a data module

Reinstating a data module is the action of restoring a deleted data module and making it available for use. If a data module is reinstated, the issue number at the time of deletion must be incremented by one at the time of release. For a detailed description of the elements and attributes of issue information and their use for indicating a reinstated data module, refer to Chap 3.9.5.2.1.1. For rules for their use, refer to Chap 3.9.5.1 and Chap 4.7.

## 2.9 Release of updated data modules

The release of all data modules is the process of declaring it fit for distribution to, and use by, a partner company and/or the customer. The QA process for this declaration is explained in Chap 3.7. For a detailed description of the settings for the elements and attributes of issue information, refer to Chap 3.9.5.2.1.1, Chap 3.9.5.1 and Chap 4.7.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Frequency of updates**. The project or the organization must decide on the frequency of updates. Refer to Para 2.1.

**Indicating the deletion of an element for display**. The project or the organization must decide whether to indicate, in display, that an element has been deleted or not. Refer to Para 2.7.

# Chapter 3.6

## *Information generation - Security and data restrictions*

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# 1 General

Data modules include four types of information relating to security. These are classification, caveats, instructions and information.

# 2 Security and data restrictions

## 2.1 Security

### 2.1.1 Security classification

Classifications include restrictive and commercial markings. A classification is a category, class or grade assigned to defense information or material, in relation to the degree of danger to security that would result from its unauthorized disclosure, excluding restrictive markings.

2.1.1.1 International defense organization classifications

International defense organizations can have their own definitions for security classifications. The security classifications for the North Atlantic Treaty Organization (NATO) are defined in Security Policy (C-M(2002)49).

2.1.1.2 National classifications

National classifications will be specified by the policy for each nation. Projects or organizations must determine how security classifications will be used and marked within their project.

### 2.1.2 National caveats

A national caveat is a restrictive marking (eg UK/US EYES ONLY) or security code word that is applied to complement an appropriate security classification which is normally not lower than confidential.

Data modules/technical publications which require national caveats are permitted. The national caveat is normally used to restrict the data modules/technical publications to named persons or authorized nominees.

### 2.1.3 Commercial security classification

A commercial security classification is a category or grade, such as "Commercial In Confidence", assigned to company or government department information or material to indicate the degree of danger to the company or government department security that would result from its unauthorized disclosure. It also an indication of the standard of protection required to guard against unauthorized disclosure, excluding restrictive markings. A commercial security classification is normally used by a company to protect information or material relating to government contracts which have not been awarded.

Whilst these classifications would not normally be used for data modules/technical publications there can be occasions where, at the start of a project, data modules are produced and given commercial security classifications before a NATO/national security classification has been allocated by the project or organization. The originator of the data module should take advice from either the project or organization security instructions or the company security controller on the use of the particular commercial security classification and the precautions to be taken with the information and material. As soon as a government contract has been agreed, the NATO or national security classification becomes effective.

The retention of this classification within a data module, throughout its life is to be determined by the project or organization.

### 2.1.4 Restrictive markings

Restrictive markings are additions to the security classification of data modules/technical publications. The restrictive markings that are available for data modules are national caveats (including international defense organization markings), commercial markings and export controls, distribution, handling and destruction. The markings are used to indicate that the handling and distribution of the data module/technical publication is restricted to those

categories of persons authorized to have access to the information contained therein. The security markings on data modules/technical publications are always a combination of the security classification and any restrictive marking.

Security code words must be defined within the project.

## 2.2 Instructions

This information type gives specific instructions relating to the data module.

### 2.2.1 Distribution

The distribution requirements, including export control notices, which apply to a data module, dependant on its security classification and user rights must be recorded within the data module. The distribution is recorded and approval for copying and must be obtained from either the originator or the company security controller.

### 2.2.2 Export control

The project or organization security instructions will normally give the instructions for the control of export of data modules. Where appropriate, these are recorded in the data module. If there are no project security instructions, the company security controller should be contacted for advice.

### 2.2.3 Handling

The project or organization security instructions will normally give the instructions for handling, including storage, of classified data modules/technical publications. If there are no project security instructions, the company security controller should be contacted for advice.

### 2.2.4 Destruction

The project or organization security instructions will normally give instructions on how to destroy classified data modules/technical publications when they are no longer required. If there are no project security instructions, the company security controller should be contacted for advice. Paper classified data modules/technical publications (including drafts, spoilt work etc) are normally destroyed by either shredding or burning. Unwanted copies of classified data modules/technical publications must be given the appropriate security protection until they are destroyed; once they are destroyed, certificates are signed and retained.

### 2.2.5 Use or disclosure

The project or organization security instructions will normally give the instructions for the intended use or disclosure of the data module.

### 2.2.6 Supersedure

The project or organization security instructions will normally give the instructions for notices that the data module or publication supersedes other data modules or publications.

## 2.3 Information

This information includes copyright, policy reference and conditions that can apply to a data module.

### 2.3.1 Copyright

A marking that is used to give copyright information like the copyright mark [©] followed by the year, or years, and the copyright holder.

### 2.3.2 Policy reference

This is a reference to the appropriate security policy documentation.

#### 2.3.3 Conditions

These are any specific conditions that can apply such as changing security classifications as a result of aggregation of data.

## 2.4 Classifying data modules/technical publications

It is the responsibility of the originator to classify the data module/technical publication according to the total content, ie classified according to the highest classified information or material they contain. For example, a data module/technical publication containing information or material classified between restricted and secret must be classified as secret.

Normally the originator of the data module/technical publication would classify data module/technical publications according to the security classification of the source data used in their production. If the originator is in doubt as to the correct security classification, advice should be sought from either the project or organization security instructions or the company security controller. Some projects can stipulate a maximum security classification for the data modules/technical publications. It is the responsibility of the originator to make sure that this maximum security requirement is not exceeded.

## 2.5 Changes in security classification

Although data modules/technical publications would have been given a correct security classification when originated, they can require changes for a number of reasons:

- The result of a security review their security classification can be downgraded.
- The result of adding new classified information, data modules/technical publications can require their security classification upgraded.
- The classification of data modules can also be affected by the aggregation of data modules into a CSDB.

It is the responsibility of the originator of the data module/technical publication to upgrade or downgrade data module/technical publications according to their new content. Advice can be taken from either the project or organization security instructions or the company security controller. When changing the security classification of data modules/technical publications, the originator must always take into account the maximum security requirement for the project or organization (see Para 2.1.4 and Para 2.2). Changes to the security classification of data modules are considered a status change to the data module and is to be recorded within the data module in accordance with Chap 3.5.

## 2.6 Presentation

Refer to Chap 6 for the presentation of security markings for data modules and their presentation in technical publications.

## 2.7 Control

The project or organization security instructions will normally give the instructions for the control of classified data modules/technical publications. If there are no project security instructions, the company security controller should be contacted for advice. Examples of the control of classified data modules/technical publications are:

- Classified data modules/technical publications should be seen only by authorized persons who have a need to see them. Control of classified data modules/technical publications helps to:
  - reduce the risk of breaches of security, either by deliberate action or carelessness
  - assist in investigations into breaches of security
  - reinforce the "need to know" principle
- All classified data modules/technical publications should be accountable; a system should be adopted which makes sure that all classified data modules/technical publications do not go astray and that a designated person is responsible for their inception or receipt until their destruction.

– At set periodicities, spot/total checks of classified data modules/technical publications should be carried out.

## 2.8 Common source database

The classification of data modules when aggregated into a CSDB would normally be as high as the highest security classified data module. However, there are occasions where the aggregation of data modules requires that the security classification is, in fact, higher than the highest classification. Projects should refer to project security instructions on this matter. If there are no project security instructions the company security controller should be consulted.

## 2.9 Emergency planning

It is recommended that plans be developed for the protection, removal, or destruction of classified material in case of fire, natural disaster, civil disturbance, terrorist activities, or enemy action, to minimize the risk of its compromise. The level of detail and amount of testing and rehearsal of these plans should be determined by an assessment of the risk of hostile action, natural disaster, or terrorist activity that might place the information in jeopardy.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Definitions of security terms**. The project or organization must decide on the definitions of security terms. Refer to Para 2.1.1.

**Application of caveats**. Projects must determine if the policies that apply to security marking, instructions, etc. and how those markings are required to be applied within their project. Refer to Para 2.1.2.

**Retention of classifications**. The project or organization must decide on the retention of security classifications. Refer to Para 2.1.3.

**Use and marking of security classifications**. The project or organization must decide on how the security classifications will be used and indicated. Refer to Para 2.1.4.

# Chapter 3.7

## *Information generation - Quality assurance*

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# 1 General

The QA of data modules/technical publications is the collection of checking activities that are carried out to ensure that the contents are fit for purpose and technically accurate. These checking activities can vary, especially for aerospace systems between civil and military programs.

# 2 Quality assurance

## 2.1 Quality Assurance application

### 2.1.1 Quality assurance for air programs

Military air QA differs from the civil air QA in that each of the military customers can set its own requirements which have to be complied with by the contractor/industry. Civil customers and civil aviation airworthiness authorities' requirements are, that the manufacturer's organization leads to the required quality of data modules/technical publications which must comply with acceptable rules such as those detailed in the ATA series of specifications.

In military projects, fitness for use checking is carried out by the contractor (first verification) and optionally by the customer (second verification) whereas in civil projects, this checking is the responsibility of the contractor.

### 2.1.2 Quality assurance for land and sea systems

The QA requirements for both military and civil programs in land and sea applications are defined by the customer. Therefore, the degree of the application of QA detailed in this chapter is to be decided by the project or organization.

### 2.1.3 In-process review - Military

An In-Process Review (IPR) is an optional review by the customer of data modules/technical publications that are being produced by the contractor for the Product. The main function of the in process review is for the customer to give guidance to the contractor. Normally in process review activities are initiated by the customer but they can also be requested by the contractor when assistance or clarification is required. The in process review ensures that the data modules/technical publications are being prepared to the required scope, depth and timescale in accordance with the contract and the applicable specifications.

### 2.1.4 First QA review - Civil

First QA review is the process by which the contractor's QA organization verifies that the produced output adequately and accurately complies with the requirements set by the rules of the project or organization and the applicable specifications.

### 2.1.5 First verification - Civil and military

First verification (sometimes known as validation) is the process by which the contractor validates that the data modules/technical publications are:

- the correct data modules/technical publications
- fit for purpose
- adequately describe the Product
- technically accurate
- safe to use by the customer

First verification is certified by the contractor for all military programs. For civil aerospace programs, the first verification must satisfy the civil aviation airworthiness authority of the contractor.

### 2.1.6 Second verification - Military

Second verification is the optional process by which the customer carries out a practical demonstration of the data modules/technical publications, supplied by the contractor, to make

sure that the technical information is adequate to permit the efficient and safe use of the Product. Responsibility for the technical accuracy of the information remains with the contractor.

## 2.2 The quality assurance process

To ensure that the data modules/technical publications are produced in accordance with the customer's requirements, the contractor must include in his production procedures the appropriate control of quality. The assurance of quality must be substantiated by evidence that the quality control is maintained and that "in-house" checks and first verification have been carried out. As part of this QA, the customer can review the contractor's quality control, including the "in-house" checks and first verification, to ensure that the required quality is achieved by the contractor.

### 2.2.1 Quality assurance program

The contractor must produce and maintain a documented QA program for the technical information that is contracted for. The program must be reviewed as necessary to ensure that it remains effective and describes, in sufficient detail, the procedures that ensure that the data modules/technical publications that are being produced are technical accurate, safe to use and meet the requirements in terms of scope, depth and timescales.

The QA program should take into account such areas as:

- development, preparation, maintenance and distribution of procedures for the preparation, "in-house" checks and first verification of the data modules/technical publications
- co-ordination with design, production, product support and other such departments to ensure that the source data used to produce the data modules/technical publications is to the required standard
- the establishment and maintenance of a system for identifying the QA status and technical standard of the technical data being prepared for the data modules/technical publications during all preparation stages
- the establishment of first verification procedures and "in-house" checks to determine the adequacy and accuracy of the data modules/technical publications during the development stages
- formal in process review (military) or first QA reviews (civil) to make sure that the data modules/technical publications are adequate and comply with the specifications for both content and production
- first verification of the data modules/technical publications. Refer to Para 2.1.5.
- commenting, recording and reporting on issues raised during the production process and the in-service phase of the Product. This can be achieved by using the commenting process explained in Chap 4.6.
- establishing the correct security classification for data modules in accordance with the project or organization security guidelines
- a detailed schedule that shows the timing and sequence of the various stages throughout the production and in-service phases. An outline example of such a schedule, for a project or an organization, is shown at Fig 1, where the dotted line boxes indicate supplier activity and the solid line boxes indicate customer activity. In this example, the in process review activity takes place after the first verification and the second verification takes place during the in process review. Alternatively, the second verification activity could take place during first verification or after the in process review.

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*Fig 1 Outline schedule example*

**2.2.2 Implementation of the quality assurance program**

The contractor must prepare a schedule which will permit the customer or the appropriate release authority to carry out in process review (military) or QA checks (civil) of the data modules/technical publications. In process review (military) or QA checks (civil) can also be requested by the contractor when assistance or clarification is required.

Data modules/technical publications produced for military programs by the contractor can be subject to second verification, either at the contractor's premises or the customer's premises. Second verification by the customer does not absolve the contractor from carrying out first verification and must not be used by the contractor as evidence of effective QA if done at the contractor's premises.

Data modules/technical publications can require second verification at the contractor's premises so as to prove practical applicability to the satisfaction of the appropriate release authority or the customer.

In certain cases, first and second verification can be combined into one process of technical verification, and can be applied to all data modules/technical publications, upon agreement between the contractor and the customer in these processes.

**2.2.3 Methods of first verification**

The method of first verification of draft data modules/technical publications depends on the type of technical information they contain. Some drafts can be checked against items of design documentation such as drawings, test schedules etc. This is known as "Table top" first verification. Other drafts, such as those containing procedural steps, can require a practical demonstration of the procedure. This is known as "On object" first verification. Other drafts can require that both types of first verification are carried out.

The contractor must use his engineering judgment in deciding which first verification method is to be used. The technical need for the type of first verification can have to be weighed against economic considerations in respect of time, safety and other prevailing factors but in all cases, is to be carried out.

The contractor in military programs must submit his first verification proposals to the customer for agreement.

### 2.2.4 Practical demonstration of first verification

A practical demonstration of first verification of a procedure must be carried out in sequence and under conditions that provide reasonable assurance of the suitability of the procedure under normal customer conditions. Use must be made of the appropriate approved tools/test equipment, if available.

The customer must be informed of any situations where a contractor in military programs is not able to carry out first verification because of the lack of facilities. This could occur, for example, when separately developed Product and test equipment come together for the first time after the Product has been delivered to the customer. In these cases, the first verification must be carried out as soon as possible.

For civil programs, data modules/technical publications containing procedural information for airborne equipments must be shop first verified. Should this not be possible before the issue of the data modules/technical publications to the customer, it is permissible to carry out the first verification by simulation. All procedures that have been first verified by simulation, however, must have a practical demonstration at the earliest possible time.

### 2.2.5 Methods of second verification

The methods of second verification that can be used are table top, on object or both, in the same way as first verification. The application of these methods must be determined by the project or organization.

## 2.3 Indicating QA in data modules

As data modules progress through the production phase to the in-service phase their QA status is recorded. Whilst in production, the elements of QA are populated to indicate that a data module is:

- unverified which indicates that the data module is effectively in draft
- first verified with the type being set to one of:
  - table top
  - on object
  - table top and on object
- second verified with the type being set to one of:
  - table top
  - on object
  - table top and on object

When a data module is changed and, therefore requires re-verification, the QA status is set back to unverified.

Data modules that are changed between releases must have those changes tracked using the elements and attributes for issue information.

For a detailed explanation of the rules for the population of these elements and their attributes, see Chap 3.9.5.1.

## 2.4 Review cycle examples

The nature of modern complex projects means that they also often have complex contractual arrangements. The examples given at Para 2.4.1 and Para 2.4.2, are intended as examples only and that project or an organization must establish and detail their own processes and procedures.

### 2.4.1 Simple example

In the case of the simple project that has one supplier, one customer and one Product, the review cycle is relatively simple as shown in Fig 2.

### 2.4.2 Complex example

In more complex contractual arrangements, a consortium of companies could be responsible for the whole project. The example shown in Fig 3 contains less detail than that of Fig 2 as there are three partner companies who are each a design authority for a contributing part of the Product and one of them has the lead function for technical publications. In this example, this lead company has decided to outsource the production of data modules.

As lead technical publications function, PC1 has the responsibility to the project for the QA aspects of all data modules that are produced in support of all three contributing companies. Therefore, it is PC1 who must ensure that all three contributing companies become involved in validating that the correct data modules have been produced and that those that have been produced are technically accurate and safe to use.

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*Fig 2 Simple QA review cycle example*

ICN-AE-A-000307-A-U8025-00016-A-01-1

*Fig 3 Complex QA review cycle example*

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Degree of the application of QA**. For both military and civil projects, the project or organization must decide the degree of the application of QA. Refer to Para 2.1.2.

**Decide on which type of first verification to use**. The project or organization must decide which if the types of first verification must be applied to data modules/technical publications. Refer to Para 2.2.3.

**Decide whether first verification rules apply**. The project or organization must decide whether a set of rules apply. For example, such a rule might be that all data modules that have a safety related procedure must have first verification carried out "On object". Refer to Para 2.2.3.

**Application of second verification**. The project or organization must decide on the rules for the application of second verification. For example, such a rule might be that have a safety related procedure must have second verification carried out "On object" and at the same time as first verification. Refer to Para 2.2.5.

**Decide on the appropriate review cycle process**. The project or organization must decide on the most appropriate review cycle processes and procedures. Refer to Para 2.4.

# Chapter 3.8

## *Information generation - Disassembly principles*

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# 1 General

The disassembly principles have a basic principle supported by three rules.

# 2 Disassembly principles

## 2.1 Basic principle

The disassembling principle is based on the consecutive numbering of assemblies obtained during equipment disassembly and subsequent maintenance activities. The assemblies numbered are subsequently allocated their own set of data modules. The allocation of "00" is reserved for the complete equipment followed by sequential numbering in accordance with this chapter.

**Note**

The numbering sequence is not necessarily inline with any step by step maintenance task.

## 2.2 Rules for numbering assemblies

Assemblies need to be numbered, using the disassembly code, only if one or more of the following three conditions apply:

### 2.2.1 Rule No. 1

The first condition for numbering an assembly, using the disassembly code, is the performance of further maintenance actions on that assembly. If there are no maintenance actions performed on an assembly, that assembly will not be allocated a number or a set of data modules.

### 2.2.2 Rule No. 2

The second condition for the allocation of a number, using the disassembly code, is the complexity of an assembly. Simple assemblies may not need data modules. This is to prevent unnecessary breakdown of maintenance information.

### 2.2.3 Rule No. 3

In addition and to prevent unnecessary breakdown, a number is allocated, using the disassembly code, only in such cases where the volume of maintenance information relating to maintenance actions to be taken is sufficient to warrant an individual data module to be prepared.

## 2.3 Assemblies and parts

As a rule disassembly generates parts, which happens when an assembly is disassembled. Since maintenance actions might sometimes be applicable to parts as well as assemblies, the following rule applies:

If maintenance actions on parts need to be performed, the information must be included in the data module of the assembly to which the parts belong, unless the issue of separate data modules is justified. The same applies to those assemblies which are not allocated an individual number in accordance with rules No. 2 and 3, above, despite maintenance actions being required.

## 2.4 Symbolic explanation

### 2.4.1 Simple example

A simple symbolic example is shown in Fig 1. Based on the complete equipment, the process of disassembly into assemblies and parts is described. The following assemblies/parts are obtained during disassembly of the complete equipment (ie the subject being disassembled (disassembly code = "00")):

- three assemblies, which are subject to further maintenance actions
- six assemblies/parts, which do not require maintenance

In this case, all of the three assemblies, which are subject to further maintenance actions, will be numbered in accordance with the three rules given in Para 2.2. The disassembly code for these will be allocated the numeric characters "01", "02" and "03" and will thus be provided with a separate set of data modules each; the sets will be marked with the subjects of disassembly: "01", "02" or "03". Under the maintenance actions, these three subjects of disassembly will be further disassembled into assemblies/parts that do not require further maintenance actions.

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*Fig 1 Disassembling principle - Simple example*

### 2.4.2 Complex example

A complex symbolic example is shown in Fig 2. Based on the complete equipment (ie the subject being disassembled (disassembly code = "00")) all pipes, hoses and cables will be removed during the first step of disassembly. In this case, they are not subject to further maintenance actions.

The equipment, less the pipes, hoses and cables (which have previously been removed) is subject to further maintenance actions and, therefore, the disassembly code is allocated the numeric characters "01". In accordance with the maintenance activity (as described in the set of data modules) another step of disassembly is undertaken; removal of accessories. The removal of the three accessories will generate four assemblies in total, all of which are subject to further maintenance actions and, therefore, have their disassembly codes allocated a number. The accessories will have their disassembly codes set to "02", "03" and "04", and the remaining assembly will have its disassembly code set to "05".

For each of the four assemblies, there is a separate set of data modules which will be identified with the appropriate setting of disassembly code to "02", "03", "04" and "05", as appropriate. Under the appropriate maintenance actions, accessories are further disassembled as shown, that is, into assemblies/parts that do not require further maintenance actions.

The subject of disassembly, "05", is more complex in structure. Under maintenance actions, it is further disassembled into three subassemblies which in turn are subject to maintenance actions. This gives further data modules with their of disassembly codes set to "06", "07" and "08", respectively, to support each of the disassembled items.

The subjects of disassembly, "06" and "07", are further disassembled under the appropriate maintenance actions, with an additional assembly requiring maintenance actions resulting in each case, ie subjects of disassembly "09" and "10".

There is no need to disassemble subject of disassembly "08" any further for the maintenance actions. There is, however, a requirement for a set of data modules as the assembly requires maintenance actions.

Finally, the subject of disassembly "09" is subjected to final disassembly within the scope of the appropriate set of data modules. The subject of disassembly "10" is not disassembled further but is itself subject to maintenance actions.

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*Fig 2 Disassembling principle - Complex example (Sheet 1 of 2)*

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*Fig 2 Disassembling principle - Complex example (Sheet 2 of 2)*

## 2.5 Examples

### 2.5.1 Example 1 - Hydraulic assembly

All information (ie the supporting set of data modules) relating to the complete hydraulic assembly has its disassembly code set to "00" in accordance with the rules for the subject of disassembling as shown in Fig 3. The assignment of further disassembly codes in support of items further disassembled, for example, can be found under Information Code "041" (constructional description, see Fig 4).

In this case, assemblies without a number require no further maintenance actions. The number of further disassembled subjects is, therefore, seven ("01" to "07"). The disassembling of the hydraulic assembly itself is also a maintenance action which relates to the complete equipment and will, therefore, be coded using disassembly code "00" as shown in Fig 5.

The disassembled subjects "01" to "07" are allocated their own set of data modules, each of which is coded using the respective disassembly code setting ("01" to "07"). In this example, the disassembled subjects "01" to "07" are further disassembled within the scope of maintenance actions. The pertinent figures and data module codes for these disassembly actions are shown in Fig 6 thru Fig 12.

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 00A - 041A - C (Constructional Description)

ICN-AE-A-004003-G-S3627-00029-A-01-1

*Fig 3 Disassembly code 00 (Removed complete component)*

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 00A - 041A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00030-A-01-1

*Fig 4 Disassembly code 00 (Assignment of subjects of disassembly)*

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 00A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00031-A-01-1

*Fig 5 Disassembly code 00 (Component breakdown)*

1 Retaining ring
2 Gasket
3 O-ring
4 Filter
5 O-ring
6 Backup ring
7 Bleed Valve
8 Filter bowl assy
9 Guide assy
10 Cap
11 Sleeve
12 Bush
13 Spring
14 Filter bowl

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 01A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00032-A-01-1

*Fig 6 Subject of disassembly 01*

1 Retaining ring
2 Gasket
3 O-ring
4 Backup ring
5 Filter
6 O-ring
7 Backup ring
8 Bleed valve
9 Filter bowl assy
10 Guide assy
11 Cap
12 Sleeve
13 Bush
14 Spring
15 Filter bowl

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 02A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00033-A-01-1

*Fig 7 Subject of disassembly 02*

1 Non-return valve
2 O-ring
3 O-ring
4 Backup ring
5 Spring
6 Spool assy
7 Piston valve
8 Valve sleeve
9 Retaining ring
10 Plug

This figure will be on of the figures contained in Data Module
YY - A - XX-XX-XX - 03A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00034-A-01-1

*Fig 8 Subject of disassembly 03*

1 Valve assy
2 O-ring
3 Retaining ring
4 Distance sleeve
5 Spring
6 Piston and valve assy
7 Piston valve
8 Valve housing
9 Plug

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 04A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00035-A-01-1

*Fig 9 Subject of disassembly 04*

1 Backup ring
2 O-ring
3 O-ring
4 Backup ring
5 O-ring
6 Valve
7 Locking ring
8 Sleeve
9 Spring
10 Sleeve
11 Spool assy (composed of parts 12, 13, 14)
12 Spool
13 Sleeve
14 Housing
15 O-ring

This figure will be one of the figures contained in Data Module YY - A - XX-XX-XX - 05A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00036-A-01-1

*Fig 10 Subject of disassembly 05*

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 05A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00037-A-01-1

*Fig 11 Subject of disassembly 06*

1 Bypass valve
2 O-ring
3 Backup ring
4 O-ring
5 Pin
6 Plug
7 Spring
8 Spool assy
9 Piston valve
10 Valve sleeve
11 Backup ring
12 O-ring

This figure will be one of the figures contained in Data Module
YY - A - XX-XX-XX - 07A - 530A - C (Disassembling)

ICN-AE-A-004003-G-S3627-00038-A-01-1

*Fig 12 Subject of disassembly 07*

### 2.5.2 Example 2 - AFDS computer

The removed complete computer, (disassembly code "00"), is shown in Fig 13. Fig 14 shows further disassembled subjects.

As a particular feature of this example, assembly "01" is disassembled into two further subassemblies, "14" and "15" as shown in Fig 14. Both subassemblies are subject to maintenance actions.

The disassembly of the complete computer into its assemblies is as shown in Fig 15, and the disassembly of the subject with the disassembly code set to "01" is shown in Fig 16. Further disassembly of subjects with disassembly codes set to "02" and "03", are shown in Fig 17 and Fig 18, respectively.

This figure will be one of the figures contained in data module
YY-A-XX-XX-XX-00A-041A-C (Constructional description)

ICN-AE-A-004003-G-S3627-00039-A-01-1

*Fig 13 Disassembly code 00 (Removed complete component)*

*Fig 14 Disassembly code 00 (Assignment of subjects of disassembly) (Sheet 1 of 2)*

*Fig 14 Disassembly code 00 (Assignment of subjects of disassembly) (Sheet 2 of 2)*

This figure will be one of the figures contained in data module YY-A-XX-XX-XX-00A-530A-C (Disassembling)

ICN-AE-A-004003-G-S3627-00042-A-01-1

*Fig 15 Disassembly code 00 (Component breakdown)*

1 Screw
2 Spring washer
3 Cover
4 Gasket
5 Nut
6 Locking washer
7 Screw
8 Washer
9 Spring washer
10 Screw
11 Spring washer
12 Screw
13 Washer
14 Spring washer
15 Screw
16 Insulating washer
17 Distance sleeve
18 Spring washer
19 Screw
20 Choke L4
21 Spring washer
22 Circuit board
23 Resistor R24
24 Nut
25 Spring washer
26 Screw
27 Circuit board
28 Screw
29 Washer
30 Transformer T1
31 Capacitor C11
32 Capacitors C3

This figure will be one of the figures contained in data module YY-A-XX-XX-XX-01A-530A-C (Disassembling)

ICN-AE-A-004003-G-S3627-00043-A-01-1

*Fig 16 Subject of disassembly 01*

1 Nut
2 Screw
3 Spring washer
4 Screw
5 Handle
6 Thread insert
7 Screw
8 Fixing lug
9 Threaded bush
10 Screw
11 Locking unit
12 Hollow rivet
13 Louvre
14 Thread insert
15 Screw
16 Stop
17 Guide plate
18 Screw
19 Stop
20 Guide plate
21 Screw
22 Stop
23 Guide plate
24 Screw
25 Stop
26 Guide plate
27 Guide plate
28 Thread insert
29 Thread insert

ICN-AE-A-004003-G-S3627-00044-A-01-1

*Fig 17 Subject of disassembly 02*

This figure will be one of the figures contained in
data module YY-A-XX-XX-XX-03A-530A-C
(Disassemble)

1 Nut
2 Spring washer
3 Screw
4 Relay RL1.RL2.RL3
5 Nut
6 Spring washer
7 Screw
8 Relay RL1.RL2.RL3
9 Diode D1.D2.
10 Nut
11 Spring washer
12 Screw
13 Relay RL1.RL2.RL3
14 Diode D3
15 Cushion
16 Nut
17 Stud
18 Screw
19 Washer
20 Distance collar
21 Nut
22 Spring washer
23 Screw
24 Guide
25 Circuit board
26 Plug PL1
27 Thread insert
28 Screw
29 Spring washer
30 Screw
31 Spring washer
32 Nut
33 Hollow rivet
34 Louvre
35 Housing
36 Rivet
37 Identification plate

ICN-AE-A-004003-G-S3627-00045-A-01-1

*Fig 18 Subject of disassembly 03*

# Chapter 3.9

## *Information generation - Authoring*

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| Chap 3.9.5 | Authoring - Data modules |
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## 1 General

To assist with authoring in a CSDB environment general guidance is given. Authoring in this environment is fundamentally different from traditional processes. There are rules, which are generic and applied to all data module types. There are other rules that are applied to specific data module types.

### 1.1 Purpose

The purpose of this chapter is to introduce the rules for authoring.

### 1.2 Scope

All authoring aspects for all data module types are covered in the subchapters of this chapter. In most cases there are business rules decision points associated with the data modules types on

which the project or the organization will have to make a decision. Chap 2.5 gives guidance on business rules.

# 2 Authoring

The rules and guidance for authoring are given in the following chapters:

- Chap 3.9.1 provides the general writing rules to be followed in the preparation of text. The rules set out the guidance for the preparation of operator and maintenance information.
- Illustrations are prepared to help the reader's understanding of the text, by amplifying and clarifying it and avoiding lengthy explanations. The rules for illustrations are detailed in Chap 3.9.2.
- Definitions, creation and use of warnings, cautions and notes are given in Chap 3.9.3.
- Chap 3.9.4 gives the rules for the creation of front matter data modules.
- Chap 3.9.5 explains markup including the basic XML terms and definitions.
- Definitions, creation, use and rules for the elements and attributes for the identification and status section are given in Chap 3.9.5.1.
- All the rules for the different data module types are given in Chap 3.9.5.2.

# Chapter 3.9.1

## *Authoring - General writing rules*

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| Chap 5 | Information sets and publications |
| Chap 6.2 | Information presentation/use - Page-oriented publications |
| Chap 6.3 | Information presentation/use - Interactive electronic technical publications |
| ASD-STE100 | Simplified Technical English® (ASD-STE100) |
| ISO 31-11 | Quantities and units -- Part 11: Mathematical signs and symbols for use in the physical sciences and technology |

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|---|---|
| ISO 6093 | Information processing - Representation of the numerical values in character strings for information interchange |
| ISO Standard 1000 | SI units and recommendations for the use of their multiples and of certain other units |

# 1 General

There are three methods of producing data modules:

- document production using traditional editing or What You See Is What You Get (WYSIWYG) systems
- XML production
- database driven production

The traditional production requires the author to manually enter most of the information, including titles/headings, etc. Headers and footers, table of contents and other introductory lists are typed or auto generated by the system. The author also selects the right element in the template (style sheet) to get the correct presentation.

By using an XML based editor, the author can concentrate on the content of the information, within the bounds of the structure. The presentation (including headers, footers, introductory lists, if page-oriented presentation) is delegated to the production and presentation application.

S1000D facilitates the first two production methods for all types of data modules. However, the third method can be used for the production of any non-text oriented data modules, ie IPD, wiring data and maintenance planning data, fault, technical repository data, etc.

Chap 3.2 and Chap 3.9.5 define the structures available to the author when creating a document. Chap 6.2 provides the detailed rules and examples of S1000D standard presentations for page-oriented publications. Chap 6.3 provides basic rules for look and feeling of IETP.

This chapter describes the basic writing rules for creating technical information in data modules.

**Note**

Chap 6.2 shows the presentation of page-oriented publications. However the structure (the use of text and graphics components) explained in this chapter are valid and independent of the presentation form.

# 2 General writing rules

## 2.1 Language

The project or the organization will specify the language in which the data modules must be written. If that language is English, then the project or the organization must decide whether to use the writing rules and vocabulary in Simplified Technical English® (ASD-STE100) or not.

A standard dictionary must also be designated by the project or the organization. If the maintenance data for the data modules is required in the English language, it is recommended that the Webster's Dictionary be used as the standard.

If specific maintenance terminology is required, it is recommended that either a terminology database, or project glossary of such terminology is produced or cross-references are made to existing glossaries/specifications. It is essential that the maintenance terminology be agreed by all disciplines within the project. Ideally, this will include the Product names and task short descriptions.

## 2.2 Abbreviations

An abbreviation is a shortened form of a word, expression or phrase and is used to conserve space and time. To ensure consistency throughout all the project documentation (including data modules), it is recommended that either a standard list of abbreviations be produced at the start of the project or existing abbreviation standards used both of which can be included in the project terminology database. Some suggested general rules on the use of abbreviations are given below:

- Only use an abbreviation when its meaning will be clear to the reader. When in doubt spell it out
- Wherever possible, use abbreviations that conform to a recognized standard used by, or made available to, the customer
- Abbreviations not in common use, or not to a recognized standard, but which are used frequently, can be put in brackets after the word, expression or phrase, when used for the first time. Thereafter the abbreviation can be used
- Use the same abbreviation for the singular and plural
- Do not use full stops [.] in abbreviations except for where their omission would create ambiguity (eg "No." for number and "in." for inch to avoid confusion with "no" and "in"). Stops are also not required for contractions (eg "Mk" for a specific mark) or for shortened identifications, acronyms, (eg "North Atlantic Treaty Organisation (NATO)" for the North Atlantic Treaty organization and "STN for Special Technical Notice)
- Avoid the use of abbreviations in contents lists, titles etc wherever possible (eg "Operation of the HLWSCU" is meaningless unless you know that the HLWSCU is the High Lift Wing Sweep Control Unit). However, for air systems SNS 24-20 in this specification, use "Alternating Current (AC) Generation", and this abbreviation must be used
- Abbreviations used on placards, labels and signs must be replicated in data modules, even though they may not conform to recognized standards or these suggested rules. If the text given on placards, labels and signs is shown in uppercase letters, then the text must be written in uppercase letters in the related text in the data module, eg "Put the warning placard DO NOT OPERATE THE LANDING GEAR on the landing gear handle", "Connect the ground electrical connector to the OUTLET SUPPLY receptacle on the leak test set". This does not apply to the text that is given on tools.
- A list of all non common abbreviations, which are not among the recognized standards required by the customer, can be included in the data module. (Information code "005" can be used to list abbreviations)

## 2.3 Information affected by modification

Information must be provided on any changes introduced by modification to the build standard of the Product. Data modules affected by such information must be arranged so that, when all Products are modified, non-applicable information can be removed without an entire rewrite of the data modules.

## 2.4 Numeric values

### 2.4.1 General

Wherever possible, the rules concerning the expression of numerical values must be in compliance with International Standards Organization (ISO) 6093 Information processing - Representation of the numerical values in character strings for information interchange.

Unless otherwise stated, all numeric values, eg speeds, Mach numbers, accelerations, temperatures and altitudes, quoted must be as indicated on the equipment.

When a range of values is associated with a unit, the unit symbol must be repeated after each number, eg "2,3 mm to 7,8 mm". When a value followed by a tolerance is expressed, both must be in the same units, but the unit need only be placed after the complete expression. The mathematical presentation (eg 12 ± 1 mm) is the preferred one. However, if this is not possible, the complete expression (12 plus or minus 1 mm) can also be used.

Numbers from one to nine normally must be expressed as words when used in text, except when used in a dimensional sense or for reference purposes. Numbers of 10 and over must be expressed in Arabic numerals except where ambiguity might otherwise result (eg two hundred and fifty 27 mm cartridges).

### 2.4.2 Fractions

The use of a fraction can be avoided, by using decimal notation or words, except where indicators or controls are marked in vulgar fractions. Fractions must be presented in text using the slash [/] character, with one space separating a whole number from a fraction, (eg 1 1/2). When super- and sub-script are used, then there must be no space between the whole number and the fraction (eg 1½).

### 2.4.3 Separators

The decimal separator is a comma [,] in compliance with ISO 31-11. This separator must be used together with International System (SI) units, Refer to Para 2.5. A dot [.] must be used as the decimal separator for Imperial or United States (US) units.

- SI-units comma [,]
- Imperial-US/units dot [.]

Numbers less than unity have their decimal separator preceded by a zero in all cases, (eg 0,012).

Very large or very small numbers expressed to a reasonably small number of significant figures, can be conveniently set out when written manually as multiples of a power of ten to simplify their presentation.

Examples:

- 2998000000 becomes $2,998 \times 10^{9}$

or

- 0,000000000006624 becomes $6,624 \times 10^{-12}$

Presentation of numbers generated from, for example, a database can vary according to the system being used.

## 2.5 Units of measurement

The SI units of measurement must be used within all publications. Where non-SI units are quoted (eg for a pressure gauge calibrated in psi), the SI conversion is to be included in brackets. The SI conversion is to be rounded up or down to a corresponding number of significant figures. The one exception to this rule is the case of Nautical Miles.

ISO Standard 1000 must be used for the presentation of unit symbols. Some general rules for presenting unit symbols are:

- when in doubt, spell the name of the unit out
- do not use the point after the unit symbol (eg A = Ampere, mm = millimeter)
- do not use an "s" for plurals
- put a one-character space between the unit symbol and the unit quantity
- use the units given on gauges, indicators, etc

## 2.6 Names

To ensure consistency throughout all project documentation, including data modules, it is recommended that standard names (for materiel, equipment, components, assemblies, parts, etc.) be used throughout all disciplines of the project. Normally, engineering drawings are the source data for names. The drawings are used as the verified source data to produce, for example, the IPD data modules.

Markings on controls must be quoted as marked. Where a control selection exists but is not actually marked, it must be described fully.

Consistency of names must always be maintained between text and illustrations in data modules. Terminology that conveys the purpose, function, or nature of an item irrelevant to a procedure requirement should not be used. For example, the spoiler center wing input quadrant need not be called such in a procedural step to insert a rig pin. The presence of an illustration showing the location of the quadrant enables the step to be written simply (eg "Insert the rig pin in the quadrant" or "Insert the rig pin") when there is only one quadrant and one rig pin. Modifiers are only necessary when more than one item of the same name is acted upon in the same procedure.

## 2.7 Basic punctuation rules

STE is recommended as a guide for the use of punctuation marks in maintenance data. STE states that semicolon [;] is not permitted. Specific rules for lists are given in Chap 3.9.5.2.1.3 and for titles in Chap 3.9.5.2.1.5.

## 2.8 Use of uppercase

All text must be written in lowercase. Sentence case (the first letter in a sentence is given in uppercase) or, where appropriate, all uppercase must be used for specific abbreviations, acronyms or expressions. The following examples are specific expressions:

- Chap, Para, Fig, Table, WARNING, CAUTION and Note are specific expressions.
- Titles with a "hyphen" must use an initial uppercase after the dash, eg Corrosion control - Rudder.
- Titles with a "slash" [/] must use initial uppercase after the slash if it is the first set of word in a sentence, eg Module/Publication must.
- Titles of an information set or a publication (Refer to Chap 5) must be written with initial uppercase, eg Weapon loading, description and operation.
- When explaining an acronym the first time in a data module the corresponding initials must be in uppercase, eg CPF.

Placards, labels and signs must be replicated, including uppercase, when referenced in data modules. Refer to Para 2.2.

## 2.9 Highlighted text

To highlight a word, an expression or a sentence, bold text is the preferred method. Alternatively, the use of color is permitted. Uppercase, italic or underlining are not permitted to highlight text, except for legacy data.

**Note**

Exceptions are the captions WARNING which are underlined and bold and CAUTION which are bold. Refer to Chap 3.9.3.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Specify the language**. The project or the organization must specify the language that data modules will be produced in. Refer to Para 2.1.

**Use of Simplified English**. When data modules are produced in English, the project or the organization must decide whether to use Simplified English or not. Refer to Para 2.1.

**Use of a standard dictionary**. The project or the organization must decide which standard dictionary is used for producing data modules. Refer to Para 2.1.

**Terminology database or glossary**. The project or the organization must decide whether to use a terminology database or a glossary. Refer to Para 2.1.

**Use of a standard list of abbreviations**. The project or the organization must decide whether to use a standard list of abbreviations, or not. Refer to Para 2.2.

**Agree on a standard list of abbreviations**. If used, the project or the organization must agree on a standard list of abbreviations. Refer to Para 2.2.

**Highlighting text**. The project or the organization must decide whether to use bolding or color to emphasize text. Refer to Para 2.9.

# Chapter 3.9.2

## *Authoring - Illustration rules and multimedia*

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| Chap 3.9.2.5 | Illustration rules and multimedia - Interactive 3D content |
| Chap 7.3.3 | CSDB objects - Multimedia |

## 1 General

This chapter provides general guidance and rules on authoring illustrations and multimedia objects:

- Chap 3.9.2.1 provides the primary rules for the creation of 2D illustrations with basic illustration examples
- Chap 3.9.2.2 defines and explains navigation and configuration of illustrations
- Chap 3.9.2.3 covers the use of color in illustrations and photographic images
- Chap 3.9.2.4 provides the primary rules and details the minimum standards for the creation of audio, video, animation 2D or 3D multimedia objects with basic examples provided
- Chap 3.9.2.5 covers 3D multimedia objects including dynamic and interactive technical content

# 2 Project guidance

This chapter covers the delivery of many different media types with a wide range of project requirements in mind. As a result where this chapter cannot mandate output media types it will give guidance and the minimum specified requirements. It is strongly recommend that projects use open specifications when delivering multimedia and that proprietary types are discouraged as a media object type. Refer to Chap 7.3.3. It is also essential that project business rules governing the delivery of media objects types are agreed with exchange and maintenance strategies in place and specified in the configuration file.

## 2.1 Illustration rules - Introduction

Illustrations must be prepared to amplify and clarify the text and to avoid lengthy explanations. They must be located as close as possible to the related portions of the text.

Before the production of project documentation begins, the parts of the documentation which have to be printable must be defined. It must also be clarified if the customer is in a position to provide all end users with the technology to use electronic publication functionality such as color displays and color printing. When colored illustrations are to be printed using black and white, it must be ensured that the print medium can handle the file content.

Chap 3.9.2.1 gives rules and guidance for the production of illustrations which have to be presented on paper or on screen. The basic set of rules is common for both environments but specific rules apply. The final requirements must be considered within the project business rules.

The rules applied to IPD illustrations can also be used for the production of illustrations during the initial provisioning process. Such a process is defined in S2000M.

The illustrations used in the IPD publication are identified as "Figures". The purpose of these figures is to clearly depict the detailed parts in disassembly order. If one illustration page is insufficient for the presentation of an assembly, a figure is spread over several illustration sheets.

## 2.2 Multimedia - Introduction

The implementation of multimedia elements to projects requires testing in the role in which it is to be used and support environment in which it will operate. Consideration must be given to display backgrounds, colors and presentation methods used. Working conditions such as, lighting, weather and noise levels can have a major impact on the ability to use or understand the presentation. All media projects must be appropriately tested before delivery.

Once all these factors have been considered and defined in the project requirements plan, agreement can then be reached on the user interface and delivery methods to be deployed.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Scope of printable data**. The project or the organization must determine which parts of the documentation need to be printable.

**Multimedia technologies and environment**. The project or the organization must agree to the multimedia technologies and the expected environment in which it will operate.

# Chapter 3.9.2.1

## *Illustration rules and multimedia - Illustrations, General*

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# 1 General

This chapter provides the primary rules for the creation of 2D illustrations with basic illustration examples.

# 2 The primary rules of illustration

Illustrations must communicate to the user in a simple, clear and economical way and visually enhance the technical information required by the user to perform the intended task. Illustrations must be prepared in accordance with the text and other information in data modules, such that the end user receives the maximum amount of information (description of systems, components, operation, task execution, etc).

The following is a general guide to help the illustrator and publication designer create illustrated information inline with the above principles:

- The information given must provide the end user with the maximum information for the output media (on paper or IETP) used.
- Illustrations must be prepared to present the view and scale that is most favorable for the user.
- Illustrated parts must be clearly identifiable to the user and annotated appropriately. If required for clarification, a location drawing (refer to Chap 3.9.2.2) and/or direction indicators are used.
- Location arrows, leader lines, annotations, etc must be clearly shown and free from surrounding detail.
- Reusability and uniformity are of prime importance for clarity and the complete set of information. Uses of "typical" and "natural" views for similar equipment are important elements in good illustration.

- The illustrations must be clear, showing only the detail required and what is being described to the user. The inclusion of unnecessary details, such as shaded areas, as well as the presentation of detailed parts not visible in the perspective view by using broken lines, must be avoided. Fig 1, Fig 2, Fig 3, Fig 4, Fig 5 and Fig 6 give the general rules for the clarity of illustrations. The exact presentation of details, such as threads on screws or their head style, can be omitted. Limit the artistic effects, do not use shadow effects. The use of artistic embellishment is to be limited and only used to add visual clarity for the user.
- The level of detail in the illustration must be measured, simple and relevant to the amount of information that the end user can process. Highly detailed source material like 3D Computer-Aided Design (CAD) data, digital mockups or 2D drawings, can risk complex and unnecessary modifications.
- Always construct the layouts, building the illustrations logically and in sequence in accordance with Chap 3.9.2.2.
- Graphics must be produced to a realistic and sensible size. Whenever the scale of a graphic does not allow small detail to be clearly shown, these details must be enlarged.
- Where the disassembly order or detail parts can be properly identified from the plan view representation of a production drawing, that representation must also be used in the illustration. This form is applicable to items such as hose assemblies, control rods, clamps, instrument panels, circuit boards or ground equipment. Refer to Fig 7, Fig 8, Fig 9, Fig 10 and Fig 11.
- Do not overcrowd the illustration reproduction area.
- If several identical parts are used in the same assembly, only one of them need be illustrated if it is possible to positively allocate them to their respective location and/or orientation.
- Wiring or system diagrams, schematics or other charts where symbols are used are also acceptable as an illustration if they provide for the proper identification of the detail parts. Refer to the black and white example in Chap 3.9.2.3.
- The project must decide if schematics derived from engineering drawings include the original drawing number and revision status within the illustration reproduction area.
- Present graphics in accordance with the output media.
- Consider final requirements within project business rules.

## 2.1 Mode of presentation

### 2.1.1 Specific rules and recommendations for illustrations in page-orientated publications

For ease of reading and cross-referencing, the preferred layout is portrait (IPD illustrations are always to be in portrait layout). Foldouts or landscape are only allowed as exceptions, as defined in the project business rules.

### 2.1.2 Specific rules and recommendations for IETP illustrations

In comparison to the page orientated (paper) documentation, the following deciding restrictions are no longer relevant or additional possibilities are available for screen presentation:

- Fundamentally, no constant, printable page layouts are required. Only the necessary illustration part is displayed on the screen in the required size. However the need for printing of data module pages or the illustration itself must be considered.
- Objects are named to facilitate easy reference to multiple components of an illustration that have the same name. For example, graphic objects can be given a name applicable to a certain configuration with the same name. It can also be useful to name sets of hotspots that need to be turned on and off. Naming schemes and groupings must be coordinated.
- Information regarding graphic object identifiers, names, or coordinates that will be referenced in an IETP must be documented and communicated in such a manner that hotspots can be defined.
- The use of color to show the clarity of important information has priority.

– All forms of picture presentation can be used, such as color photographs, bitmaps of 3D models and electronic legacy data providing that they are in accordance with the data format in this specification.

## 2.2 Illustration sizes, line weights, typeface and type size

### 2.2.1 Illustration sizes and orientation

The following illustrations sizes can be used in data modules: full page, flexi height and landscape fold out. The final illustration reproduction areas are given in Table 2.

*Table 2 Illustration reproduction areas*

| Page sizes | A4 and US A size publications | A5 publications | US 5 inch x 8 inch publications |
|---|---|---|---|
| Full page | 170 mm x 222 mm[1] | 120 mm x 157 mm | 105 mm x 137 mm |
| Flexi height | 170 mm x (45 thru 210 mm)[2] | 120 mm x (30 thru 175 mm) | 105 mm x (25 mm thru 137 mm) |
| Fold out | 360 mm x 222 mm | 254 mm x 157 mm | 222 mm x 137 mm |

1 Illustrations primarily to be used in illustrated parts data must always be full page A4, ie 170 mm x 222 mm
2 Using height 210 mm allows for a heading on the top of the page

For illustrations used as symbols in the text, the illustration reproduction area is the symbol size.

The preferred illustration reproduction area sizes, defined in Table 2, are used as a guideline when producing IETP illustrations. The preferred orientation is portrait. However the final size and orientation of an illustration for an IETP must be designed and delivered around the individual project. The project or the organization must bear in mind the need for printouts from the IETP.

### 2.2.2 Line weights, and text style

#### 2.2.2.1 Line weights

Line weights, typeface, type sizes, symbols in illustration representation and general standards are all defined in this chapter as they would appear at a scale of 1:1 in a paper publication. Table 3 gives a summary of line weights and their primary use.

**Black and white illustrations**. Line weights, typeface and type sizes in illustrations must be prepared according to the rules shown in Fig 1.

**Color illustrations**. Line weights, typeface and type sizes in illustrations must be prepared according to the rules shown in Fig 2 and/or Fig 3.

**Note**

The dashed (170 mm x 222 mm) border line in Fig 1, Fig 2 and Fig 3 gives the illustration reproduction area and can be used to check the scale.

The distance between two lines must at least be equal to the sum of the weights of these lines.

The project or the organization must decide if color is used in the final deliverables.

*Table 3 Lines - Their primary use and weights*

| **Line weight use** | **Color illustration, 2 line weights** | **Color illustration, 3 line weights** | **Black/White illustration, 3 line weights** |
|---|---|---|---|
| | Weight Fig 3 | Weight Fig 2 | Weight Fig 1 |
| Hidden lines, leader lines and center/projection lines, line shading and section lines, location drawings, reference structure/items | 0,18 mm | 0,18 mm (or 0,25 mm) | 0,18 mm (or 0,25 mm) |
| Illustration of items | 0,18 mm | 0,35 mm | 0,35 mm |
| Highlighted items and highlighted reference structure | 0,50 mm | 0,50 mm | 0,50 mm |

1 Illustrations of items
2 Reference structure/items
3 Center lines / Projections lines
4 Hidden lines (to be avoided)
5 Leader lines
6 Highlighted item
7 Highlighted reference structure

Lines

| | | |
|---|---|---|
| Illustration of items/Object lines | 0,35 mm | |
| Hidden lines<br>Leader lines<br>Center lines/Projection lines<br>Line shading and section lines<br>Location drawings<br>Reference structure/items | 0,18 mm<br>(or 0,25 mm) | |
| Highlighted items<br>Highlighted reference structure | 0,50 mm | |

Letters

**Annotations**

Sanserif type (eg Univers, Helvetica, Arial) 8 pt to 10 pt light (Cap-height 2,0 mm to 2,7 mm) written in upper or lower case as decided by the project

**Item numbers**

Sanserif type (eg Univers, Helvetica, Arial) 10 pt light (Cap-height 2,5 mm to 2,7 mm)

ICN-AE-A-030902-G-S3627-00003-A-11-1

ICN-AE-A-030902-G-S3627-00003-A-11-1

*Fig 1 Black and white illustrations - General rules, 3 line weights*

1 Illustrations of items
2 Reference structure/items
3 Center lines / Projections lines
4 Hidden lines (to be avoided)
5 Leader lines
6 Highlighted item
7 Highlighted reference structure

Lines

| | | |
|---|---|---|
| Illustration of items/Object lines | 0,35 mm | |
| Hidden lines<br>Leader lines<br>Center lines/Projection lines<br>Line shading and section lines<br>Location drawings<br>Reference structure/items | 0,18 mm<br>(or 0,25 mm) | |
| Highlighted items<br>Highlighted reference structure | 0,50 mm | |

Letters

**Annotations**

Sanserif type (eg Univers, Helvetica, Arial) 8 pt to 10 pt light (Cap-height 2,0 mm to 2,7 mm) written in upper or lower case as decided by the project

**Item numbers**

Sanserif type (eg Univers, Helvetica, Arial) 10 pt light (Cap-height 2,5 mm to 2,7 mm)

ICN-AE-A-030902-G-S3627-00003-B-12-1

ICN- AE-A-030902-G-S3627-00003-B-12-1

*Fig 2 Color illustrations - General rules, 3 line weights*

1 Illustrations of items
2 Reference structure/items
3 Center lines / Projections lines
4 Hidden lines (to be avoided)
5 Leader lines
6 Highlighted item
7 Highlighted reference structure

Lines

| | | |
|---|---|---|
| Illustration of items/Object lines | 0,18 mm (or 0,25 mm) | |
| Hidden lines | | |
| Leader lines | | |
| Center lines/Projection lines | | |
| Line shading and section lines | | |
| Location drawings | | |
| Reference structure/items | | |
| Highlighted items | 0,50 mm | |
| Highlighted reference structure | | |

Letters

**Annotations**

Sanserif type (eg Univers, Helvetica, Arial) 8 pt to 10 pt light (Cap-height 2,0 mm to 2,7 mm) written in upper or lower case as decided by the project

**Item numbers**

Sanserif type (eg Univers, Helvetica, Arial) 10 pt light (Cap-height 2,5 mm to 2,7 mm)

ICN-AE-A-030902-G-S7282-00372-A-05-1

ICN-AE-A-030902-G-S7282-00372-A-05-1

*Fig 3 Color illustrations - General rules, 2 line weights*

2.2.2.2 Text style

The text annotation font must be of Sanserif type (eg Univers, Helvetica, Arial). The size must be 8 pt to 10 pt light (Cap-height 2,0 mm to 2,7 mm), written in uppercase or sentence case as decided by the project.

Basic rules for use of capitals (uppercase characters) and highlighting of text apply. Refer to Chap 3.9.1.

The font for item numbers must be of Sanserif type (eg Univers, Helvetica, Arial). The size must be 10 pt light (Cap-height 2,5 mm to 2,7 mm). Refer to Fig 4 and Fig 5.

**Note**

Exception is made for wiring diagrams or similar situation where the text style is ruled by the settings in the diagram generating application.

## 2.3 Symbols

### 2.3.1 International System of units (SI units) and symbols

In general, Système International d'Unites (SI) units and International Standards Organisation (ISO) standards apply as stated in the writing rules. Projects however, can specify additional standards.

### 2.3.2 General symbols

General symbols for illustrations and photographs (eg arrows and direction indicators) must be prepared in accordance with the examples given in Fig 4 and Fig 5. Hatches, solids, raster and pattern fills must apply as given in Fig 6. Refer to Chap 3.9.2.3.

## 2.4 Halo

To clarify the readability of an illustration it is necessary to emphasize eg the path of a leader line to a component when they intersect other geometry inline drawings and photographs. This is achieved by the use of a halo:

- on each side of leader lines, hidden lines, center/projection lines and reference structure/item lines
- around dimension arrows, brackets, direction arrows, multipliers, etc

The halo must be approximately 1 mm on each side of the general symbols. Refer to Fig 5.

ICN-AE-A-030902-G-S3627-00004-A-10-1

*Fig 4 General symbols - Illustrations*

ICN-AE-A-030902-G-S3627-00004-B-10-1

*Fig 5 General symbols - Photographs*

ICN-AE-A-030902-0-U8025-00562-A-02-1

*Fig 6 Standard fills*

## 2.5 Type of illustrations

Normally, illustrations are prepared as line drawings. Subject to agreement with the customer, full color illustrations, photographs and monochrome (half tones) can be used, provided they meet all requirements to show clear details. Again, cognizance is to be taken of any project output requirements. The following types of drawings are used:

- **Isometric projection** (30°/30°, ellipse 35°). This is the preferred 3-dimensional drawing method for detail, exploded views or larger installations and must remain in the classical LTF (left top forward) orientation. Refer to Fig 1, Fig 2 and Fig 3.
- The **exploded view** of IPD illustrations must be shown in the correct disassembly order. If necessary, details can be shown in a different isometric orientation.
- As an alternative, **trimetric projection** can be used.
- **Perspective**. Normally used only for abnormally large components such as aircraft fuselage, wing sections and tail assemblies. Perspective can also be used for location drawings. For technical publications, the orientation of the mechanics viewpoint is permitted.
- **Orthographic projections**. These 2-dimensional illustrations are used each time this kind of presentation adequately serves the purpose.
- **Diagrams/Schematics**. This type of presentation is used to explain the operation of a system or a circuit.
- **Graphs**. This type of representation is used to explain the relation between various parameters.

## 2.6 Resolution for illustrations

The preferred resolution for illustrations is 300 dots per inch (dpi). The data standards definitions for the incorporation of images are described in Chap 4.8.

## 2.7 Use of hatch styles, solids, raster and pattern fills

To highlight areas, show flows or to differentiate materials, hatch styles, solid, raster or pattern fills are used. When using color fills bear the output demands in mind.

The recommended hatch styles, solids, raster and pattern fills are given below.

The S1000D and ATA/Aerospace Industries Association of America (AIA) graphics standards are still undergoing harmonization work and a defined set of fills with a proposed statement of use will be issued later. The approved use and defined style of CGM hatch style definition settings are given in Table 4 below. Refer to Fig 6.

**Hatches**: The CGM Version 3 "Hatch Style Definition" element allows for the definition of a hatch style and associates it with an index by which it can be used within the graphic.

The indexes are negative, to avoid conflict with standardized or registered values.

The duty cycle length settings in the following Table 4 are based on a unit of 0,0254 mm. Table 4 gives the hatch style definition settings.

**Solids**: This fill type allows for the use of color values to indicate filled areas.

**Raster**: This fill type allows for the use of predefined raster to indicate filled areas.

**Pattern**: This fill type allows tiled designs represented as a bitmap. Standard pattern indexes have not been defined.

*Table 4 Hatch style definition settings*

| Hatch index | Style indicator | Hatch directions | Duty cycle length | Number of hatch lines | List of gap widths | List of line types |
|---|---|---|---|---|---|---|
| -1 | Parallel | 45 | 28 units | 1 | 4 | 1 |
| -2 | Parallel | 135 | 28 units | 1 | 4 | 1 |
| -3 | Cross | 45, 135 | 28 units | 1 | 4 | 1, 1 |
| -4 | Parallel | 45 | 49 units | 1 | 7 | 1 |
| -5 | Parallel | 135 | 49 units | 1 | 7 | 1 |
| -6 | Cross | 45, 135 | 49 units | 1 | 7 | 1, 1 |
| -7 | Parallel | 45 | 70 units | 2 | 3, 7 | 1 |
| -8 | Parallel | 135 | 70 units | 2 | 3, 7 | 1 |
| -9 | Parallel | 45 | 70 units | 1 | 10 | 1 |
| -10 | Parallel | 135 | 70 units | 1 | 10 | 1 |
| -11 | Cross | 45, 135 | 70 units | 1 | 10 | 1, 1 |
| -12 | Parallel | 45 | 98 units | 2 | 4, 10 | 1 |
| -13 | Parallel | 135 | 98 units | 2 | 4, 10 | 1 |

## 2.8 Information Control Number - ICN

Each illustration must be allocated an ICN. If specified to appear on the illustration reproduction area, the ICN is located within the lower right hand corner as shown on Fig 1, Fig 2 and Fig 3.

In order to avoid redundancy, an illustration sheet can be referred to in different contexts. Thus an illustration sheet can belong to different figures with different titles.

The ICN addresses an illustration sheet including its update status independently of the status of a data module or publication where it is used within a figure.

The details describing the use of ICN and its breakdown are laid down in Chap 4.4. Refer to Fig 7.

ICN-AE-A-030902-0-C0419-00118-A-02-1

*Fig 7 Illustration example - Plan view non-exploded*

## 2.9 Reference illustrations/structure

Reference illustrations (phantom representation) of structure and assemblies which are not part of the assembly to be illustrated, but which show assembly relationship, are to be shown using reference structure line weights or defined colors without item numbers and leader lines. Wherever possible, reference illustrations are not itemized. Refer to Fig 1, Fig 2, Fig 3, Fig 8 and Chap 3.9.2.3.

ICN-AE-A-030902-G-S7282-00148-A-04-1

*Fig 8 Illustration example - Item tabulation of similar content*

## 2.10 Callouts and leader lines

### 2.10.1 General

Callouts can be written as annotations (direct annotations) or as item numbers (indirect annotations). If item numbers are used, they must be explained in a legend within the illustration reproduction area or in the related text. The indirect method of annotations is preferred, especially if the data module or technical publication has to be translated. Refer to Chap 3.9.2.2 and Chap 3.9.2.3.

General guidelines for item numbers:

- Use a separate graphical text element (in a sensitive area) for each item number. This applies equally to tabulated items and multiple indexing (refer to Fig 8 or Fig 11).
- Use three separate graphical text elements for mirrored items, the first for the opening bracket, the second for the item number and the third for the closing bracket (refer to Chap 3.9.2.2).
- Use uppercase letters for item number variants. Refer to Chap 3.9.2.2.

If it is necessary to quantify an item number (attaching parts), use lowercase multiplier "x" as shown in Chap 3.9.2.2.

General guidelines for multipliers:

- Put the multiplier and the appropriate quantity to the right of the respective item number.
- Leave a space between the item number and the multiplier information (eg "1 x3").
- Use two separate graphical text elements (in sensitive areas) in the illustration.
- Do not use multipliers if an item is cross-referenced and shown more than once, regardless if the item number is the same or different.

Examples of multiplier presentations are shown in Chap 3.9.2.2. For the text style of callouts refer to Para 2.2.2 and Fig 1, Fig 2 or Fig 3.

Leader lines must:

- be as short as possible
- stop the line before an item
- be stopped with a dot when entering a part
- only have arrowheads in exceptional circumstances to promote clarity (eg in graphs)
- be "laid free" (halo) to clarify the path to the component when they intersect other geometry

### 2.10.2 Item numbers and leader lines in IPD illustrations

In addition to the above, the following rules apply for the annotation of IPD illustrations:

The number of locations shown in the illustration must correspond with the quantity per next higher assembly indicated in the text for the item. This requirement can be achieved by the following methods:

- by illustrating and separately referencing the different locations of an item. Refer to Fig 12, Item 26.
- by the number of leader lines (more than one leader line pointing to the same item number). Refer to Fig 12, Item 28.
- by the number of identical key characters (letters) if a detail illustration applies to more than one location. Refer to Chap 3.9.2.2 and Fig 12, Item A.
- By using the multiplier "x" after the item number followed by the appropriate quantity. This procedure is permissible only if all locations cannot be shown (refer to Fig 12, Item 4) or where, for practical and economic reasons, it is desirable to omit additional reference lines (eg where installation locations are clearly identifiable but the extensive use of additional information such as repetitive item numbers, detail illustrations, etc would make an illustration unnecessarily difficult to read). Refer to Chap 3.9.2.2.

If hotspots are needed for the production of the IETP IPD information set, links between the illustration and the IPD data can be provided using the element <hotspot> in accordance with Chap 3.9.5.2.1.8.

## 2.11 Center lines/projection lines

Center lines/projection lines are used in illustrations to indicate how detail parts and assemblies match.

The projection line must be routed through at least one hole, or to a prominent reference point of the detail part/assembly.

Projection and centerlines must be "laid-free" at the intersection with other geometry.

The centerline represents the imaginary line through a center of an item/assembly.

If possible, projection lines/center lines must be without bends or 90° turns.

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*Fig 9 Illustration example - Cathode Ray Tube (CRT) screen*

ICN-AE-A-030902-0-C0419-00116-A-02-1

*Fig 10 Illustration example - Plan view schematic with clamps*

ICN-AE-A-030902-0-C0419-00117-A-02-1

*Fig 11 Illustration example - Plan view ground equipment*

ICN-AE-A-030902-G-S7282-00146-A-07-1

*Fig 12 Illustration example - Navigation within IPD, more than one sheet (Sheet 1 of 2)*

ICN-AE-A-030902-G-S3627-00147-A-06-1

*Fig 12 Illustration example - Navigation within IPD, more than one sheet (Sheet 2 of 2)*

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Engineering numbers and revision status**. The project or the organization must decide if schematics derived from engineering drawings include the original drawing number and revision status within the illustration reproduction area. Refer to Para 2.

# Chapter 3.9.2.2

## *Illustration rules and multimedia - Navigation and configuration*

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# References

*Table 1 References*

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| Chap 3.9.5.2.1.8 | Common constructs - Hotspots |
| Chap 7.3.2 | CSDB objects - Graphics |

# 1 General

This chapter defines and explains navigation and configuration of illustrations. It is to be used in conjunction with Chap 3.9.2.1.

# 2 Navigation and configuration content

This chapter covers various aspects, production, and use of navigation symbols with rules and guidance for the configuration of illustrations.

## 2.1 Navigation rules

### 2.1.1 Use of hotspots

Hotspots are sensitive areas in illustrations necessary for creation of links used to navigate within technical publications. This area can be activated by hyperlinks from:

- text in a data module to one area of an illustration
- text in a data module to several areas of an illustration
- one area of an illustration to the data module text
- one area of an illustration to another area of the same illustration
- one area of an illustration to an area of another illustration
- one area of an illustration to another data module
- one area of an illustration to parts information

The sensitive area can be represented by:

- callout numbers (can include the leader line)
- the itemized graphic elements or their surface
- callout numbers including leader lines and itemized graphic elements (or their surface)

Highlighting the sensitive area by touching with the cursor is a viewer constraint. Examples of sensitive areas and their presentation are given in Fig 1.

| Sensitive areas | Presentation | Type | Example given in |
|---|---|---|---|
| 21 x2 | 21 x2 | Multiplier | Chap 3.9.2.1 |
| 87R | 87R | Reference designator | Fig 10 |
| 13<br>14<br>15 | 13<br>14<br>15 | Item number | Chap 3.9.2.1 |
| 1 3216VE | 1 3216VE | Item number + reference designator | Fig 11 |
| (7) | (7) | Item number for mirrored item | Fig 2 |

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*Fig 1 Sensitive area examples and their presentation*

A hotspot can be turned on or off by changing the visibility of the sensitive area. A hotspot is considered visible unless the attribute `visibility` of element <`hotspot`> overrides the default.

To set up links between data module text and illustrations, or between illustrations, cross-reference identifiers are necessary. The required target address is the identifier of the hotspot within the illustration.

The sensitive area is defined by using the WebCGM Application Structure (APS) attribute `region`. The display area of the target in a graphic is defined by the WebCGM APS attribute `viewContext`.

For the creation of hotspots and the control of dynamic behavior of the illustration, the S1000D CGM profile defined in Chap 7.3.2 applies. The methods of implementing and using hotspots are given in Chap 3.9.5.2.1.8.

### 2.1.2 Graphical access

The graphical access to information in an IETP can be achieved with illustrations and hotspots to relevant data modules. This is helpful if the user knows the item but not the name or naming conventions.

As well as using the table of contents via viewer to get access to the applicable part of the document, the user can also use illustrations in different detailed sections. This is achieved by the use of hotspot technology and the applicable detailed illustrations as described in Chap 3.9.5.2.1.8. This chapter includes the concept of defining and accessing information about an illustration in addition to its visual image for the purpose of hyperlink and navigation.

## 2.2 Figure title and number

In order to establish the relationship to the text of a data module or publication, illustrations must be given figure numbers and titles. The figure number reflects the sequence in the data module or publication.

For IPD illustrations, the figure title must be identical with the description for part given against the item number "0" (zero) of the figure.

Figure titles are part of the data module or publication text.

Figure numbers must be generated on output only.

The figure number, followed by the title, must be centered at the bottom of the page outside the illustration reproduction area. The figure number and the title must be separated with two blanks. If an illustration requires several illustration sheets, the note (Sheet X of Y) must be added at the end of the title as shown in Chap 3.9.2.1. Figure number, title, and note are not to exceed two lines.

Illustrations used as symbols (element <symbol>) are not to be given a figure number, figure title, nor have the ICN presented/printed.

As an alternative, an individual figure number can be appended to each illustration sheet, eg:

- Fig 7.1 Computer (Sheet 1 of 2) and Fig 7.2 Computer (Sheet 2 of 2)
- Fig 1 Pump (ACDC) (Sheet 1 of 2) and Fig 1 Pump ACDC (Sheet 2 of 2)

**Note**

In this issue of S1000D, the figure numbering follows both the basic rules and the alternative with individual unique figure numbers.

## 2.3 Location drawings

The location drawing normally appears in the upper left corner of the illustration. It shows the position of the assembly relative to the vehicle/equipment/assembly and represents the view most favorable for the illustration. In the case of airframes and engines, this can be supplemented by adding stations (STA), zones (Z), or frame (FR) areas.

The part to be pointed out in a location illustration or photograph can be identified by darkening the outlines, blackening or standard blue or using tints. Location illustrations are not required where the illustrated system or assembly can be positively located. Refer to Fig 2.

If a detail part can be properly identified in an overall view, the illustration of the part need not be exploded. Refer to Chap 3.9.2.1.

Examples are shown on Fig 3, Fig 4, Fig 5, Fig 7, Fig 8, and in Chap 3.9.2.1 and Chap 3.9.2.3.

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*Fig 2 Illustration example - Mirrored items and detail without location*

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*Fig 3 Color illustration example - Use of views for typical navigation*

ICN-AE-A-030902-G-S7282-00005-A-05-1

*Fig 4 Black and white illustration example - Use of views for typical navigation*

ICN-AE-A-030902-G-7282-00006-A-06-1

*Fig 5 Illustration example - Typical navigation from general view to section*

ICN-AE-A-030902-G-S7282-00150-A-04-1

*Fig 6 Illustration example - Identification of components on complex circuit board (Sheet 1 of 2)*

ICN-AE-A-030902-G-S7282-00151-A-05-1

*Fig 6 Illustration example - Identification of components on complex circuit board (Sheet 2 of 2)*

ICN-AE-A-030902-G-S7282-00153-A-04-1

*Fig 7 Illustration example - Cockpit presentation*

## 2.4 Illustration of views, details and sections

### 2.4.1 General

If enlarged views, details, and sections are to be shown, they must be located on the illustration in alphabetic order. It is preferable to start in the top right corner of the illustration with View A/Detail A/Section A-A (whichever applies) and proceed, if possible, in a clockwise mode locating as necessary.

Section cut-lines and section arrows must conform to the perspective of the view.

For location of hidden details not visible on main views, use broken locating arrows.

Use general symbols for presentation in accordance with Chap 3.9.2.1.

Examples are shown on Fig 3, Fig 4, Fig 5 and Fig 7.

### 2.4.2 IPD illustrations

The allocation of the capital letter identifying the "assembled item" is necessary where the "assembled items" cannot be shown in the main illustration (either they have a single collective part number, and therefore attract an item number, or not).

A location drawing refers out by means of an arrowhead and capital letter to a detailed illustration of an assembly (refer to Para 2.3). This assembly also has its own part number and therefore an item number, both, the capital letter and the item number will appear as shown in Chap 3.9.2.1.

If several separate detail part illustrations are necessary within the same figure, they must be initially identified on the first illustration sheet of the figure (ie in the main illustration). The detail part illustrations can then appear on additional illustration sheets, if necessary.

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*Fig 8 Illustration example - Navigation via frame stations*

## 2.5 Identification of electrical and electronic components

### 2.5.1 General

If electrical or electronic components require identification by circuit reference designators, the designators must either be included in a legend and/or within the associated text, but not included within the illustration itself.

In the case of orthographic illustrations, eg a printed-circuit board, item numbers applied within the boundary of the component or by leader lines can be used. Examples are shown in Fig 6, Fig 8 and Fig 9.

### 2.5.2 IPD illustrations

Electrical components in IPD illustrations must not be referred to in a legend or associated text. If annotations of the reference designators make an illustration difficult to read because of the congestion of annotations, an illustration must be repeated on several illustration sheets. Each sheet will identify a different range of the total number of components.

In an isometric view, the reference designator must be positioned near the item number of the relevant component.

If the illustrated size of components is insufficient for each to be annotated, the reference designators can be assigned to the components by the use of reference lines or by arranging them besides the component in such a way that their relationship to the component is clearly recognizable.

The use of reference designators does not replace the need for item numbers. Refer to Fig 10.

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*Fig 9 Illustration example - Identification of components on simple circuit board*

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*Fig 10 Illustration example - Identification of components on complex circuit board using direct method*

ICN-AE-A-030902-0-C0419-00115-A-02-1

*Fig 11 IPD illustration example - Reference designator and item number*

## 2.6 Mirrored items

Illustrate the Left Hand (LH)/TOP/Forward (FWD) part only. If item numbers of the part not shown are different, then they can be contained within brackets below or above the item number of the illustrated part. The leader line must go to the item number of the part which is illustrated.

A deviation from this rule is permitted if the mirrored parts differ in detail or if for evaluation, it is preferable to illustrate another part, eg a right-hand part.

Appropriate references to the detail parts of a mirrored item, such as "LH only", "Right Hand (RH) only", "LH shown", "RH shown", can be included in the illustration. An example is given in Fig 2.

## 2.7 Illustration of different configurations

Illustrated configuration deviations normally record the appropriate Usable on Code Assembly (UCA), or Usable on Code Equipment (UCE), or the Effectivity next to the detail part concerned. Refer to Fig 11 and also S2000M, Appendix 1, Data Dictionary for details.

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*Fig 12 Illustration example - Different configurations*

## 2.8 Item tabulation

In cases where visually similar components appear at a number of different locations within one figure, it is permissible to illustrate them only once. The locations and the item numbers can be indicated by multiple indexing or tabulation on the illustration. Refer to Chap 3.9.2.1.

## 2.9 Attaching parts (IPD illustrations)

If a number of identical attaching parts is used for a detail part or assembly, the installation locations of all attaching parts must be identified in accordance with Para 2.3.

If the order of sequence of the attaching parts can not be discerned from the illustration - but if it is absolutely necessary for comprehension - a breakdown example in the sequence of removal must be given.

Where identical attaching parts are fitted at several locations, but the orientation differs, the illustrations must be annotated to show the correct orientation at each fitment point.

Plate nuts must not be illustrated, but the bore must indicate their location and rivet holes on the respective component.

# Chapter 3.9.2.3

## *Illustration rules and multimedia - Use of color and photographs*

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# 1 General

The electronic environment presents opportunities for the enhancement of graphical technical data by introducing color and photographic images. This chapter contains the required information and rules to produce and deliver color illustrations and photographic images to visually improve the users' interpretations of technical data.

# 2 Use of color and photographs

## 2.1 Rules and recommendations for color illustrations

The introduction of color has a profound effect in the way in which we can deliver technical information to the user. However, along with all the benefits it brings, caution must be used in the application of color in critical information situations. The following rules and recommendations must be used:

- In critical information situations, colors must be supported with another method of identification, distinctive symbols, markings, banding or wording. Refer to Fig 7, Fig 10 and Chap 3.9.2.1.
- If color is used and assigned a unique meaning to perform a described procedure then no more than six colors must be used. More than six and the user will experience difficulty remembering the entire assigned color scheme and this is detrimental to carrying out the described task. However this does not mean that only six colors can be used in any one project, it means that careful consideration is to be given when assigning specific colors and meaning to a task. Refer to Table 2 and Fig 1.
- The cultural color conventions must not be disobeyed, red is for danger, yellow for warning and green for safe or exit. Red and yellow must be reserved for alerts, warnings and selective highlighting. Refer to Table 3.
- Color must be used consistently throughout an IETP and in printed material preserving conventional practices and arrangements.
- Where color is used in unusual environments, artificial illumination, night vision goggles, red lighting and emergency situations the ability to display correctly as intended or appear as designed in printed material must be ensured.
- The implementation of color requires testing in the role in which it is to be used and support in the environment in which it will operate. Consideration must be given to backgrounds used, or which colors are positioned next to each other. Colors will appear different, lighter or darker, because of effects on color hue.
- For aircrew publications, the illustrations must use the appropriate color if the use of color on the displays has a semantic meaning. Refer to Fig 3.
- If appropriate, consideration is to be given to the visual compatibility and color accuracy with operational equipment or controls with the color information contained in IETP illustrations.

– If line drawings are produced from 3D engineering drawings, they are only modified to show important details more clearly. Different thickness of lines is not necessary in an IETP. The difference between the reference structure and callout parts must be presented by the different colors in the illustrations and defined in the project business rules.

### 2.1.1 Photographs

Photographs are still raster images, generated through one of the following methods:

– film or digital photography
– digital scanning
– nondestructive test methods
– computer generation

Photographs include photo-realistic computer generated images. Refer to Fig 2, Fig 3 and Fig 4.

Photographs can be used equivalent to line art illustrations, if the creation is more economic and applicable for:

– aged illustrated parts documentation
– maintenance tasks of crowded compartments
– training documentation
– documentation of non-destructive test results

## 2.2 Use of color

The prime objective of this section is to define the use of color, ensure uniformity and to deliver color accuracy in displayed and printed technical publications. However, this section can not define a "fits all" easy solution to color by assigning a unique or tight inflexible meaning to a whole spectrum of colors. This is unwise following careful research into color use and the resulting complexities of color behavior in unusual or special lighting environments.

Therefore with due consideration of too many factors, the following eleven color specification and guidance was produced. It was defined in joint consultation with the ATA/Aerospace Industries Association of America (AIA) and S1000D committees to define colors for illustrations in support of textual documentation. Refer to Fig 1.

### 2.2.1 The S1000D standard color palette

Table 2 gives the recommended S1000D standard color palette defined in Red/Green/Blue (RGB), Pantone and Cyan/Magenta/Yellow/Key (CMYK) values. The use of these colors is subject to the same guidelines and considerations as given in Para 2.1.

*Table 2 The S1000D standard color palette*

| Color | RGB value | Pantone value[1] | CMYK value[1] | | | |
|---|---|---|---|---|---|---|
| Red | R255 | Red 032 | C 0% | M 100% | Y 100% | K 0% |
| Yellow | R255 G255 | Yellow | C 0% | M 0% | Y 100% | K 0% |
| Blue | B255 | 300 | C 100% | M 43% | Y 0% | K 0% |
| Green | G255 | 375 | C 43% | M 0% | Y 79% | K 0% |
| Orange[2] | R255 G102 | 1585 | C 0% | M 60% | Y 94% | K 0% |
| Amber[2] | R255 G153 | 1385 | C 0% | M 38% | Y 94% | K 0% |
| Cyan | G255 B255 | 304 | C 31% | M 0% | Y 6% | K 0% |

| Color | RGB value | Pantone value[1] | CMYK value[1] | | | |
|---|---|---|---|---|---|---|
| Magenta | R255 B255 | 238 | C 18% | M 83% | Y 0% | K 0% |
| Light blue | R204 G255 B255 | 566 | C 23% | M 0% | Y 10% | K 0% |
| Light yellow | R255 G255 B204 | 600 | C 0% | M 0% | Y 20% | K 0% |
| Light grey | R204 G204 B204 | 420 | C 23% | M 17% | Y 17% | K 0% |

1 The Pantone and CMYK values are currently only a suggestion

2 While both orange and amber were deemed desirable by members of both ASD and ATA working groups, it is recommended that these two colors are not used together. In grayscale, amber appears as a darker grey than light blue or light grey. Refer to Fig 7 and Fig 10.

As appropriate, colors introduced into projects must be prepared according to the rules in Para 2.2.2 and as detailed in the standard color palette detailed above in Table 2. Refer also to the illustration examples shown in Fig 5, Fig 6 and Fig 7. The use of this color palette can also be applied to legacy projects.

Table 3 provides guidance for selecting colors.

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*Fig 1 Standard color palette*

**2.2.2 The use of color to represent a hierarchy of structure**

If color is used, it must represent the following hierarchy of structure. This means that colors used for an individual part will change between detail views, in accordance with its status within that view.

Refer to Fig 6 and Fig 7, where a part that is removed in a particular view will, along with its attaching parts, be light blue. Other parts within the main assembly can be removed in subsequent views and these will be highlighted in light grey.

Along with the appropriate navigational symbols, this will guide the user to the relevant detail view. In this view, the items to be removed and their attaching parts are now colored light blue. The original light blue assembly now represents background structure and is therefore shown in light yellow. This process can be repeated as necessary until the required stratum of information is attained.

If a project adopts hierarchical color representation for structure, then this process must be maintained throughout the life of that project.

*Table 3 Use of color*

| Color | Used for |
|---|---|
| Red | Critical alerts, emergency information, warnings (fuel, danger areas, conflict alert, compressed gas, locked or guard levers). Use this color sparingly. Refer to Para 2.1 and Fig 7. |
| Yellow | Warnings, cautions and emergency rescue points (emergency controls: yellow used with diagonal black bands) |
| Blue | Reference structure, Navigation and special symbols (associated system colors: Hydraulics, Hydraulic power). Refer to Fig 8. |
| Green | Safe and Exit (associated system colors: Power plant, breathing oxygen) |
| Orange | Warnings and danger areas (associated system colors: Pneumatics, Electrical and lubrication) |
| Amber | Flight control warning. Caution for heavy, hot, fragile items and tools. Amber is used to indicate tools that must be removed before returning to service (associated system colors: Electrical power). Refer to Fig 7. |
| Cyan | Hidden lines (associated system colors: Flight controls) |
| Magenta | Highlighting parts, zones on the main locator view and frames sections. Magenta is used to highlight parts or zones on the main locator view. It is applied as line art, outlining the subject item(s) using a 0,50 mm line weight. It is used only on the initial locator view as a starting point for subsequent navigation through a figure and frames sections (associated system colors: Oxygen). Refer to Fig 9. |
| Light blue | It is used for all detail items and attaching parts and is applied as a fill to the relevant parts/area and represents the final stage of the navigation process where the part(s) is called out for identification or a removal/installation procedure. Refer to Fig 9. |
| Light yellow | Is used to indicate all reference items and structure, locator views and peripheral information. It is applied as a "fill" to the relevant parts/area and is used to differentiate background information from detail. Refer to Fig 6 and Fig 9. |
| Light grey | Light grey is used to indicate the main subject(s) on the locator view and on any intermediate sub-locator views. It is applied as a "fill" to the relevant parts/area that, combined with the relevant navigation symbols, guides the user to the appropriate detail views. Refer to Fig 6 and Fig 9. |

| Color | Used for |
|---|---|
| Black | In a hierarchal structure, black is used to represent all line art on detail parts and reference items, leader lines, hatching, dimensioning and text. |

### 2.2.3 The use of non-standard colors

The application of non-standard colors is still to be used in accordance with the rules given in Para 2.1. Careful consideration must be given to maintaining sufficient color variance between details in multi-colored illustrations, wiring diagrams, maps and flow diagrams requiring an extended range of colors.

## 2.3 Use of photographs

Photographs and photo-realistic computer generated images can be used provided they meet all requirements given in Chap 7.3.2 and the primary illustration rules given in Chap 3.9.2. The following rules also apply:

- Text, annotations and symbology overlaid on photographs are to be kept to a minimum and important consideration is to be given to potential changes.
- If text is required to be in within the photographic image, then it must be placed in a white box and existing illustration rules will apply. Refer to examples in Fig 2.
- Photo manipulation, highlighting and masking to show only the detail required or what is being described to the user can be used. The image must still be prepared with its proportions constrained and present a view and scale that is most favorable for the user. Line illustration and color rules will still apply.
- Hotspots can be used in photographic images to create links used to navigate within technical publications. This area can be activated by hyperlinks, also refer to Chap 3.9.2.2.

For the use of leader lines, refer to Chap 3.9.2.2.

Careful consideration must also be given to the file sizes of photographic images within paper and IETP deliverables. If the final publication, including the photographic images, is to be printed then the original images in question must be saved and stored in accordance with the industry standards. This will then ensure that a quality image is printed and delivered to the customer and will also allow future manipulation and amendments to be easily made.

Photographic images used in the production of an IETP must also be maintained as stated above, however the final delivery to the customer is at screen resolution. For further guidance refer to the examples placed in Fig 2.

### 2.3.1 Embedding of color photographs or color line artwork

The location photograph example image (top left) is 276 kbyte in size and displayed at 72 dots per inch (dpi). Refer to Fig 2. The main image on the page is 546 kbyte at 72 dpi and both images are linked and not embedded in the original file to assist smoother and quicker handling. A design for print A4 version including both images at 300 dpi of Fig 2 has a delivered file size of 20 MByte.

Note: Equipment panel is shown at the correct angle to viewer

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*Fig 2 Color illustration example - Use of a photographic image with locator view*

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# Chapter 3.9.2.4

## *Illustration rules and multimedia - Multimedia, General*

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# 1 General

This chapter describes the use and production of multimedia objects.

# 2 Multimedia - Rules and general practices

Multimedia objects and their presentations are used in support of technical textual data. They must be considered secondary and not used in place of verified text. All multimedia insertions must go through the formal S1000D verification process.

## 2.1 Rules and general practices

This chapter is to be used in conjunction with Chap 6.3.1 to build project requirements for the inclusion of multimedia objects in an IETP in accordance with the following principles:

- All multimedia objects must be developed and produced from a validated source of technical information. Individual multimedia objects must be validated before delivery in accordance with the project business rules.
- Multimedia objects must be developed and produced for the chosen project viewer or display platforms used.
- Requirements for media element support, ie plug-ins and viewers, must be defined in the project specific rules for non-textual data.
- Original material must be maintained in its native form for reusability.
- It is recommended that all multimedia objects obey the color conventions in accordance with Chap 3.9.2.3 and the rules described in Para 2.10. It is also recommended that consistency in the use of color be applied across a project.
- An indication that the media is loading and its progress must be visible to the user.
- It is recommended that all multimedia objects are built in individual parts. A portion of a media object that carries out a specific function, eg sounds, images, action codes or video sections, can be used alone or combined with the other parts.

- It is recommended that embedded multimedia objects be designed to display within the main content area as described in Chap 6.3.1. This chapter must be applied to standalone full screen media objects also.

## 2.2 Types of media

The range of media types considered suitable for incorporation into IETP systems includes the following:

- audio
- video
- animation
- 3D modeling

### 2.2.1 Audio - Definition

Audio can be a sound track, audible effect or a pure narrative heard to support, or warn, clarify a procedure or diagnosis steps and actions. All three of these audio objects can be embedded or linked externally with displayed media.

The recommended use of audio:

- natural sounds to clarify the result of actions
- audio that will enhance video, adding information required in performing the displayed actions
- user controlled audio narration from validated technical documentation to enhance user understanding
- aural warnings and audible alarms heard such as, on the flight deck or procedural queue to an action

## 2.3 Video - Definition

The term video in this case means real life moving images of equipment actions, procedural steps or a captured live event. These clips can include audio narration or a sound track. It is recommended that video objects are linked but not embedded within other media objects.

The recommended use of video:

- real images to clarify a complex or rarely required maintenance procedure
- demonstrations
- embedded training
- presentations

### 2.3.1 Interactive or scripted animation - Definition

Animation is the creation of moving 2D or 3D non-dynamic images.

The recommended use of animation:

- the movement of original images to clarify a complex disassembly or assembly procedure
- the illustration of equipment movement and linkage or electrical and liquid flow processes
- demonstration of the principles of science and the states of transition
- assisted equipment or system navigation using multiple objects or active areas
- the illustration of change over timeline
- the movement around or positioning of equipment with hidden or difficult component views

### 2.3.2 Simulation - Definition

Simulation is of a mechanical or software system through a pre-defined path, mimicking both user interaction and response.

## 2.4 Production of audio

The following rules and techniques are for the production of sound tracks, audible effects and audio narration.

The following basic set of rules is common for all three cases but specific rules apply.

- International copyright and intellectual property laws must not be infringed on sound tracks or audio effects, or use copyright free where possible
- Users must be made aware that audible warnings are contained within media projects
- Single audio tracks or multi tracked sounds must be preserved in their native form and remain separated from visual media
- Master recordings must be managed in accordance with Para 2.4.2.
- Media projects must determine whether a sound is internally placed or linked for final delivery. It is recommended that small audio files frequently recurring are handled internally, example beeps or clicks; larger sound tracks or short voice instructions are linked and placed externally. Each method has advantages for different situations and requires testing before the final build and delivery.
- All voice-overs and emulated warnings must maintain accurate diction and natural recognition during loading and streaming. Voice processing must be avoided.
- It is recommended that Simplified Technical English® (ASD-STE100) is used for all narrations or the appropriate technical language.
- Slang must not be used and strong dialects are to be avoided.
- Audio synchronizing with visual media must be automatic with cue points embedded corresponding with text or action being displayed.
- Audio production and technical capture settings must be noted and documented.
- The higher the sample rate of audio the better the quality, lower audio data noise. Audio objects must be produced in accordance with the multimedia example set.

### 2.4.1 Audio capture - Two channel or stereo

All recording must be made taking the modulation up to as near the operating level as possible, ie zero = 0 dB (digital system) or zero volume unit meter, 100 % (on combined or analogue systems). This will avoid clipping/distortion eg sound too quiet or too loud.

Peak Program Meter (PPM) can be set for a particular arrangement, but must reflect a fully modulated recording, ie modulation taken up to the full operating level of the sound equipment.

- Audio master voice recording must be recorded in an acoustically inert environment which causes little or no coloration to the narrator’s voice and is sound proofed against extraneous noise.
- Steps must be taken to ensure sound purity, by using an appropriate microphone to suit the narrator’s voice. It is vital that these constants are adhered to, so that retakes recorded at a later date will seamlessly match the Master Recording (MR).
- Audio mastering minimum standard (origination) to be compatible with video standards or audio for CD disc. For video this must be recorded on a system (capture) capable of a sample rate of 48 kHz at 16 Bit (dual channel).
- Mastering for CD music disc only must be carried out on a system recording at 44 kHz at 16 bit CD audio encoding file.
- Care must be taken at post production stage when using both audio and video within the same project. Different embedded sampling rates may not be compatible within certain applications.
- Changing from one sample rate to another is to be avoided as this needs to be carried out via a process that will anti-alias the sound, changing file formats causes problems of subtle distortion.
- It is recommended that all stages of the electronic equipment chain and media do not introduce more than 0.1 % total harmonic distortion, collectively.

### 2.4.2 Subsequent audio

All subsequent audio editing or processing must be carried out on the system that preserves the quality set by the MR with a Production Master (PM) being produced at the same quality as the master.

Audio MR editing objects for short voice instructions must be prepared according to the rules and to the multimedia example set.

Archiving of MR and publication module must be maintained and it is recommended that compression is applied to a copy of the publication module in accordance with the requirements of the project.

Short audio compressed objects for short voice instructions must be prepared according to the rules and to the multimedia example set.

Minimum compression, rate with the appropriate encoding/codec for narrowband or broadband audio material, must be used to maintain accurate diction and natural sound recognition. It is recommended that a free or an open source codec is used.

### 2.4.3 Low bandwidth network

For minimum and maximum streaming bit rates for audio files hosted on a network, the following restrictions are recommended (kbps = kilobits per second):

- on-demand files over a low bandwidth network (56 kbps down to 28 kbps)
- maximum recommended bit rate is 44 kbps
- minimum bit rate of 8,5 kbps

### 2.4.4 Broad bandwidth network

For minimum streaming bit rates for audio files hosted on a network the following restrictions are recommended:

- on-demand files over a broad bandwidth network (512 kbps to a sustained rate of 256 kbps)
- minimum recommended encoded rate is 64 kbps
- top limits need to be tested with project hardware

### 2.4.5 Control of sound objects

Refer to Para 2.9 for further information.

### 2.4.6 Audio required noise levels

Audio levels are to be recorded (captured) at the maximum levels possible without being over recorded (clipping). It is recommended to control set levels when recording multi-narrators sessions to stop peak overload on one voice which might result in under recording others.

The maximum system noise within a master recording must be better than -65 dB and a post production master a minimum of -60 dB to reduce "hissing".

Noise reduction system (Dolby) encoded information must not be included in the MR, PR, or any other media.

It is vital that all steps be taken to limit voice "essing" and transient noises (door bang) to have as "soft an edge" as possible so that quantization noise is not a factor when subsequent compression is applied, as this will result in distortion.

It is also important to minimize room acoustic from being recorded by using "close micing" techniques, when not using sound booths, but by using this technique all "wind pop" must be eliminated. "Close proximity bass effect" must be controlled, typically 12 dB/octave roll off at 80 Hz on the microphone or at the recording chain input.

All steps must be taken to minimize "noises off", background sounds on location, thus saving corrective editing.

General sound coloration must be controlled, eg no sound like "it's coming up a drain". The use of lip microphones is only permitted in high ambient conditions and where it is part of the production.

## 2.5 Production of video

The following rules and techniques are for the production of video objects which also can include narration and or sound tracks. The following basic set of rules is common for both cases but specific rules apply.

To be effective, a video object for technical publications is to be produced in accordance with the principles below:

- International copyright and intellectual property laws must not be infringed on sound tracks or audio effects.
- Lighting and picture quality must maintain natural color representation throughout the presentation.
- The use of artificial lighting in the production of video presentations must not, where color is of technical relevance, display incorrectly and its natural appearance must be ensured.
- The location and parts must be clearly identifiable to the user. If required for clarification, a location or positioning video image and/or direction indicators must be used.
- Video images must be prepared to represent the natural view and scale that is realistic to the user. Different angles or cut-away views must be explained to the user.
- Individual video objects must be produced in parallel with textual instruction to complement each other.
- Textual technical data is to be avoided and not embedded in video objects or referenced outside the file.
- Artistic fades, blends or graphical effects must not be used.
- It is recommended that the use of freeze frames or mixing live actions with animated objects within video presentations is limited and only used to add visual clarity and value for the user.
- If suitable, a video object could serve more than one purpose, eg assembly/dismantling.
- Captured images must be stable and free from rapid movements.

### 2.5.1 Video capture

Digital Video (DV) capture devices recording an YCbCr frame Page: 6
(Y is the luma component and Cb and Cr are the blue and red chroma components), based on the IEC 61834 standard providing a data rate of 25 Megabits per second (Mbps), is the recommended minimum standard for capturing and editing digital video. Media projects that require highly detailed images and accurate color representation must use capture devices with three Charged Coupled Devices (3 CCDs) devoted to each of the red, green and blue color spectrums.

It is strongly recommended that a digital uncompressed video source is used and captured at the following rates:

- PAL and SECAM 25 frames a second at 720 x 576 pixels (digital), 4:2:0
- NTSC 29,70 frames a second at 720 x 420 pixels, 4:1:1
- audio to be two channels set to 48 kHz 16 bit and fully modulated
- recording media must have a compression ratio of no greater than 5:1

### 2.5.2 Transition and video effects

Technical clips or training video productions must only use simple cuts, standard fades and basic blend.

### 2.5.3 Low bandwidth network streaming

The following restrictions are recommended for on-demand narrowband video streams:

- maximum bit rate 80 kbps, except for short clips of less than five minutes which can be coded at 128 kbps
- It is recommended that higher bit rates are only used for two minutes or less video clips.
- Projects are advised to include a 34 kbps stream as a minimum, and can include others up to the maximum bit rate if multi-bit rate streaming is used. The maximum bit rate must not be exceeded.
- It is recommended that the audio parts of video streams are in mono.

### 2.5.4 Broad bandwidth network streaming

The maximum bit rate for broadband video content is 256 kbps. It is recommended that this maximum is not exceeded. Projects are advised to use the option in their production software which gives a rate of 225 kbps stream (usually the "256 kbps connection" option).

Video with sound, of the total bit rate of the video stream, projects are advised to allocate 32 kbps or 64 kbps to audio. It is recommended that speech and music are in mono unless projects specifically need stereo. The reason is that stereo information is mostly contained in the higher frequencies, which are harder to encode, resulting in imperfect stereo.

### 2.5.5 Video picture output

A digital platform is recommended for the production master output, MiniDV - MPEG-2 MP@ML profile as minimum is required. Once mastered, a copy of the video can be compressed to the customer requirement, hence made ready for the appropriate network.

The following video output sizes are recommended:

- low bandwidth network video output be generated at 320 x 240 pixels
- broad bandwidth network video output be generated at 640 x 480 pixels
- individual file sizes do not exceed four Megabytes (Mbyte) for low band networks and 16 Mbyte for broad bandwidth networks.
- individual video objects, steps or scenes do not exceed two minutes

It is recommended that all outputs be set to a variable bit rate and tailored to project delivery.

### 2.5.6 Control of video objects

User control of interactive video objects can be achieved using the agreed media player or interface specified in the project configuration file.

## 2.6 Production of animation

The following rules and techniques are for the production of animated objects. Animation is the S1000D preferred option to deliver an extended range of multimedia objects to the user.

To be effective, animation for technical publications is to be produced in accordance with the recommended principles below:

- All animated illustrations must be taken from original validated source material.
- Animated 2D and 3D technical non-dynamic images, where appropriate, must comply with Chap 3.9.2.
- Color illustrated animated assembly sequences must comply with color convention and Para 2.10.1.
- During animated sequences callouts must remain static.
- All scripting or action codes must be embedded and named at root level.
- Common project symbols, buttons, transitions and action scripts must be maintained in layers and stored in module form for project reusability.
- Asset libraries must be used to assist global changes or updates.
- Large multimedia objects eg video, sounds or raster images must not be embedded.

- Shared object libraries are to be used.
- Textual objects must be 12 pt and fonts embedded for better anti-aliasing.

### 2.6.1 Interactive animation

User control of interactive animation objects can be achieved using the agreed media player or interface specified in the project business rules.

Animated objects must be prepared according to the rules and the multimedia example set.

## 2.7 Simulation of user equipment

The following rules and techniques are for the production of simulation objects. These objects are the visualization and interactive emulation of user equipment using pre-determined or interactive illustrations or animations. The following applies:

- Equipment visualization must be an accurate representation of user equipment.
- Views and scale must be typical and natural.
- Interactive actions and operation sequences must be logical and accurate.
- Audio objects used for simulation must be produced in accordance with Para 2.4.
- Must correctly mimic the operational equipment.

## 2.8 3D modeling

Three-dimensional (3D) digital models that present the user full 3D views of the data. 3D can also include animation, either interactive or scripted.

3D visualization gives the user a full 3-axis view of the scene and it is possible to orient the view such that the maintainer's viewpoint is accurate and true to life.

Scripted animation in 3D can give an accurate picture of disassembly/assembly procedures. Maintenance procedures can be validated using 3D visualization

User control of interactive 3D objects can be achieved using the agreed media player or interface specified in the project business rules.

3D objects must be prepared according to the rules and the multimedia example set.

## 2.9 Introduction and content - Standalone media

Introductory details - CD and DVD labels must conform to distribution media labeling standards.

Media labeling must be produced in accordance with the following principles:

- must include a title, conventional naming, contact, authority, security caveat, expires date stamped
- warning regarding the time dated and validation of the information
- an introductory page to contain a description of the content
- user notes must have minimum machine specification including any special plug-ins or enabling features required to view the contained data. (DVD or CD package must have text only file with package asset lists for data module)
- the table of contents contains hypertext links to all references
- permissions and releases for persons presented in media productions are accomplished in accordance with the applicable laws of the country or states in which the media was developed
- reusable objects be defined with tailored metadata
- the use of metadata is an important part of the content production process and must comply with the project business rules

## 2.10 Creation principles (user interface) - General

This section governs only the media displayed within the main window area, or a standalone media object that is displayed full screen as described in Chap 6.3.1 within an IETP.

### 2.10.1 User interface visual structure "look and feel"

The following rules and techniques are for the production of a user interface. This must be produced in accordance with Chap 6.3.1 or have the following below:

- OK or start buttons as required
- use standard objects and icons
- clear start or user launched point for all media objects
- control within the media window or by external means
- set screen sizes or frame sizes throughout the project
- navigational information must be standardized, eg same order, same position throughout project
- layout and structures must be consistent, eg in order of the basic functions or maintenance task (with no buttons)
- buttons must be consistent and with an alternative text tag
- textual information or lettering must be minimum of 12 pt and in accordance with Chap 3.9.2.1
- images have descriptive alternative text (eg ALT tags in web deliverables)
- use color and backgrounds in accordance with Chap 3.9.2.3
- exit button or stop, pause button as required

### 2.10.2 Production guidelines

These guidelines will assist the multimedia designer to maintain a consistent user interface for data presentation. It is recommended that the designer adopt the following techniques:

- automatic definition of the size and position of the windows
- use of a symbolic map to show "where you are" and the route taken
- provision of pictorial access (a graphical menu) to the Product system structure and data
- ensure consistency in the use
- establish a consistent substructure or series of templates
- appropriate user interfaces and skill levels for users with creditable use cases and scenarios

### 2.10.3 Basic navigation functions

All multimedia must incorporate methods of navigation. Though the nature and content of each application will dictate the navigation features provided, the basic (minimum) navigation functions are:

- Frame forward/backward
- Start/Stop and Pause
- Home, Quit or Exit and Menu
- Volume controls - On /Off

### 2.10.4 Warnings and cautions

The presentation of warnings and cautions must conform to the general requirements as given in Chap 6.2 and Chap 6.3.1.

## 2.11 Use of color in multimedia

These rules and techniques are for the use of color in all visual multimedia objects. The following applies:

- In the production of color or black and white animated 2D illustrations, color must be applied in accordance with Chap 3.9.2.3.

- For video and realistic images of equipment or parts the color rules generally will not apply, however, any tool items, highlighting or navigation symbols superimposed must be applied in accordance with Chap 3.9.2.3.
- Color used in Digital Mock-Up (DMU) presentations are given in Chap 3.9.2.5.
- A web safe palette will be required if projects consider their work be viewed through an eight bit (256 color) computer system. Refer to Chap 3.9.2.3.
- Color Gamut differences require testing within the project environment.

### 2.11.1 Animated hierarchical structure using color

Animated color 2D illustrations must be prepared according to these rules and the multimedia example set:

- All animations must start with a locator view, indicating the main subject item as a light grey and highlighted with a magenta line, all other reference structure is filled light yellow.
- All navigation symbols must be blue and remain static.
- Black line art with a light blue fill is used to identify detail items and attaching parts for animated removal or installation.
- Black line art with an amber fill will be used to identify animated tool items introduced and that must be removed before returning to service.
- Red must only be used and applied in accordance with Chap 3.9.2.3
- During animated sequences callouts remain static or appear in the last frame.

## 2.12 Use of multimedia for navigation

The following rules and techniques are for the production of hotspots, scripted actions and object behavior within media presentations. This paragraph is to be used in conjunction with Chap 3.9.5.2.1.8, Chap 6.3.1 and Chap 7.3.3 to build project requirements for image or object driven navigation of content or actions within multimedia presentations. Also see examples in the multimedia example set.

### 2.12.1 Use of hotspots

Hotspots, as with graphics, are a sensitive area in a visual presentation necessary for creation of links used to navigate or start other actions. This can happen within a media environment or be used to link out or call upon on another relevant object. This area can be activated by hotspots from:

- text in a data module to one area of media object
- text in a data module to several areas of media object
- one area of media object to the data module text
- one area of media object to another area of the same media object
- one area of media to another area of a media object

The sensitive area can be represented by:

- visible image region (or invisible before a cursor event)
- color objects used in accordance with Chap 3.9.2.3
- blue navigation symbols can include the leader line
- buttons with or without text objects
- callout numbers can include the leader line
- the itemized graphic objects or their surface
- callout numbers including leader lines and itemized graphic objects (or their surface)

Highlighting the sensitive area by touching with the cursor is a viewer or application constraint. This can be handled within the media environment as specified by the project.

To set up links between data module text and multimedia presentations, or between media objects, cross-reference identifiers are necessary. This also applies to defined regions and view

context attributes. The required target address of points and values are handled within the media environment as specified by the project.

### 2.12.2 Scripted actions

Scripted actions add interactivity to multimedia presentations. They are generated and embedded by the production application and used by the specified viewer. The uses of these scripts are essential and control a media object in response to specified user situations or interactive conditions. Scripted actions can generate or control object behavior as described in Para 2.12.3. They must be simple, built in a modular form and tested thoroughly before inclusion.

### 2.12.3 Object behavior

Object behavior is a result of a call from another media object or being directly touched with the cursor. This can visually change the object's appearance in the user view context, animate the object or play other media objects. These types of interactivity or actions can be handled by the application or project specified viewer. The following object behaviors are allowed:

- display a text string, screen tips
- display other menu options as described in Para 2.10.3
- swap image or restore original image
- start and stop object animations
- play audio, beep or start or stop audio files
- control and perform object or media transitions
- using an object as the target of an action
- linking to frames, views or other objects

# Chapter 3.9.2.5

## *Illustration rules and multimedia - Interactive 3D content*

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# 1 General

This chapter frames and describes the initial requirements for the use and production of 3D and full interactive technical content. Multimedia elements and presentations produced in accordance with this chapter could be used in support of or instead of technical textual data and would be verified and used as authoritative alternatives for written data.

# 2 Interactive 3D content

## 2.1 Rules and general practices

This chapter is to be used in conjunction with Chap 3.9.2.4 and Chap 6.3.1 to build project requirements for the inclusion of interactive 3D content in an IETP and in accordance with the principles below.

- All interactive 3D content or technical media must be developed and produced from a validated source of technical information. The production and delivery processes must be validated in accordance with the project rules.
- Interactive 3D content must be developed and produced for the chosen project viewer or display platforms used.

- Requirements for media element support and viewers must be defined in the project specific rules for non-textual data.
- All interactive 3D content must obey color convention in accordance with Chap 3.9.2.3 and the rules described in Para 2.3.1.
- All interactive 3D content or technical media must be produced in accordance with the Multimedia example set.

## 2.2 Types of media

The range of media types considered suitable for incorporation into IETP system includes the following:

- interactive 3D content
- verified interactive technical media

### 2.2.1 Interactive 3D content - Definition

Interactive 3D content is defined as 3D images dynamically generated from engineering models and other production systems with user interaction.

The recommended use of 3D:

- the movement of an original 3D object to clarify a complex disassembly or assembly procedure
- the movement around or positioning of equipment to show hidden or difficult component views

### 2.2.2 Interactive verified technical media - Definition

Interactive verified technical media is the creation or the generations of 3D dynamic images or 3D data that is verified, as authoritative as written textual data and can be visually manipulated.

The recommended use of interactive verified technical media:

- delivery of interactive and dynamically generated visual technical information
- used instead of technical textual data

## 2.3 Production of interactive 3D content

To be effective for technical publications, 3D data must be generated and produced from the original validated engineering models, although it is not required that they be dimensionally accurate. The following rules and recommendations must be used:

- Removed parts must remain in view and be parked in a removed area or bench location to complete the maintenance sequence.
- During animated sequences, visual callouts or navigations symbols must not move but must remain static or appear in the last frame of the sequence to navigate further.
- Animated removal or tool actions must be realistically performed as viewed by the user.
- For animated moving parts or actions that would represent a danger or hazard to the maintainer, warnings and cautions must appear, in accordance with Chap 6.3.1 and be acknowledged by the user before proceeding to the next step. Textual data can have also warned the maintainer beforehand.

### 2.3.1 Use of color in interactive 3D content

These rules and techniques are for the production of dynamically generated and interactive 3D color animations. Solid 3D objects and all color applied to their surfaces must be in accordance with following:

- Red must only be used and applied in accordance with Chap 3.9.2.3.
- Animated moving parts that would be a danger or hazard to maintainer must be colored in accordance with Chap 3.9.2.3.

- For realistic rendered surfaces of equipment or parts, the color rules generally will not apply, however, any tools items, highlighting or navigation symbols must be applied in accordance with Chap 3.9.2.3, hierarchical structure rules.
- Introduced 3D tools/heavy objects must have an amber surface.
- Hidden or difficult access components, first must be viewed normally with solid surfaces in the way.
- Hidden objects for removal must appear light blue and, to differentiate, background surface information must be light yellow or realistic colors.
- All color applied to 3D objects must add value to the users visual interpretation.
- Initial locator view or sequences, indicating the main subject items must have a light grey surface and any brief highlighting for the viewer must have a magenta surface.
- All navigation symbols must be blue and remain static.
- Black line art with a light blue fill is can be used to identify detail items and attaching parts for animated removal or installation.

# Chapter 3.9.2.6

## *Illustration rules and multimedia - e-learning and SCORM*

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## 1 General

This chapter will, in future issues of this specification, contain information on the acquisition and use of multimedia, e-learning, and SCORM data.

# Chapter 3.9.3

## *Authoring - Warnings, cautions and notes*

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# 1 General

This chapter gives the definitions and rules for warnings, cautions and notes.

## 1.1 Warnings

Warnings are used in data modules and technical publications to alert the user that possible hazard are associated with the materials/processes/procedures/limits. These can cause death or injury in any form, if the instructions in the operational or procedural task are not followed precisely. Warnings describe the hazards and the possible impact.

## 1.2 Cautions

Cautions are used in data modules and technical publications to alert the user that damage to the Product is possible if the instructions in the operational or procedural task are not followed precisely. Cautions describe the hazards and possible impact.

## 1.3 Notes

Notes used in data modules and technical publications provide the user with additional information, which is helpful but does not belong to the immediate subject. Operational and procedural tasks can be made easier by the use of notes, but when used, they do not take the place of operational or procedural information.

## 1.4 Safety conditions

Warnings and cautions that apply to the whole of an instruction must be contained or referenced in the Preliminary requirements - Safety conditions. Refer to Chap 3.9.5.2.1.9.

Warnings must precede cautions and cautions must precede notes.

## 1.5 General warnings and cautions

Warnings and cautions that apply to the Product or part thereof can be captured in descriptive data modules using the information code 012 (General warnings and cautions and related safety data).

## 1.6 Presentation

Examples of the presentation of warning, caution and notes are given in Chap 6.2.2.

# 2 Content

Warning and cautions can be located:

- in one or more separate descriptive data modules using the information code 012 in the data module code. Refer to Para 1.5.
- in Preliminary requirements (element <preliminaryRqmts>) - Safety conditions (element <reqSafety>) of a procedural data module. Refer to Para 1.4.
- within operational and maintenance procedures, at the element level of a data module. Warnings and cautions are to be placed directly preceding the paragraph to which they pertain.
- in a collection (element <warningsAndCautions>). Refer to Para 2.4

Notes can be placed either before or after the paragraph to which they pertain or in the Preliminary requirements - Safety conditions of a procedural data module. Refer to Para 1.4.

## 2.1 Warnings

**Description:** The element <warning> is used to contain hazard information that can cause personal injury or death.

Warnings in data modules must always precede the text where the hazard arises (for details see below) and must always precede cautions and notes.

Warnings of a general nature which are applicable throughout a procedure can precede the instruction to save repeating the warning before each of the individual steps of the maintenance task where the hazard arises. Refer to Para 2.1.2.

The caption **WARNING** must begin the warning followed by symbols, if any. Refer to Chap 6.2.2 for examples.

**Note**

The caption WARNING is not entered in the data modules when data modules are written in an XML editor or a What You See Is What You Get (WYSIWYG)-editor with an automatic function for presentation of legends. If not, the author must make sure that the caption is included.

Warnings must not be numbered. Warnings must be the first item within that step/para.

**Note**

There are two methods to present the Warnings, refer to Chap 6.2.2.

**Note**

Warnings must not be used in purely descriptive information (ie data modules with information code 040, 041 etc.). This does not prohibit the use of warnings in the descriptive data module for the production of content such as a summary of warnings.

The following applicability rule must be followed:

- Warnings that pertain to parent elements are also applicable to all of its child elements.

**Markup element:** <warning> (O)

ICN-S3627-S1000D0524-001-01

*Fig 1 Element <warning> and element <caution>*

**Attributes:**

- `applicRefId` (O), `which` contains applicability information. Refer to Chap 3.9.5.3
- `id` (O), the identifier for the warning element. Refer to Chap 3.9.5.2.1.2.
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `warningType` (O), describes the type of warning
- `internalRefId` (O), to facilitate the (ID/IDREF) linking mechanism. Refer to Chap 3.9.5.2.1.2
- `vitalWarningFlag` (O), indicates whether the warning is vital or not. This attribute can have the following values:
  - "`0`" - a **non-vital** warning
  - "`1`" - a **vital** warning

  **Note**

  It is not recommended to use the attribute `vitalWarningFlag` as it gives a classification to the warnings and thus can interfere with country legislations and rules.

- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <`symbol`> (O). Refer to Chap 3.9.5.2.1.10
- <`warningAndCautionPara`> (M). Refer to Para 2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute `vitalWarningFlag`
- use of the attribute `warningType`
- general warnings as individual data modules
- use of the collection of warnings

**Markup example:**

```
<warning>
<warningAndCautionPara>Do not ride with a cracked
stem.</warningAndCautionPara>
</warning>
```

### 2.1.1 Symbol

The element <`symbol`> must be populated in accordance with Chap 3.9.5.2.1.10.

Warnings and cautions can be emphasized with one or more symbols using the element <`symbol`>. It is recommended to use International Standards Organisation (ISO) standards.

### 2.1.2 Warning and caution para

**Description:** The element <`warningAndCautionPara`> contains the warning or caution text.

**Markup element:** <`warningAndCautionPara>` (M)

ICN-S3627-S1000D0525-001-01

*Fig 2 Element <`warningAndCautionPara`>*

**Attributes:**

- `applicRefId` (O), `which` contains applicability information. Refer to Chap 3.9.5.3
- `id` (O), the identifier for the warning and caution paragraph element. Refer to Chap 3.9.5.2.1.2.

  **Note**

  The attribute `id` is required when authoring a warning and caution collection. Refer to Para 2.4

- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- Includes the child elements of the `attentionText` group applicable for the actual data module type. Refer to Para 2.1.2.1.

and

– <attentionListItem> (O). Refer to Para 2.1.2.2

**Business rules decisions:**

– None identified

**Markup example:**

```
<warningAndCautionPara>If you operate the front brake without
the rear brake you can cause a crash.</warningAndCautionPara>
```

2.1.2.1 The attentionText group

The content of the attentionText group varies depending on data module type but the name of the group is still the same for all data module types. The full (maximum) content of the attentionText group is shown in Fig 3.

ICN-S3627-S1000D0545-001-01

*Fig 3 The `attentionText` group*

The content of the three different warning/caution/note paragraph types are detailed in Fig 4. The figure provides the element name, which data module types the element is available in and which subelements are available in that context.

The description of the content of the subelements is given in Chap 3.9.5.2.1.10.

| Element [group] | Data module type in which the element occurs | Available subelements (grey indicates available) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | functionalItemRef | circuitBreakerRef | controlIndicatorRef | inlineSignificantData | quantity | zoneRef | accessPointRef | identNumber | internalRef | indexFlag | changeInline | emphasis | symbol | subScript | superScript | dmRef | pmRef | externalPubRef | footnote | footnoteRef | acronym | acronymTerm | captionGroup | caption | verbatimText |
| <warningAndCautionPara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <warningAndCautionPara> [attentionText] | fault<br>proced<br>process<br>schedul | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <attentionListItemPara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <attentionListItemPara> [attentionText] | fault<br>proced<br>process<br>schedul | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | fault<br>proced<br>process<br>techrep | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | schedul | | | | | | | | | | | | | | | | | | | | | | | | | | |

ICN-S3627-S1000D0546-001-01

*Fig 4 Paragraph models and available subelements*

2.1.2.2 Attention random list

**Description:** The element <`attentionRandomList`> contains the list items.

When used in warnings and cautions, this element mirrors the element <`randomList`> with the exception that the following content is not available:

- sequential list
- definition list
- note
- index flag
- footnote
- footnote reference
- caption group

When used in notes, this element mirrors the element <`randomList`> with the exception that the following content is not available:

- definition list
- note
- index flag
- footnote
- footnote reference
- caption group

There are two types of attention random lists:

- simple - recognized by the value "`pf01`" of the attribute `prefix` giving just an indented item without a prefix

– unordered - the lists recognized by the default value "pf02" of the attribute prefix giving the following default sequence of prefix: [-][●][-]

The difference between a simple random list and an unordered random list is in the presentation. Refer to Chap 6.2.2.

Attention random lists do not allow titles, nor can they be nested.

Only one level of attention random lists is allowed.

**Markup element:** <attentionRandomList> (O)

**Attributes:**

– applicRefId (O), which contains applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the attention random list element. Refer to Chap 3.9.5.2.1.2.
– changeType (O), changeMark (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
– listItemPrefix (O), this element is used to indicate whether the list is a simple list or an unordered random list. This attribute can have the following values:
  - "pf01" - "pf99" where "pf02" is the default value. Refer to Chap 3.9.6.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
– securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

– <attentionRandomListItem> (M). Refer to Para 2.1.2.2.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<attentionRandomList>
<attentionRandomListItem>…</attentionRandomListItem>
</attentionRandomList>
```

2.1.2.2.1 *Attention random list item*

**Description:** The element <attentionRandomListItem> contains one list item for attention random lists.

Each list item can consist of one or more paragraphs.

**Note**

To enable more than one paragraph, the Schema allows a list item to contain one or more paragraphs. Use the element <attentionListItemPara> if your list item has more than one paragraph.

**Markup element:** <attentionRandomListItem> (M)

**Attributes:**

– applicRefId (O), which contains applicability information. Refer to Chap 3.9.5.3
– id (O), the identifier of the attention random list item element. Refer to Chap 3.9.5.2.1.2.

- changeType (O), changeMark (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <attentionListItemPara> (O). Refer to Para 2.1.2.2.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<attentionRandomListItem>...</attentionRandomListItem>
```

*2.1.2.2.2 Attention list item para*

**Description:** The element <attentionListItemPara> contains the list items paragraphs when one or more list item paragraphs are needed.

**Markup element:** <attentionListItemPara> (O)

**Attributes:**

- applicRefId (O), which contains applicability information. Refer to Chap 3.9.5.3
- id (O), the identifier of the attention list item para element. Refer to Chap 3.9.5.2.1.2.
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- Includes the child elements of the attentionText group applicable for the actual data module type. Refer to Para 2.1.2.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<attentionListItemPara>...</attentionListItemPara>
```

## 2.2 Cautions

**Description:** The element <caution> contains hazard information that can cause damage to the Product.

Cautions in data modules must always precede the text where the hazard arises (for details see below) and must always precede notes.

Cautions of a general nature, however, which are applicable throughout an instruction, can precede the instruction to save repeating the caution before each of the individual steps of the maintenance task where the hazard arises. Refer to Para 2.1.2.

The caption **CAUTION** must begin the caution followed by symbols, if any. Refer to Chap 6.2.2 for examples.

**Note**

The caption CAUTION is not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation of legends. If not, the author must make sure that the caption is included.

Cautions must not be numbered. Cautions must be the first item within that step/para.

The scope of cautions follows the same rules as for warnings. Refer to Para 2.1.

**Note**

There are two methods to present the Cautions, see Chap 6.2.2.

**Note**

Cautions must not be used for purely descriptive information (ie data modules with information code 040, 041 etc.). This does not prohibit the use of cautions in the descriptive data module for the production of content such as a summary of warnings.

The content of the element <`caution`> is given by a combination of the same subelements and attributes as used by element <`warning`> except for the absence of the attribute `vitalWarningFlag`. Refer to Para 2.1.

**Markup element:** <`caution`> (O)

**Attributes:**

- `applicRefId` (O), `which` contains applicability information. Refer to Chap 3.9.5.3
- `id` (O), the identifier for the caution element. Refer to Chap 3.9.5.2.1.2.

  **Note**

  The attribute `id` is required when authoring a warning and caution collection. Refer to Para 2.4.

- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `cautionType` (O), describes the type of caution
- `internalRefId` (O), to facilitate the ID/IDREF linking mechanism. Refer to Chap 3.9.5.2.1.2
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <`symbol`> (O). Refer to Chap 3.9.5.2.1.10.
- <`warningAndCautionPara`> (M). Refer to Para 2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute `cautionType`
- general cautions as individual data modules
- use of the collection of cautions

**Markup example:**

```
<caution>
<warningAndCautionPara>Do not use a
<internalRef internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef>
 that has high pressure. A water hose that has high pressure can
cause some parts to become loose or full of
water.</warningAndCautionPara>
</caution>
```

## 2.3 Notes

**Description:** The element <note> contains additional information that can be useful to the user.

Normally, notes in data modules must follow the text to which they refer. In certain circumstances, it can be necessary to allow for notes to precede the text to which they refer. In this case, projects must declare the use of notes in their business rules.

Notes must always follow warnings and cautions.

Notes of a general nature, which are applicable throughout procedure, can precede the instruction to save repeating the note throughout the procedure.

The production of notes as individual data modules is not recommended.

The caption **Note** must begin the note. If the notes are numbered then the caption **Note X** must begin the note. Refer to examples in Chap 6.2.2.

**Note**

The caption **Note** is not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation of legends. If not, the author must make sure that the caption is included.

If there is more than one note they can, by project decision, be numbered to enable cross-references to be made to them within the text.

A note can comprise of one or more paragraphs. It is however recommended to keep the notes as simple as possible.

The use of attention sequential lists and attention random lists are discouraged. Refer to Para 2.3.2 and Para 2.1.2.2.

There can be instances where notes are applicable to complete steps/paras or substeps/subparas, including their substeps/subparas. In those circumstances, notes must be the first item within that step/para. They must follow the step/para number and title, if any, and precede any text.

The scope of notes follows the same rules as for warnings. Refer to Para 2.1.

The content of the element <note> is given by a combination of the same subelements and attributes as used by element <warning> (refer to Para 2.1) except for the absence of the attribute `vitalWarningFlag` and the addition of sequential lists.

**Markup element:** <note> (O)

ICN-S3627-S1000D0547-001-01

*Fig 5 Element <note>*

**Attributes:**

- `applicRefId` (O), which contains applicability information. Refer to Chap 3.9.5.3
- `id` (O), the identifier for the note element. Refer to Chap 3.9.5.2.1.2.
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `noteType` (O), describes the type of note
- `internalRefId` (O), to facilitate the ID/IDREF linking mechanism. Refer to Chap 3.9.5.2.1.2.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <`symbol`> (O). Refer to Chap 3.9.5.2.1.10.

and one of the following is required:

- <`notePara`> (C). Refer to Para 2.3.1.
- <`attentionSequentialList`> (C). Refer to Para 2.3.2.
- <`attentionRandomList`> (C). Refer to Para 2.1.2.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute `noteType`
- general notes as individual data modules

**Markup example:**

```
<note>
<notePara>The stem must point forward in alignment with the
wheel.</notePara>
</note>
```

### 2.3.1 Note para

**Description:** The element <notePara> contains the note text.

**Markup element:** <notePara> (C)

ICN-S3627-S1000D0549-001-01

*Fig 6 Element <note>*

**Attributes:**

– Includes the same set of attributes as the element <attentionListItemPara>. Refer to Para 2.1.2.2.2.

**Child elements:**

– Includes the child elements of the attentionText group applicable for the actual data module type. Refer to Para 2.1.2.1.

and

– <attentionSequentialList> (O). Refer to Para 2.3.2.
– <attentionRandomList> (O). Refer to Para 2.1.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<notePara>It is not necessary to remove the handlebar for this
procedure.</notePara>
```

### 2.3.2 Attention sequential list

**Description:** The element <attentionSequentialList> contains an attention sequential (ordered) list in a note. This element mirrors the element <sequentialList> with the exception that the following content is not available:

– definition list
– note
– index flag
– footnote
– footnote reference
– caption group

An attention sequential list, when formatted, has numbers before the list items. Refer to Chap 6.2.2.

In the attention sequential list, a list item can consist of one or more paragraphs.

A sequential list, when formatted, is numbered with Arabic numerals. Refer to Chap 6.2.2.

Attention sequential lists are limited to a maximum of two levels.

**Markup element:** <`attentionSequentialList`> (C)

ICN-S3627-S1000D0548-001-01

*Fig 7 Element <`attentionSequentialList`>*

**Attributes:**

– Includes the same set of attributes as the element <`attentionListItemPara`>. Refer to Para 2.1.2.2.2.

**Child elements:**

– <`title`> (O). Refer to Chap 3.9.5.2.1.5
– <`attentionSequentialListItem`> (M). Refer to Para 2.3.2.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<attentionSequentialList>
<attentionSequentialListItem>...</attentionSequentialListItem>
</attentionSequentialList>
```

2.3.2.1 Attention sequential list item

**Description:** The element <`attentionSequentialListItem`> contains list items and can consist of one or more paragraphs.

**Markup element:** <`attentionSequentialListItem`> (M)

**Attributes:**

– Includes the same set of attributes as the element <`attentionListItemPara`>. Refer to Para 2.1.2.2.2.

**Child elements:**

– <`attentionListItemPara`> (O). Refer to Para 2.1.2.2.2.
– <`attentionRandomList`> (O). Refer to Para 2.1.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<attentionSequentialListItem>...</attentionSequentialListItem>
```

## 2.4 Warnings and cautions collection

**Description:** The element <warningsAndCautions> contains the collection of warnings and cautions used within a data module. Each warning or caution is authored separately within the element <warningsAndCautions>. Warnings and cautions can be authored once in a data module and then referenced as needed.

The collection (element <warningsAndCautions>) must not include warnings or cautions that are unused within the data module.

**Note**

The collection can be used in combination with warnings and cautions authored at the element level of a data module. The collection is useful for holding common (or multi-use) alerts while local (or single-use) alerts can be authored as needed.

The warnings and cautions collection is referenced by the use of the attribute warningRefs or the attribute cautionRefs and is allowed on the following elements:

– <crewDrill>. Refer to Chap 3.9.5.2.6.
– <crewDrillStep>. Refer to Chap 3.9.5.2.6.
– <crewRefCard>. Refer to Chap 3.9.5.2.6.
– <descrCrew>. Refer to Chap 3.9.5.2.6.
– <description>. Refer to Chap 3.9.5.2.2.
– <entry>. Refer to Chap 3.9.5.2.1.6.
– <isolationProcedureEnd>. Refer to Chap 3.9.5.2.4.
– <isolationStep>. Refer to Chap 3.9.5.2.4.
– <levelledPara>. Refer to Chap 3.9.5.2.2.
– <proceduralStep>. Refer to Chap 3.9.5.2.3.
– <safetyRqmts>. Refer to Chap 3.9.5.2.1.9.

The attribute warningRefs is populated with the identification (attribute id) assigned to the applicable warning within the collection (element <warningsAndCautions>).

The attribute cautionRefs is populated with the identification (attribute id) assigned to the applicable caution within the collection (element <warningsAndCautions>).

ICN-S3627-S1000D0550-001-01

*Fig 8 Element <warningsAndCautions>*

**Markup element:** <warningsAndCautions> (O)

**Attributes:**

- id (O), the identifier of the warnings and cautions collections element. Refer to Chap 3.9.5.2.1.2.
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <warning> (C), the attribute id must be used when authored within the collection. Refer to Para 2.1.
- <caution> (C), the attribute id must be used when authored within the collection. Refer to Para 2.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of warning and caution collection

**Markup example:**

```
<warningsAndCautions>
<warning id="warn-0001">
<warningAndCautionPara>The 1st warning in the warnings and
cautions collection, used multiple times within the
DM.</warningAndCautionPara>
</warning>
<warning id="warn-0002">
<warningAndCautionPara>The 2nd warning in the warnings and
cautions collection, used multiple times within the
```

```
DM.</warningAndCautionPara>
</warning>
<caution id="caut-0001">
<warningAndCautionPara>The 1st caution in the warnings and
cautions collection, used multiple times within the
DM.</warningAndCautionPara>
</caution>
</warningsAndCautions>
...
<reqSafety>
<safetyRqmts warningRefs="warn-0001" cautionRefs="caut-0001">
<warning>
<warningAndCautionPara>Some other warning, not included in the
collection.</warningAndCautionPara>
</warning>
</safetyRqmts>
</reqSafety>
...
<table>
<tgroup cols="2">
<tbody>
<row>
<entry warningRefs="warn-0001 warn-0002" cautionRefs="caut-
0001"></entry>
<entry>
<caution>
<warningAndCautionPara>A caution used one-time only and authored
in the applicable table entry.</warningAndCautionPara>
</caution>
</entry>
</row>
</tbody>
</tgroup>
</table>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of attribute `vitalWarningFlag`.** The project or the organization must decide if and how the attribute `vitalWarningFlag` will be used. Refer to Para 2.1.

**Use of attribute `warningType`.** The project or the organization must decide whether to use the attribute `warningType` or not. Refer to Para 2.1.

**General warnings as individual data modules.** The project or the organization must decide whether to produce general warnings as individual descriptive data modules or not (IC 012). Refer to Para 2.1.

**Use of the collection of warnings.** The project or organization must decide whether to produce warnings in a collection or not. If used, the attribute `id` must be included for warnings within the collection. Refer to Para 2.4.

**Use of attribute `cautionType`.** The project or the organization must decide whether to use the attribute `cautionType` or not. Refer to Para 2.2.

**General cautions as individual data modules.** The project or the organization must decide whether to produce cautions as individual descriptive data modules or not (IC 012). Refer to Para 2.2.

**Use of the collection of cautions.** The project or organization must decide whether to produce cautions in a collection or not. If used, the attribute `id` must be included for cautions within the collection. Refer to Para 2.4.

**Use of attribute `noteType`.** The project or the organization must decide whether to use the attribute `noteType` or not. Refer to Para 2.3.

**General notes as individual data modules.** The project or the organization must decide whether to produce notes as individual descriptive data modules or not (IC 012). Refer to Para 2.3.

# Chapter 3.9.4

## *Authoring - Front matter*

## Table of contents

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# 1 General

This chapter gives guidance on authoring front matter in a data module environment. Note that authoring front matter in a data module environment is fundamentally different from traditional processes in that the author is actually populating data modules, sometimes in a random manner, rather than writing a publication in a sequential manner.

Each publication or volume thereof must have a set of front matter as given in Chap 5.3.1.1.

Examples for page-oriented front matter are given in Chap 6.2.3.1 if not otherwise stated.

Issue number and date must be the same for the publication and all new or re-issued front matter data modules.

# 2 Front matter

## 2.1 Title page

The title page contains, if applicable, the following information:

- Product/project and country (O). This information has to be agreed between the publication producer and the customer.
- publication/volume title (M)
- publication module code (M)
- page identification = data module code (M)
- issue number of the publication (M)
- project's logotype (O)
- data restrictions (C)
- publishing authority (M)
- manufacturer's information (M)

Issue date of the publication (issue date of the title page data module) and security markings follow the rules for page layout. Refer to Chap 6.2.1.

The security marking must represent the highest classified information in the publication or volume.

The title page must be reissued with each issue.

## 2.2 List of effective pages

### 2.2.1 Definition

The List of Effective Pages (LOEP), if used, must identify each page in the page-oriented publication contents by giving:

- data module code
- page number
- issue date
- applicability

All new (additional) or changed pages must be marked with:

- N = New page
- C = Changed page

where:

"N" indicates a new page. This means that this page is an additional page compared with the last issue of the publication.

"C" indicates a changed page. This means that this page has some form of technical or editorial (including layout and new date) change compared with the last issue of the publication.

The LOEP must present the issue number and date of the actual publication.

If a project decides to use LOEP instead of List of Effective Data Modules (LOEDM), the LOEP must be reissued with each issue of the publication.

### 2.2.2 Project specific decisions

The project must decide on the use of LOEP in place of LOEDM.

## 2.3 List of effective data modules

### 2.3.1 Definition

The LOEDM lists all data module of the publication by giving:

- data module title (<techName> - <infoName>)
- data module code
- issue date
- number of pages (O)
- applicability

All new (additional) or changed data modules must be marked with:

- N = New data module
- C = Changed or revised data module

"N" indicates a new data module. This means that this data module is an additional data module compared with the last issue of the publication.

"C" indicates a changed or revised data module. This means that this data module has some form of technical or editorial (including layout and new date) change compared with the last issue of the publication.

**Note**

N and C are to be considered from a publication issue view.

The LOEDM must present the issue number and date of the actual publication.

The LOEDM must be reissued with each issue. By project decision the LOEDM can be replaced by an LOEP.

## 2.4 Change record

The change record is intended to provide a continuing record of the state of each individual copy of the publication. The change record must only be reissued when all of the initial change record predefined issues are filled in.

## 2.5 Highlights

### 2.5.1 General

The highlights give the reasons for the changes of the data modules/illustrations in each issue, using the optional elements <reasonForUpdate> and/or <reasonForAmendment>. The highlights must give:

- data module code
- reason for change

The highlights must not list the changes in:

- Title page
- List of effective pages
- List of effective data modules
- Change record
- Table of contents

The highlights data module must present the issue number and date of the actual publication.

The highlights must be issued with each issue of the publication or volume. Highlights must not be used in IPD.

### 2.5.2 Paper distributed publications

A variant of a highlight data module is an "extended" highlight data module for paper publications. This variant includes instructions for the updating of the publication. In addition to the list of highlights, refer to Para 2.5.1, a table giving the following information must be added:

- data module code
- data module title (<techName> - <infoName>)
- issue date
- number of pages (O)
- applicability

All data modules which are removed from previous issue and to be inserted in the new issue must be marked:

- R = Remove data module
- I = Insert data module

## 2.6 Access illustration

Access illustrations are a set of illustrations that can be included to support the navigation of the publication. Access illustrations are to be used in IETP only.

## 2.7 List of abbreviations

The List of Abbreviations (LOA) lists the non-standard abbreviations used in a publication. An example of a LOA is given in Chap 5.2.1.18.

## 2.8 List of terms

The List of Terms (LOT) lists the non-standard terms used in a publication. An example of a LOT is given in Chap 5.2.1.18.

## 2.9 List of symbols

The List of Symbols (LOS) lists the non-standard symbols used in a publication. An example of a LOS is given in Chap 5.2.1.18.

## 2.10 Technical standard record

Incorporated technical changes can be presented in a Technical Standard Record (TSR). The list is presented as an informal table.

TSR must not be used in the IPD.

## 2.11 Table of contents

The Table of Contents (TOC) gives the title of all documents together with the data module code and its applicability. The documents must be presented in the order of appearance in the publication. The TOC must not include the front matter documents Title page, LOEDM, LOEP, Change Record (CR) or TOC itself. If the publication is divided with tab dividers a TOC also can be given to each chapter or part.

## 2.12 List of applicable specifications and documentation

Specifications and documents which are necessary to read or follow when using the publication can be presented in a List of Applicable Specifications and Documentation (LOASD). An example of a LOASD is given in Chap 5.2.1.18.

LOASD must not be used in the IPD.

## 2.13 List of support equipment

The List of Support Equipment (LOSE) lists the required support equipment, necessary to perform the tasks, described in the publication. The list of support equipment is to be used in IETP only.

LOSE must not be used in the IPD.

## 2.14 List of supplies

The List of Supplies (LOSU) lists the required supplies necessary to perform the tasks described in the publication. The list of supplies is to be used in IETP only.

LOSU must not be used in the IPD.

## 2.15 List of spares

The List of Spares (LOSP) lists the required spares necessary to perform the tasks described in the publication. This is used in IETP only.

LOSP must not be used in the IPD.

## 2.16 List of illustrations

The List of Illustrations (LOI) is a list of all illustrations contained in the publication and includes:

- ICN
- Title

This is used in IETP only.

## 2.17 Product cross-reference table

The Product Cross-reference Table (PCT) lists the products concerned by the publication. To each product is associated the corresponding product sets and other data related to the operation of the product.

The general mechanisms of the PCT are described in Chap 4.14.

There is a dedicated data module Schema for the PCT, refer to Chap 3.9.5.3.3 for details.

A display example is available in Chap 6.2.3.1.

## 2.18 Conditions cross-reference table

The Conditions Cross-reference Table (CCT) lists the technical conditions impacting the publication. To each technical condition is associated a status according to products and other data related to the technical condition itself.

The general mechanisms of the CCT are described in Chap 4.14.

There is a dedicated data module Schema for the CCT, refer to Chap 3.9.5.3.2 for details.

A display example is available in Chap 6.2.3.1.

## 2.19 Applicability cross-reference table

The general mechanisms of the Applicability Cross-reference Table (ACT) are described in Chap 4.14.

There is a dedicated data module Schema for the ACT, refer to Chap 3.9.5.3.1 for details.

A display example is available in Chap 6.2.3.1.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of LOEP**. The project must decide if it will deliver a LOEP instead of a LOEDM. Refer to Para 2.2.

**Use of the extended highlight data module**. The project or the organization must decide whether to use an extended highlight data module or not. Refer to Para 2.5.

# Chapter 3.9.5

## *Authoring - Data modules*

## Table of contents

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| REC-xml-20060816 | W3C Recommendation: Extensible Markup Language (XML) 1.0 (Fourth Edition) 1.0 (Fourth Edition) |

## 1 General

This chapter gives the user brief definitions to some of the most common XML terms used in this specification. The markup examples that are included in the chapter are XML markup examples. For the terminology, definitions and the use of XML, refer to REC-xml-20060816 W3C Recommendation: XML 1.0 (Fourth Edition).

The chapter is further broken down to give definitions and guidance on using the XML to create data modules.

Chap 3.9.5.1 gives the definitions and guidance for the identification and status section of all types of data modules.

The definitions and guidance for the common constructs and the 14 different types of content in the content section are given in Chap 3.9.5.2.

Chap 3.9.5.3 gives the rules for applicability.

Throughout these chapters, the requirements for mandatory and optional given below are coded as follows:

– (M) mandatory

  This means that the affected element name must be presented in the data module and that the required entries in the construct must be populated.

– (O) optional

  This means that the affected element name and its associated population can be omitted.

– (C) conditional

  This means that the affected element must be present in the data module, provided that the (optional) structure containing the element is included.

XML **elements** are written in `Courier 12 in blue` within brackets preceded by the word "element", eg element <`applic`>.

**Attributes** are written in `Courier 12 in black` without quotation marks and brackets preceded by the word "attribute", eg attribute `internalRefId`.

**Values** given in the text are written in `Courier 12 in blue` within quotation marks preceded by the word "value", eg value "`Value_1`".

**Entities** are written in `Courier 12 in black` without quotation marks and brackets preceded by the word "entity", eg entity `%INSDEL`;.

XML **examples** are written in `Courier 11 in black`.

Examples:

```
<language languageIsoCode="sx" countryIsoCode="US"/>
```

```
<language languageIsoCode="de" countryIsoCode="AT"/>
```

```
<reasonForUpdate id="rfu-001" updateHighlight="1"
updateReasonType="urt02"><simplePara>The tool set is
changed.</simplePara></reasonForUpdate>
```

# 2 XML terminology and definitions

## 2.1 Element

An element is a component of an XML instance, defined by the Schema and is identified in the document by descriptive markup, usually a start-tag and end-tag.

For example: <`para`>…<`/para`>. There is also a type of element called an empty element which does not possess an end-tag.

Example: <`security securityClassification="01"/`>.

## 2.2 Generic identifier

A generic identifier is a name of an element or "tag-name".

Example: The generic identifier of the element <para> is para.

## 2.3 Attribute

An attribute is a value that can be applied to an element.

Example: The values for day, month and year are numeric attributes of the <issueDate> element: <issueDate day="30" month="07" year="2000"/>.

Attributes are either mandatory (they must be given a value) or optional. Some attributes require a typed value, while other attribute values are selectable from a list. Certain attributes have a default value which is applied automatically if a value for the attribute is not specified.

## 2.4 Tag

The start of an element is marked by a start-tag, and the end by an end-tag (unless the element is an empty element). An element start-tag is comprised of a less-than sign [<], then the generic identifier, then, if required, a set of attributes followed by a greater-than sign [>].

Example: The start-tag of a paragraph is <para>.

An element end-tag is comprised of a less-than sign [<] followed by a slash [/], then the generic identifier and finally a greater-than sign [>].

Example: The end-tag of a paragraph is </para>.

In XML markup empty tags are represented like this <security securityClassification="01"/> or like this <unverified></unverified>.

## 2.5 XML Schemas

The XML Schema controls which elements can appear in an XML instance and in which order. The Schema also defines the rules for attributes and entities and provides data type constraints which describe valid units of data.

## 2.6 Data type string

String data is any character(s) entered between the start-tag and end-tag of an element (plain text) and characters between quotes that make up the value of an attribute.

Example: <para>This is plain text data</para>.

## 2.7 Entity

An entity is a character string which, in the final data module output, will be replaced by a character, symbol or an external file.

### 2.7.1 Character entities

Some characters required for data modules are not available on a computer keyboard, for example, degrees, fractions and Greek letters. These characters are made available on XML systems by substituting a character entity for the required character. Most XML systems allow an inserted character entity to be displayed on the screen as it will appear to the reader. When entering a character entity, it must be preceded by [&] and followed by [;], for example, in XML, the characters inserted for degrees [º] will be °.

It is important to remember that, in XML, character entities are case sensitive, so using an initial uppercase letter will affect the final character shown in the data module.

Example: Σ (uppercase S) = Σ, and σ (lowercase letter s) = σ.

Table 2 details some of the more common character entities currently in use. For a complete list, refer to the S1000D data module Schemas.

*Table 2 Example of commonly used character entities*

| Entity | Character | Entity | Character | Entity | Character | Entity | Character |
|---|---|---|---|---|---|---|---|
| alpha | α | epsis | ε | lt | < | plusmn | ± |
| amp | & | eta | η | micro | µ | prop | ∝ |
| beta | β | equiv | ≡ | mu | µ | psi | ψ |
| bull | • | gamma | γ | ne | ≠ | radic | √ |
| deg | ° | ge | ≥ | Ohm | Ω | rho | ρ |
| Delta | Δ | gt | > | Omega | Ω | Sigma | Σ |
| delta | δ | infin | ∞ | percnt | % | sigma | σ |
| divide | ÷ | Lambda | Λ | Phi | Φ | Theta | Θ |
| endash | – | lambda | λ | phis | φ | theta | θ |
| emdash | — | le | ≤ | pi | π | | |

### 2.7.2 External system entities

For illustrations and symbols, a system entity is inserted into the XML instance normally carried out by the system.

## 2.8 Use of some special characters

The following rules apply:

- Hyphen [-] is used in the data module code, ICN, publication module code, CSN and as a separator in normal text, eg between the element <`techName`> and the element <`infoName`> on data module titles.
- Space [ ] is used as a single space character (using spacebar on the keyboard) to substitute numbers in, for example, the CSN (Space = ASCII 32 (hexadecimal code 20).

**Note**

The special characters are in the above mentioned cases normally inserted by the formatting application and must not to be entered by the author.

**Note**

For the entry of XML elements and attributes which can be used as hyperlinks in the IETP (for example, CSN, part numbers, NSN), any spaces must be entered from the keyboard using the spacebar. Do not use XML character entities for these elements and attributes.

## 2.9 XML Schema representation

In S1000D some chapters include graphical representations of the XML Schemas fragments. This method allows the author to learn the schema structure of S1000D progressively. The symbols used are explained below.

Element content

Element with textual content (the "paragraph" symbol in the upper left of the elemet box indicate that it is either a pure textual element or a mixed content element).

Empty element.

Element occurrence indicators

Element with subelements. Subelements can be presented in another chart. In this case, just the "+" symbol appears (otherwise, the breakdown in displayed on the right side of the described element).

Required (M), (once and only once).

Optional (O), (zero or one time)

Required and repeatable (one or more times).

Optional and repeatable (zero or more times).

Attributes

Attributes of an element. A solid line around an attribute indicates that it is required (once and only once). A dotted line surrounding an attribute indicates that it is optional.

Connectors

Sequence of branches, mandatory. The contained elements (if present) must be in the order listed in the branches of the connector.

Sequence of branches, optional and repeatable. The contained branches (if present) must be in the order listed in the branches of the connector.

Choice of branches, mandatory. One and only branch is allowed from the defined branches of the choice.

Choice of branches, optional and repeatable. Zero to many branches in any order is allowed from the defined branches of the choice.

Choice of branches, mandatory and repeatable. One to many branches in any order is allowed from the defined branches of the choice.

Groups (do not appear in an XML instance)

Group of elements. Used in maintaining Schemas.

# Chapter 3.9.5.1

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| REC-xml-20060816 | W3C Recommendation: Extensible Markup Language (XML) 1.0 (Fourth Edition) 1.0 (Fourth Edition) |

# 1 General

The identification and status section gives all the identification elements required to address and control the data module. It also provides the status elements for information on the security, quality and technical status together with the applicability of the overall data module content.

# 2 Identification and status section

**Description:** The element <`identAndStatusSection`> is used to contain the identification and status of a data module, which are captured in the two parts, identification and status.

**Markup element:** <`identAndStatusSection`> (M)

ICN-83007-0000000025-001-01

*Fig 1 Element <identAndStatusSection>*

**Attributes:**

– None

**Child elements:**

– <dmAddress> (M). Refer to Para 2.1.
– <dmStatus> (M). Refer to Para 2.2.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

## 2.1 Identification part

**Description:** The element <dmAddress> is used to contain the unique identification and additional information supporting the data module.

**Markup element:** <dmAddress> (M)

ICN-83007-0000000026-001-01

*Fig 2 Element <dmAddress>*

**Attributes:**

– None

**Child elements:**

- <dmIdent> (M). Refer to Para 2.1.1.
- <dmAddressItems> (M). Refer to Para 2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmAddress>
<dmIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="3" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="720" infoCodeVariant="A" itemLocationCode="A">
</dmCode>
<language countryIsoCode="US" languageIsoCode="sx"/>
<issueInfo issueNumber="005" inWork="00"/>
</dmIdent>
<dmAddressItems>
<issueDate year="2007" month="07" day="31"/><dmTitle>
<techName>Headset</techName>
<infoName>Install procedures</infoName>
</dmTitle>
</dmAddressItems></dmAddress>
```

### 2.1.1 Data module identification

**Description:** The element <dmIdent> is used to contain the unique identification of the data module.

**Markup element:** <dmIdent> (M)

ICN-83007-0000000027-001-01

*Fig 3 Element <dmIdent>*

**Attributes:**

- None

**Child elements:**

- <identExtension> (O). Refer to Para 2.1.1.1.
- <dmCode> (M). Refer to Para 2.1.1.2.
- <language> (M). Refer to Para 2.1.1.3.
- <issueInfo> (M). Refer to Para 2.1.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<dmIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="3" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="720" infoCodeVariant="A" itemLocationCode="A">
</dmCode>
<language countryIsoCode="US" languageIsoCode="sx">
</language>
<issueInfo issueNumber="005" inWork="00"/>
</dmIdent>
```

2.1.1.1 Data module code extension

**Description:** The element <identExtension> establishes a producer unique subdomain for instance identification. The data module identification extension gives the additional parameters needed to establish a unique identification of a data module in those cases when data module code, issue and in-work numbers together with the language and country are insufficient to form a universally unique identity.

**Markup element:** <identExtension> (O)

**Attributes:**

– extensionProducer (M), the data module producer the value of which forms part of the universally unique identifier of a data module instance and contains the CAGE code of the producer of the data module instance.
– extensionCode (M), the data module extended code the value of which is decided by the data module producer. Typically, but not necessarily, it will contain a customer related content, eg customer CAGE amended with a sequence number. If it is used, it must contain uppercase alphabetic (A-Z) and numeric (0-9) characters.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– using of data module code extensions
– defining a list of CAGE codes

**Markup example:**

```
<identExtension extensionProducer="SF518"
extensionCode="ABC00231"/>
```

2.1.1.2 Data module code

**Description:** The element <dmCode> contains the data module code and forms part of the unique identifier of a data module. All data modules are allocated a data module code.

The data module code provides four top level pieces of information. The first is the identification of the Product, or part of the Product, about which the data module has been written, using the model identifier, the system difference code, the SNS, the disassembly code and the disassembly code variant. The second is the identification of the information type, using the

information code. The third is the identification of the location at which the information in the data module is appropriate, using the item location code. The fourth is the identification of the type of learning content in learning data modules. Refer to Chap 4.3.

**Markup element:** <dmCode> (M)

**Attributes:**

- modelIdentCode (M), the model identifier or project name. Refer to Chap 4.3.1
- systemDiffCode (M), the system difference code. Refer to Chap 4.3.2
- systemCode (M), the system code (part of the SNS). Refer to Chap 4.3.3
- subSystemCode (M), the subsystem code (part of the SNS). Refer to Chap 4.3.3
- subSubSystemCode (M), the sub-subsystem code (part of the SNS). Refer to Chap 4.3.3
- assyCode (M), the assembly code (part of the SNS).. Refer to Chap 4.3.3
- disassyCode (M), the disassembly code. Refer to Chap 3.8 and Chap 4.3.4
- diassyCodeVariant (M), the disassembly code variant. Refer to Chap 4.3.5
- infoCode (M), the information code. Refer to Chap 4.3.6
- infoCodeVariant (M), the information code variant. Refer to Chap 4.3.7
- itemLocationCode (M), the item location code. Refer to Chap 4.3.8
- learnCode (O), the learn code. Refer to Chap 4.3.9 and Chap 8.5
- learnEventCode (O), the learn event code. Refer to Chap 3.9.5.2.13 and Chap 4.3.10

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- data module coding strategy
- hierarchical allocation of information codes

**Markup example:**

Markup example for maintenance data modules

```
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="041" infoCodeVariant="A" itemLocationCode="A"/>
```

Markup example for training data modules

```
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="041" infoCodeVariant="A" itemLocationCode="A"
learnCode="T12" learnEventCode="C"/>
```

2.1.1.3 Language

**Description:** The element <language> is used to describe the language in which the data module is written.

**Markup element:** <language> (M)

**Attributes:**

- `languageIsoCode` (M). Generally, this attribute is coded by using the two alpha characters from International Standards Organisation (ISO) 639. Simplified languages are coded by using additional codes similar to, and not in conflict with, ISO 639 codes. For example, `languageIsoCode="sx"` means a Simplified Technical English® (ASD-STE100) data module and `languageIsoCode="ra"` means a rationalized French data module.
- `countryIsoCode` (M). This attribute is coded using the two alpha characters from ISO 3166 to denote the country where the language is spoken.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- choice of language code and country code

**Markup example:**

The following example is for a data module written in the default language:

```
<language languageIsoCode="sx" countryIsoCode="US"/>
```

The following example is for a data module written in Simplified Technical English with Oxford English spelling:

```
<language languageIsoCode="sx" countryIsoCode="GB"/>
```

The following example is for a data module written in Rationalized French:

```
<language languageIsoCode="ra" countryIsoCode="FR"/>
```

The following example is for a data module written in German:

```
<language languageIsoCode="de" countryIsoCode="DE"/>
```

The following example is for a data module written in German for an Austrian end user:

```
<language languageIsoCode="de" countryIsoCode="AT"/>
```

2.1.1.4 Issue information

**Description:** The element `<issueInfo>` contains the issue number of the data module.

**Markup element:** `<issueInfo>` (M)

**Attributes:**

- `issueNumber` (M). Every approved issue of a data module must be allocated an incremented issue number which, with the data module code, uniquely identifies that instance of the data module. The initial issue must be numbered with the value "`001`", which must be incremented with every approved release of a data module.
- `inWork` (M). This attribute gives the "inwork" number of the unreleased data module. It can be used for monitoring and control of intermediate drafts within a project. The initial inwork number is set to the value "`01`", and is incremented with every change to the unreleased data module.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– exchange of draft data modules within the project

**Markup example:**

Examples (These examples show the use of the attribute `inWork`):

A data module that is inwork, where this is the second draft

```
<issueInfo issueNumber="000" inWork="02"/>
```

A data module that is released for the first time

```
<issueInfo issueNumber="001" inWork="00"/>
```

A data module that is the subject of a first change to the content section and is in work

```
<issueInfo issueNumber="001" inWork="01"/>
```

A data module that has been changed and released for the second time

```
<issueInfo issueNumber="002" inWork="00"/>
```

### 2.1.2 Date module address items

**Description:** The element <`dmAddressItems`> contains information that is supplementary to the data module identification but not part of the unique identifier.

**Markup element:** <`dmAddressItems`> (M)

ICN-83007-0000000028-001-01

*Fig 4 Element <`dmAddressItems`>*

**Attributes:**

– None

**Child elements:**

– <issueDate> (M). Refer to Para 2.1.2.1.
– <dmTitle> (M). Refer to Para 2.1.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<dmAddressItems>
<issueDate year="2007" month="07" day="31"/><dmTitle>
<techName>Headset</techName>
<infoName>Install procedures</infoName>
</dmTitle>
</dmAddressItems>
```

2.1.2.1 Issue date

**Description:** The element <issueDate> contains date information for the data module. Every issue of a data module whether initially written, completely revised or updated by changes, must be allocated an ISO 8601 calendar date in the form YYYY-MM-DD.

**Markup element:** <issueDate> (M)

**Attributes:**

– year (M). A four digit number, which is the year of issue.
– month (M). A two digit number, which is the month of issue.
– day (M). A two digit number, which is the day of issue.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– definition of the issue date

**Markup example:**

```
<issueDate year="2007" month="02" day="28"/>
```

2.1.2.2 Data module title

**Description:** The element <dmTitle> contains the title of the data module. The data module title must give meaning to the Product identification and action elements of the data module code. Authoring of titles must be in accordance with Chap 3.9.5.2.1.5.

**Markup element:** <dmTitle> (M)

**Attributes:**

– None

**Child elements:**

- <techName> (M). Refer to Para 2.1.2.2.1.
- <infoName> (O). Refer to Para 2.1.2.2.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmTitle>
<techName>Steering</techName>
<infoName>Description of how it is made</infoName>
</dmTitle>
```

*2.1.2.2.1 Technical name*

**Description:** The element <techName> content must reflect the name of the hardware or function. That is, it must reflect the system, subsystem or sub-subsystem concerned.

Examples:

- Aircraft
- Landing gear system
- Hydraulic accumulator No. 2
- Three axes trim actuator
- Servicing

**Markup element:** <techName> (M)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- rules for technical names
- source of the technical names

**Markup example:**

```
<techName>Steering</techName>
```

*2.1.2.2.2 Information name*

**Description:** The element <infoName> is linked to the information code using the attribute infoCode. Normally the information name is the short description of the information code. For example, information code 520 will have information name "Remove procedure". Projects can decide to modify (or extend) the information name to one that is more suitable, provided the sense of the information code is maintained. An example of where this could be used would be the information code 251 is "Clean procedures". A project can have a data module that tells the reader how to clean with water (this could be 251A) another data module could tell the reader how to clean with air (this could be 251B). In both cases, the information name can be extended from "Clean procedures" to "Clean procedures (clean with water)" and "Clean procedures (clean with air)".

The information name is used to complete the data module title by adding the meaning of the information code.

Examples:

- A description of how it is made (information code 041)
- Functional test (information code 340)
- Remove procedures (vertical) (information code 520 variant A)
- Remove procedures (horizontal) (information code 520 variant B)

The information code is set to "000" when the SNS gives the function.

Examples:

- General maintenance
- Safety and protective devices
- Fatigue index calculations
- Time limits
- Preflight inspection
- Principal dimensions
- Recovering
- Static stability
- Mass and balance data
- Weigh procedure
- Level procedure
- Handling
- Scheduled servicing
- Hangar safety

**Markup element:** <infoName> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <infoName>
- rules for information names
- using the correct information name to the appropriate Schema

**Markup example:**

```
<infoName>Description of how it is made</infoName>
```

## 2.2 Status part

**Description:** The element <dmStatus> contains information about the status of the data module.

**Markup element:** <dmStatus> (M)

ICN-83007-0000000029-001-01

*Fig 5 Element <dmStatus>*

**Attributes:**

- id (O), the identifier of the <dmStatus> element. Refer to Chap 3.9.5.2.1.2.
- issueType (O). This attribute gives the issue status of the data module. There are eight values that can be used.
  - "new". Data modules up to and including the initial issue of the approved release must have the attribute issueNumber set to the value "000" for inwork versions or value "001" for the initial issue and have the attribute issueType set to the value "new".
  - "deleted". Deletion of data modules is treated as a special case of update. The data module, itself is not physically deleted from the CSDB but marked as deleted by setting the attribute issueType to the value "deleted".
  - "changed". Data modules that have been changed and have the changes indicated within the data module using change elements and attributes, must have the attribute issueType set to the value "changed".
  - "revised". Data modules that have been totally revised and that contain no change elements or attributes must have the attribute issueType set to the value "revised".

- "status". Data modules that have had their identification and status information updated must have the attribute issueType set to the value "status".
- "rinstate-status". Data modules that have been reinstated from a previously deleted data module and have only the status information changed must have the attribute issueType set to the value "rinstate-status". In the simplest case, this status change must require setting the attribute issueType to the value "rinstate-status".
- "rinstate-changed". Data modules that have been reinstated from a previously deleted data module and have the changes indicated by change elements and attributes, must have the attribute issueType set to the value "rinstate-changed".
- "rinstate-revised". Data modules that have been reinstated from a previously deleted data module and have the changes not indicated by change elements and attributes, must have the attribute issueType set to the value "rinstate-revised".

Table 2 shows the permitted values of the attribute issueType, where "X" shows that the value is permitted.

*Table 2 Values of the issue type attribute*

| **Current issue** | **Next issue of data module** | | | | | |
|---|---|---|---|---|---|---|
| | new | revised | changed | deleted | status | rinstate-x |
| new | | X | X | X | X | |
| revised | | X | X | X | X | |
| changed | | X | X | X | X | |
| deleted | | | | | | X |
| status | | X | X | X | X | |
| rinstate-x | | X | X | X | X | |

When work first starts on a data module, the attribute issueType is set to the value "new", while the issue number is set to the value "000" and inwork number to "01", using the attribute issueNumber and attribute inWork of element <issueInfo>. Then, when the data module is released, the attribute inWork is reset to the value "00", and the issue number incremented to indicate approved release of that instance of the data module. From issue "002" onwards the attribute issueType must not be set to the value "new" but is to reflect the release status of the instance of the data module.

**Child elements:**

- <sourceDmIdent> (O). Refer to Para 2.2.1.
- <security> (M). Refer to Para 2.2.2.
- <dataRestrictions> (O). Refer to Para 2.2.3.
- <logo> (O). Refer to Para 2.2.4.
- <responsiblePartnerCompany> (M). Refer to Para 2.2.5.
- <originator> (M). Refer to Para 2.2.6.
- <applicCrossRefTableRef> (M). Refer to Para 2.2.7.

- <applic> (M). Refer to Chap 3.9.5.3.
- <referencedApplicGroup> (O). Refer to Chap 3.9.5.3.
- <techStandard> (O). Refer to Para 2.2.10.
- <brexDmRef> (M). Refer to Para 2.2.11.
- <qualityAssurance> (M). Refer to Para 2.2.12.
- <systemBreakdownCode> (O). Refer to Para 2.2.13.
- <functionalItemCode> (O). Refer to Para 2.2.14.
- <functionalItemRef> (O). Refer to Para 2.2.15.
- <skillLevel> (O). Refer to Para 2.2.16.
- <reasonForUpdate> (C). Refer to Chap 3.9.5.2.1.1.
- <productSafety> (O). Refer to Para 2.2.18.
- <remarks> (O). Refer to Para 2.2.19.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- deleted data modules
- retention of deleted and changed data modules
- changed/revised ratio

**Markup example:**

Refer to Para 4.

### 2.2.1 Source data module identification part

**Description:** The element <sourceDmIdent> contains the identification of the source data module on which the current data module instance is based.

**Markup element:** <sourceDmIdent> (O)

**Attributes:**

- None

**Child elements:**

- <identExtension> (O). Refer to Para 2.1.1.1.
- <dmCode> (M). Refer to Para 2.1.1.2.
- <language> (M). Refer to Para 2.1.1.3.
- <issueInfo> (M). Refer to Para 2.1.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<sourceDmIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="131" infoCodeVariant="A" itemLocationCode="A"/>
<language languageIsoCode="en" countryIsoCode="US"/>
<issueInfo issueNumber="004" inWork="00"/>
</sourceDmIdent>
```

### 2.2.2 Security classification

**Description:** The element <security> contains the security classification of the complete data module and its contained or associated illustrations.

**Markup element:** <security> (M)

**Attributes:**

- securityClassification (M), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definitions of the available attributes
- Priorities of the attributes.
- The definitions of the meanings for the ranges of classification values.

**Markup example:**

The following is an example of a data module that could be classified secret, with a commercial classification of Commercial in Confidence and a caveat of United Kingdom (UK) Eyes Only.

```
<security securityClassification="01"
commercialClassification="cc51" caveat="cv51"/>
```

The following shows a data module that has the lowest possible security classification.

```
<security securityClassification="01"/>
```

### 2.2.3 Data restrictions

**Description:** The element <dataRestrictions> contains the instructions and information, applicable to the data module, that relate to the use, storage and handling. This element can contain applicability information.

**Markup element:** <dataRestrictions> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the data restrictions element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <restrictionInstructions> (C). Refer to Para 2.2.3.1.
- <restrictionInfo> (O). Refer to Para 2.2.3.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of data restrictions information
- use of applicability information

**Markup example:**

```
<dataRestrictions>
<restrictionInstructions>
<dataDistribution>To be made available to all S1000D
users.</dataDistribution>
<exportControl><exportRegistrationStmt>
<simplePara>Export of this data module to all countries that are
the residence of organizations that are users of S1000D is
permitted. Storage of this data module is to be at the
discretion of the organization.</simplePara>
</exportRegistrationStmt></exportControl>
<dataHandling>There are no specific handling instructions for
this data module.</dataHandling>
<dataDestruction>Users may destroy this data module in
accordance with their own local procedures.</dataDestruction>
<dataDisclosure>There are no dissemination limitations that
apply to this data module.</dataDisclosure>
</restrictionInstructions>
<restrictionInfo>
<copyright>
<para>TPSMG UK, 2003-2010</para>
<para>Government License - TPSMG 001</para>
</copyright>
<policyStatement>TPSMG TOR 001</policyStatement>
<dataConds>There are no known conditions that would change the
data restrictions for, or security classification of, this data
module.</dataConds>
</restrictionInfo>
</dataRestrictions>
```

2.2.3.1 Restriction instructions

**Description:** The element <`restrictionInstructions`> contains the instructions that are to be followed when data restrictions apply.

**Markup element:** <`restrictionInstructions`> (C)

ICN-83007-0000000030-001-01

*Fig 6 Element <`restrictionInstructions`>*

**Attributes:**

- id (O), the identifier of the restriction instructions element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <dataDistribution> (M). Refer to Para 2.2.3.1.1.
- <exportControl> (O). Refer to Para 2.2.3.1.2.
- <dataHandling> (O). Refer to Para 2.2.3.1.3.
- <dataDestruction> (O). Refer to Para 2.2.3.1.4.
- <dataDisclosure> (O). Refer to Para 2.2.3.1.5.
- <supersedure> (O). Refer to Para 2.2.3.1.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of instructions

**Markup example:**

```
<restrictionInstructions>
<dataDistribution>To be made available to all S1000D
users.</dataDistribution>
<exportControl><exportRegistrationStmt>
<simplePara>Export of this data module to all countries that are
the residence of organizations that are users of S1000D is
permitted. Storage of this data module is to be at the
discretion of the organization.</simplePara>
</exportRegistrationStmt></exportControl>
<dataHandling>There are no specific handling instructions for
this data module.</dataHandling>
<dataDestruction>Users may destroy this data module in
accordance with their own local procedures.</dataDestruction>
<dataDisclosure>There are no dissemination limitations that
apply to this data module.</dataDisclosure>
</restrictionInstructions>
```

*2.2.3.1.1 Data distribution*

**Description:** The element <dataDistribution> contains the instructions for distribution of a data module.

**Markup element:** <dataDistribution> (M)

**Attributes:**

- id (O), the identifier of the data distribution element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of the distribution list

**Markup example:**

```
<dataDistribution>To be made available to all S1000D
users.</dataDistribution>
```

*2.2.3.1.2 Export control*

**Description:** The element <`exportControl`> contains the information regarding export control of the data module. For a full explanation of the description and use of the export control elements and attributes refer to Chap 3.9.5.1.1.

*2.2.3.1.3 Data handling*

**Description:** The element <`dataHandling`> contains any handling instructions, including storage, that are specific to the data module.

**Markup element:** <`dataHandling`> (O)

**Attributes:**

– `id` (O), the identifier of the data handling element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– handling requirements

**Markup example:**

```
<dataHandling>There are no specific handling instructions for
this data module.</dataHandling>
```

*2.2.3.1.4 Data destruction*

**Description:** The element <`dataDestruction`> contains any destruction instructions that are specific to the data module.

**Markup element:** <`dataDestruction`> (O)

**Attributes:**

– `id` (O), the identifier of the data destruction element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of destruction instructions

**Markup example:**

```
<dataDestruction>Users may destroy this data module in
accordance with their own local procedures.</dataDestruction>
```

*2.2.3.1.5 Data disclosure*

**Description:** The element <`dataDisclosure`> contains any special instructions with regard to the dissemination of the data module.

**Markup element:** <`dataDisclosure`> (O)

**Attributes:**

– `id` (O), the identifier of the data disclosure element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of the disclosure instructions

**Markup example:**

```
<dataDisclosure>There are no dissemination limitations that
apply to this data module.</dataDisclosure>
```

*2.2.3.1.6 Supersedure*

**Description:** The element <`supersedure`> contains a notice that the data module supersedes other data modules.

**Markup element:** <`supersedure`> (O)

**Attributes:**

– `id` (O), the identifier of the supersedure element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`subScript`> (O). Refer to Chap 3.9.5.2.1.10.
– <`superScript`> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of Supersedure

**Markup example:**

```
<supersedure>This data module supersedes DMC-S1000D-A-03-09-
0501-00A-040A-A</supersedure>
```

2.2.3.2 Restriction information

**Description:** The element <`restrictionInfo`> contains any other information that is related to data restrictions, such as copyright information, policy references and other conditions.

**Markup element:** <`restrictionInfo`> (O)

ICN-83007-0000000031-001-01

*Fig 7 Element <`restrictionInfo`>*

**Attributes:**

– `id` (O), the identifier of the restriction information element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`copyright`> (C). Refer to Para 2.2.3.2.1.
– <`policyStatement`> (O). Refer to Para 2.2.3.2.2.
– <`dataConds`> (M). Refer to Para 2.2.3.2.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of other information

**Markup example:**

```
<restrictionInfo>
<copyright>
<copyrightPara>TPSMG UK, 2003-2010</copyrightPara>
<policyStatement>TPSMG TOR 001</policyStatement>
<dataConds>There are no known conditions that would change the
data restrictions for, or security classification of, this data
module.</dataConds>
</restrictionInfo>
```

*2.2.3.2.1 Copyright*

**Description:** The element <copyright> contains the copyright statement.

There are two methods for identifying copyright information for a particular data module. These are:

- by including the copyright statement(s) directly in data modules
- by reference to a specific data module that contain the copyright information

Both methods are permitted.

**Markup element:** <copyright> (O)

ICN-83007-0000000044-001-01

*Fig 8 Element <copyright>*

**Attributes:**

- id (O), the identifier of the copyright element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- <copyrightPara> (M). Refer to Para 2.2.3.2.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- requirements for copyright information
- include copyright in each data module, cross reference to a copyright data module or do not include copyright information at all
- implications on data module updating

**Markup example:**

Method 1: Recording copyright information directly in a data module. Note the use of the copyright character entity © to get the required symbol "©".

```
<copyright>
<copyrightPara>TPSMG UK, 2003-2010</copyrightPara>
</copyright>
```

Method 2: Reference to a specific copyright data module(s):

```
<copyright>
<copyrightPara>For Copyright information, refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="021" infoCodeVariant="A" itemLocationCode="D" />
</dmRefIdent>
</dmRef> and
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="01" disassyCodeVariant="A"
infoCode="021" infoCodeVariant="A" itemLocationCode="D" />
</dmRefIdent>
</dmRef>
</copyrightPara>
</copyright>
```

*2.2.3.2.2 Copyright paragraph*

**Description:** The element <`copyrightPara`> contains the copyright statement itself or provides a cross-reference to another data module, which contains the statement.

**Markup element:** <`copyrightPara`> (C)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the copyright paragraph element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- <`emphasis`> (C). Refer to Chap 3.9.5.2.1.10.
- <`subScript`> (C). Refer to Chap 3.9.5.2.1.10.
- <`superScript`> (C). Refer to Chap 3.9.5.2.1.10.
- <`dmRef`> (C). Refer to Chap 3.9.5.2.1.2.
- <`randomList`> (C). Refer to Chap 3.9.5.2.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<copyrightPara>For Copyright information, refer to
<dmRef>
```

```
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="021" infoCodeVariant="A" itemLocationCode="D" />
</dmRefIdent>
</dmRef> and
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="01" disassyCodeVariant="A"
infoCode="021" infoCodeVariant="A" itemLocationCode="D" />
</dmRefIdent>
</dmRef>
</copyrightPara>
```

*2.2.3.2.3 Policy reference*

**Description:** The element <policyStatement> contains the reference to the security policy information.

**Markup element:** <policyStatement> (O)

**Attributes:**

- id (O), the identifier of the policy reference element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- content of policy reference information

**Markup example:**

```
<policyStatement>TPSMG TOR 001</policyStatement>
```

*2.2.3.2.4 Data conditions*

**Description:** The element <dataConds> contains any information on any special conditions that can apply to the data module. For example the security classification of a data module may have to change when aggregated with other data modules with similar conditions.

**Markup element:** <dataConds> (O)

**Attributes:**

- id (O), the identifier of the data conditions element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– content of data conditions information

**Markup example:**

```
<dataConds>This document is supplied to ACME Ltd. for the use of
personnel employed in the Maintenance of  Moff's Aero Engines
operated by ACME Ltd.</dataConds>
```

The following example shows the complete data restrictions that apply to a data module. In the example, the following applies:

– it must be delivered by hand
– it must be stored in a secure safe for not longer than six months
– the policy is contained in UKSysOps and the disclosure is to ACME.
– the full copyright statement can be found in a referenced data module
– there are special conditions that apply to this data module in that it can only be used by Moff's Aero Engines personnel in the maintenance of their engines

```
<dataRestrictions>
<restrictionInstructions>
<dataDistribution>By hand</dataDistribution>
<exportControl>Must stay within the UK</exportControl>
<dataHandling>Must be stored in a secure safe for not longer
than 6 months</dataHandling>
<dataDestruction>Incineration</dataDestruction>
<dataDisclosure>This information is the property of Utopia Ltd.
and is not to be copied, or communicated to a third
party.</dataDisclosure>
</restrictionInstructions>
<restrictionInfo>
<copyright>
<simplePara>For copyright information, refer to
<dmRef>…</dmRef>.
</simplePara>
</copyright>
<policyStatement>UKSysOps</policyStatement>
<dataConds>This document is supplied to ACME Ltd. for the use of
personnel employed in the Maintenance of  Moff's Aero Engines
operated by ACME Ltd.</dataConds>
</restrictionInfo>
</dataRestrictions>
```

### 2.2.4 Logo

**Description:** The element <`logo`> contains the reference to the manufacturer's, project's or sponsor's logotype.

**Markup element:** <`logo`> (O)

**Attributes:**

– None

**Child elements:**

– <symbol> (C). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the logo

**Markup example:**

```
<logo>
<symbol infoEntityIdent="ICN-S3627-S1000D0494-001-01"/>
</logo>
```

### 2.2.5 Responsible partner company

**Description:** The element <responsiblePartnerCompany> contains the company or organization responsible for the data module. Only one entry is permissible.

The responsible partner company must indicate the company or organization responsible for the data module. In many projects there can be two or more partner companies and, in these cases, the organization must designate which company is the responsible for which data modules. Only the responsible partner company is to be indicated within the data module.

**Note**

A responsible partner company can be defined as one of the companies or organization making up a consortium pursuing a common project. Each of these partner companies is responsible for a certain share of the total project effort; however, only one is designated as responsible for the population of the CSDB.

This company or organization must be indicated by at least one of either the name of the company and/or the company's CAGE code, which is the preferred method or, for illustration control numbers, a project specific single alphanumeric character code as defined in Chap 4.4. However, if a responsible partner company has an enterprise code, then that code must be used.

**Markup element:** <responsiblePartnerCompany> (M)

**Attributes:**

– enterpriseCode (O), containing the CAGE code of the enterprise.
– id (O), the identifier of the responsible partner company element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <enterpriseName> (O). Refer to Chap 3.9.5.2.11.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional enterprise element and attribute
– use of the element <enterpriseName>
– use of the CAGE code
– list of permitted CAGE codes for the project

**Markup example:**

The first example is for a project which does not use the element `enterpriseName`.

```
<responsiblePartnerCompany enterpriseCode="U8025"/>
```

This example is for a project that uses the element `<enterpriseName>`.

```
<responsiblePartnerCompany enterpriseCode="U8025">
<enterpriseName>UK MoD</enterpriseName>
</responsiblePartnerCompany>
```

### 2.2.6 Originator

**Description:** The element <originator> contains the identifier of the originating company or organization responsible for the production of the data module. The originator's code is indicated with the company name, the CAGE code, which is the preferred method, or both. Normally, the originator is defined as the designated design authority of the Product; however, projects must nominate the originators. If a responsible partner company has an enterprise code, then that code must be used.

**Markup element:** <originator> (M)

**Attributes:**

- `exterpriseCode` (O). Refer to Para 2.2.5.
- `id` (O), the identifier of the originator element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

- <enterpriseName> (O). Refer to Chap 3.9.5.2.11.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the optional enterprise element and attribute
- use of the element <originator>
- use of the CAGE code
- list of permitted CAGE codes for the project

**Markup example:**

The first example is for a project which uses the CAGE.

```
<originator enterpriseCode="U8025"/>
```

This example is for a project that uses the element `enterpriseName`.

```
<originator>
<enterpriseName>Bikey Bikes</enterpriseName>
</originator>
```

### 2.2.7 Applicability cross-reference table reference

**Description:** The element <applicCrossRefTableRef> contains a pointer to the Applicability Cross-reference Table (ACT) data module that applies to the data module. Applicability and the ACT data module and related aspects are described in Chap 4.14 and Chap 3.9.5.3.1.

**Markup element:** <applicCrossRefTableRef> (M)

**Attributes:**

– None

**Child elements:**

– <dmRef> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<applicCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00W" infoCodeVariant="A" itemLocationCode="D" />
<issueInfo issueNumber="003" inWork="00"/>
</dmRefIdent>
</dmRef>
</applicCrossRefTableRef>
```

### 2.2.8 Applicability

For detailed information about applicability, refer to Chap 3.9.5.3.

### 2.2.9 Inline applicability

For detailed information about applicability, refer to Chap 3.9.5.3.

### 2.2.10 Technical standard

**Description:** The element <techStandard> contains the authorized technical standard and associated data to be entered, describing the information basis used to write the data module. The information basis can be described by giving, for example, the modification or drawing standard including amendments, alterations etc or a publication baseline. Technical standard, in this context, is defined as the technical design and development level of the technical information of the Product, on which the data module has been based. This element contains authority block or technical publications baseline number or both.

**Markup element:** <techStandard> (O)

ICN-83007-0000000032-001-01

*Fig 9 Element <techStandard>*

**Attributes:**

– None

**Child elements:**

- <authorityInfoAndTp> (C). Refer to Para 2.2.10.1.
- <authorityInfo> (C). Refer to Para 2.2.10.2.
- <techPubBase> (C). Refer to Para 2.2.10.3.
- <authorityExceptions> (M). Refer to Para 2.2.10.4.
- <authorityNotes> (M). Refer to Para 2.2.10.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of this element

**Markup example:**

```
<techStandard>
<authorityInfoAndTp>
<authorityInfo>20010131</authorityInfo>
<techPubBase>Bike book</techPubBase>
</authorityInfoAndTp>
<authorityExceptions>"..."</authorityExceptions>
<authorityNotes>"..."</authorityNotes>
</techStandard>
Authority information and publication baseline number
```

2.2.10.1 Authority block and technical publications information

**Description:** The element <authorityInfoAndTp> contains both the authority block information and the technical publications baseline when it is appropriate to use both.

**Markup element:** <authorityInfoAndTp> (C)

**Attributes:**

- None

**Child elements:**

- <authorityInfo> (M). Refer to Para 2.2.10.2.
- <techPubBase> (M). Refer to Para 2.2.10.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<authorityInfoAndTp>
<authorityInfo>20010131</authorityInfo>
<techPubBase>Bike book</techPubBase>
</authorityInfoAndTp>
```

2.2.10.2 Authority information

**Description:** The element <authorityInfo> contains the authority that owns the source data from which the data module is written. The codes to be used in this element are to be determined by the project.

**Markup element:** <authorityInfo> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– authority information values

**Markup example:**

```
<authorityInfo>20010131</authorityInfo>
```

2.2.10.3 Publication baseline number

**Description:** The element <techPubBase> contains the technical publication baseline to which the data module is written. The publication baseline number represents the technical build standard, of the Product, which defines the technical standard by reference to a certain point in time. This is achieved by declaring a "Cut–off date" or milestone and listing the drawing set standard, relevant modification documents, etc, issued prior to the Cut–off or milestone date and used as source material for the production of data modules. The technical standard so defined, ensures that all data modules are to the same standard. Projects can also decide to use this element to record the delivery number of the Logistics Support Analysis Record (LSAR) to which the data module is written.

**Markup element:** <techPubBase> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– determine what to use as the baseline

**Markup example:**

```
<techPubBase>Bike book 20010131</techPubBase>
```

2.2.10.4 Authority exceptions

**Description:** The element <authorityExceptions> contains deviations of the data module content from the standard given in the authority block for configurations.

**Markup element:** <authorityExceptions> (C)

**Attributes:**

– None

**Child elements:**

– <productConfiguration> (O). Refer to Para 2.2.10.4.1.

– <retrofit> (O). Refer to Para 2.2.10.4.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<productConfiguration>
<excludedModification>A12345</excludedModification>
<additionalModification>00345</additionalModification>
</productConfiguration>
<retrofit>
<modification authorizationIdent="K0378"
modificationType="post">
<modificationTitle>Improved suspension for Brook Trekker deluxe
models</modificationTitle>
</modification>
</retrofit>
```

*2.2.10.4.1 Product configuration*

**Description:** The element <productConfiguration> contains a reference to the Product configuration as defined for production in the authority block. Any deviation from that configuration or standard is shown by inserting the modification number.

**Markup element:** <productConfiguration> (O)

**Attributes:**

– None

**Child elements:**

– <excludedModification> (O). Refer to Para 2.2.10.4.2.
– <additionalModification> (O). Refer to Para 2.2.10.4.3.

**Business rules decisions:**

– None identified

**Markup example:**

```
<productConfiguration>
<excludedModification>A12345</excludedModification>
<additionalModification>00345</additionalModification>
</productConfiguration>
```

*2.2.10.4.2 Excluded modification*

**Description:** The element <excludedModification> contains an indication that the modification is not covered even though it was actually required.

**Markup element:** <excludedModification> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<excludedModification>A12345</excludedModification>
```

*2.2.10.4.3 Additional modification*

**Description:** The element <additionalModification> contains an indication that a modification is additionally covered.

**Markup element:** <additionalModification> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<additionalModification>00345</additionalModification>
```

*2.2.10.4.4 Retrofit*

**Description:** The element <retrofit> contains a reference to post delivery changes that are always performed in accordance with a retrofit order eg Pre– or Post–modification.

**Markup element:** <retrofit> (O)

**Attributes:**

– None

**Child elements:**

– <modification> (M). Refer to Para 2.2.10.4.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<retrofit>
<modification authorizationIdent="K0378"
modificationType="post">
<modificationTitle>Improved suspension for Brook Trekker deluxe
models</modificationTitle>
</modification>
</retrofit>
```

*2.2.10.4.5 Modification*

**Description:** The element <modification> contains the identification of the retrofit order.

**Markup element:** <modification> (M)

**Attributes:**

- `id` (O), the identifier of the modification element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorizationIdent` (M), used to contain the identification of the retrofit order
- `modificationType` (M), the type of modification in terms of pre, post and pre and post. This attribute can have one of the following values:
  - "`pre`", indicates that the data is the initial standard, or to a previous modification standard than the one given
  - "`post`" (D), indicates that the data is to a standard that is after the modification given
  - "`prandpo`", indicates that the data is to a standard that satisfies both a standard before and after the modification given
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`modificationTitle`> (O). Refer to Para 2.2.10.4.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<modification authorizationIdent="K0378"
modificationType="post">
<modificationTitle>Improved suspension for Brook Trekker deluxe
models</modificationTitle>
</modification>
```

*2.2.10.4.6 Modification title*

**Description:** The element <`modificationTitle`> contains the title of the modification.

**Markup element:** <`modificationTitle`> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<modificationTitle>Improved suspension for Brook Trekker deluxe
models</modificationTitle>
```

2.2.10.5 Authority notes

**Description:** The element <`authorityNotes`> contains additional information that can be necessary to explain preceding entries. Whenever a data module is only applicable to one or a range of serial numbers, this is stated here. It is recommended that, where applicable, the titles of documents be given under authority exceptions. The notes are also be used for recording

deficiency reports, special technical orders, service bulletins, explanations of excluded and additional modifications, and similar documents.

**Markup element:** <authorityNotes> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– population of this element

**Markup example:**

```
<authorityNotes>The LSAR baseline is the 27/10/2007
version.</authorityNotes>
```

### 2.2.11 Business rules reference

**Description:** The element <brexDmRef> contains a pointer to the business rules data module (BREX data module) that applies to the data module. For a detailed description of the BREX module and related aspects, refer to Chap 4.10.

**Markup element:** <brexDmRef> (M)

**Attributes:**

– None

**Child elements:**

– <dmRef> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– the need to develop project specific business rules

**Markup example:**

```
<brexDmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D04" subSystemCode="1" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="022" infoCodeVariant="A" itemLocationCode="D"/>
<issueInfo issueNumber="003" inWork="00"/>
</dmRefIdent>
</dmRef>
</brexDmRef>
```

### 2.2.12 Quality assurance

**Description:** The element <qualityAssurance> contains details of the status of the QA process as required by the project. The data module must be identified as either being

unverified or verified. This element can contain applicability information to indicate the applicability of the QA information. This applicability information must be a subset of the mandatory applicability settings for the complete data module. This applies equally to the element <qualityAssurance> and all its subelements.

**Markup element:** <qualityAssurance> (M)

ICN-83007-0000000033-001-01

*Fig 10 Element <qualityAssurance>*

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <unverified> (C). Refer to Para 2.2.12.1.
– <firstverification> (C). Refer to Para 2.2.12.2.
– <secondverification> (O). Refer to Para 2.2.12.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of applicability information

**Markup example:**

```
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
```

2.2.12.1 Unverified

**Description:** The element <unverified> identifies that the data module which has not yet been first verified.

**Markup element:** <unverified> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of unverified data modules

**Markup example:**

```
<qualityAssurance>
<unverified/>
</qualityAssurance>
```

2.2.12.2 First verification

**Description:** The element <firstVerification> contains identifies a data module which has been first verified. For details on verification, refer to Chap 3.7.

**Markup element:** <firstVerification> (C)

**Attributes:**

– verificationType (M). This attribute can have one of the following values:
  - "onobject", used to indicate that the first verification was carried out at the Product
  - "tabtop", used to indicate that the first verification was carried out on a desktop
  - "ttandoo", used to indicate that the first verification was carried out at the Product and on a desktop

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
```

2.2.12.3 Second verification

**Description:** The element <secondVerification> contains identifies a data module which has been second verified. Data modules cannot be only second verified. They must also be first verified. For details on verification, refer to Chap 3.7.

**Markup element:** <secondVerification> (O)

**Attributes:**

– verificationType (M). This attribute can have one of the following values:
  - "onobject", used to indicate that the first verification was carried out at the Product
  - "tabtop", used to indicate that the first verification was carried out on a desktop
  - "ttandoo", used to indicate that the first verification was carried out at the Product and on a desktop

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– implementation of second verification

**Markup example:**

```
<qualityAssurance>
<firstVerification verificationType="onobject"/>
<secondVerification verificationType="ttandoo"/>
</qualityAssurance>
```

### 2.2.13 System breakdown code

**Description:** The element <systemBreakdownCode> contains a code that captures the physical breakdown for those projects that are producing data modules that are inline with other logistic databases.

**Markup element:** <systemBreakdownCode> (O)

**Attributes:**

– id (O), the identifier of the system breakdown code element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element

**Markup example:**

```
<systemBreakdownCode>BY142</systemBreakdownCode>
```

### 2.2.14 Functional item code

**Description:** The element <functionalItemCode> can contain a code that represents the functional breakdown.

**Markup element:** <functionalItemCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<functionalItemCode>AAI2392</functionalItemCode>
```

### 2.2.15 Functional item reference

**Description:** The element <functionalItemRef> contains a functional item number.

**Markup element:** <functionalItemRef> (O)

**Attributes:**

- `id` (O), the identifier of the functional item reference element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `functionalItemNumber` (M), the functional item number identifier. Refer to Chap 3.9.5.1.
- `functionalItemType` (O), ), the functional item is an exact or family functional item number. Refer to Chap 3.9.5.1. This attribute can have one of the following values:
  - "`exact`" - the functional item number (a given item)
  - "`family`" - the family functional item number (generic code for one component which has more than one position, eg: seats, lights)
- `manufacturerCodeValue` (O), the code of the manufacturer
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`name`> (O), gives the name of the functional item. Refer to Chap 3.9.5.2.1.9.
- <`refs`> (O), references providing a link to the circuit breaker. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<functionalItemRef functionalItemNumber="101HG1"
manufacturerCodeValue="2D671"/>
```

### 2.2.16 Skill level

**Description:** The element <`skillLevel`> contains identify the skill level to which the data module has been written.

When creating training data modules, which use other maintenance data modules, the project must ensure that a mechanism exists between the maintenance and training information that allows a "relationship" to be established between the required performance levels of the student, as recorded in a LMS supplied through the training system (eg Electronic Performance Support Systems (EPSS)), and the skill level of the person conducting the maintenance activity.

This can involve linking the skill of the maintainer to training information presented at the appropriate level for task completion, based on several factors such as the location of where task is being conducted and the complexity of the Product.

**Markup element:** <`skillLevel`> (O)

**Attributes:**

- `skillLevelCode` (C), the actual code. Refer to Chap 3.9.6.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use and definition of the element for training information

**Markup example:**

```
<skillLevel skillLevelCode="sk01"/>
```

### 2.2.17 Reason for update

**Description:** The element <reasonForUpdate> contains a short explanation of the reason for updating of the data module. It can be used at issue, release or during the production process. As data modules are issued, the previous content of this element must be updated or removed. The use of this element is normally not required for data modules that are at initial issue. For more details, refer to Chap 3.9.5.2.1.1.

**Markup element:** <reasonForUpdate> (C)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <reasonForUpdate> element. Refer to Chap 3.9.5.2.1.2.
– updateReasonType (O). Refer to Chap 3.9.5.2.1.1.
– updateHighlight (O). Refer to Chap 3.9.5.2.1.1.

**Child elements:**

– <simplePara> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element
– use of the element in conjunction with the production process
– use of applicability information

**Markup example:**

```
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-001">
<simplePara>CPF 2006-47AA: Applicability structure change and
addition of actref element</simplePara>
</reasonForUpdate>
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-002">
<simplePara>CPF 2006-48AA: Export control structure change,
addition of container elements</simplePara>
</reasonForUpdate>
```

### 2.2.18 Product safety

**Description:** The element <productSafety> contains an indication when a module is transmitting information that affects the safety of the product's users. The element <productSafety> can be empty or can contain textual information describing the urgency for processing the information in the module and handling of the module when third parties now operate the Product.

**Markup element:** <productSafety> (O)

**Attributes:**

– `safetyLabel` (M), must contain a short description of the type of safety issue or a category selected from industry standard safety labels.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of product safety
– definition of safety label attributes

**Markup example:**

```
<productSafety safetyLabel="Alert">THIS SERVICE BULLETIN DATASET
HAS BEEN DELIVERED TO THE OPERATORS OF RECORD OF THE AFFECTED
AIRPLANES. IF AN AFFECTED AIRPLANE HAS BEEN LEASED OR SOLD, SEND
THE SERVICE BULLETIN TO THE NEW OPERATOR.</productSafety>
```

### 2.2.19 Remarks

**Description:** The element <`remarks`> can contain general remarks. If there are no remarks then this element need not be used.

**Markup element:** <`remarks`> (O)

**Attributes:**

– `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <`simplePara`> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element
– use of applicability information

**Markup example:**

```
<remarks>
<simplePara>Incorporates repair instruction X15526172-
A</simplePara>
<simplePara>Incorporates repair instruction X15526172-
B</simplePara>
</remarks>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

## 3.1 Data module code extensions

**Using of data module code extensions**. The project or the organization must decide whether the extended data module identification scheme has to be applied to achieve unique data module instance identities. Refer to Para 2.1.1.1.

**Define a list of CAGE codes**. The project or the organization must decide on the definition of a list of allowed CAGE codes that can be used to populate the attribute `extensionProducer`. Refer to Para 2.1.1.1.

## 3.2 Data module codes

**Data module coding strategy**. The project or the organization must decide on a data module coding strategy. Refer to Chap 4.3. Projects must also decide on which SNS is best suited to their needs. Refer to Chap 8.2 and Para 2.1.1.2.

## 3.3 Data module identification

**Choice of language**. The project or the organization must select the country and language codes and use them in a consistent manner across the project. Refer to Para 2.1.1.3.

**Exchange of draft data modules within the project**. The project or the organization must decide whether it is going to allow the exchange of draft data modules. Refer to Para 2.1.1.4.

## 3.4 Issue information

**The definition of the issue date**. The project or the organization must decide on the definition of the issue date. This can be, for example, the input date (ie the release to CSDB date), or the cut-off date for the information, etc. Refer to Para 2.1.1.4.

## 3.5 Information names

**Use of the element** `<infoName>`. The project or the organization must decide where the information name can be omitted. Although, in the Schema, the element `<infoName>` is optional, only under exceptional circumstances must it be omitted. Refer to Para 2.1.2.2.2.

**Rules for information names**. The project or the organization must decide on which information codes apply to their project. Not all information codes within S1000D will apply to a project. Further, there can be some that are defined by the project and some that can be modified. Where this is the case, it is recommended that the project compiles a list containing the list of information codes and variants that can be used, together with their information names. Refer to Para 2.1.2.2.2.

## 3.6 Technical names

**Rules for technical names**. The project or the organization must decide whether or not a project list is generated which defines the SNS and a list of technical names. Refer to Para 2.1.2.2.1.

**Source of the technical names**. The project or the organization must decide on the source of the technical names (preferably a terminology database) and use them consistently. In all cases, the technical name must reflect the item represented by the SNS. Refer to Para 2.1.2.2.1.

## 3.7 Changes to data modules

**Retention of deleted and old data modules**. The project or the organization must decide on the length of time that they retain changed and old data modules. Refer to Para 2.2.

**Changed/revised ratio**. The project or the organization must decide on a sensible percentage threshold where the amount of changes is too many to be represented by change markers, making the information difficult to read. This threshold is then used to decide when a data module becomes "revised" rather than "changed". Refer to Para 2.2.

## 3.8 Security

**Use of elements and attributes**. The project or the organization must decide the use and definitions of the available attributes. Refer to Para 2.2.2.

**Priorities**. The project or the organization must decide on the priority and relationship of the attribute `securityClassification`, the attribute `commercialClassification` and the attribute `caveat`, if they are to be used. Refer to Para 2.2.2.

**The definitions of the classification values**. The project or the organization must decide on the definition of meanings for the ranges of classification values. Refer to Para 2.2.2.

## 3.9 Data restrictions

**Use of data restrictions information**. The project or the organization must decide on the inclusion of the data restrictions information. Projects must be aware that if this is used, then various elements within are mandatory. Refer to Para 2.2.3.

**Use of applicability information**. The project or the organization must decide if it is permitted to differentiate data restrictions depending on Product configuration. Refer to Para 2.2.3.

**Projects must decide on the use of instructions**. The project or the organization must decide on the inclusion of export controls, handling, destruction and disclosure instructions. Refer to Para 2.2.3.1.

**Content of the distribution list**. The project or the organization must decide on the extent and content of the distribution list that is appropriate to a data module. Refer to Para 2.2.3.1.1.

**Content of export control details**. The project or the organization must decide on the requirements and procedures that must be applied to a data module regarding export controls. Refer to Para 2.2.3.1.2.

**Handling requirements**. The project or the organization must decide on the handling requirements and procedures that must be applied to a data module. Refer to Para 2.2.3.1.3.

**Content of destruction instructions**. The project or the organization must decide on the extent on appropriateness of destruction instructions that apply to a data module. Refer to Para 2.2.3.1.4.

**Content of disclosure instructions**. The project or the organization must decide to whom the data module can be disclosed. Refer to Para 2.2.3.1.5.

**Content of Supersedure**. Projects must decide on the requirements that must be applied to a data module with regard to supersedure notices. Refer to Para 2.2.3.1.6.

**Content of other information**. The project or the organization must decide on the extent of additional information to be included in a data module. Refer to Para 2.2.3.2.

**Copyright information**. The project or the organization must decide if this information is required, and which of the recommended methods is to be used for this purpose. Any copyright information must be obtained from the relevant authority. A project must also be aware of the implications on data module updating if the copyright information changes and the information is stored in each data module. Refer to Para 2.2.3.2.1.

**Method of including copyright information**. The project or the organization must decide, if copyright information is to be included, which method to include the copyright information in each data module or to cross refer to a copyright data module. Refer to Para 2.2.3.2.1.

**Content of policy reference information**. The project or the organization must decide whether this information is required for an individual data module. If so, they must obtain this information from the relevant security authority. Refer to Para 2.2.3.2.3.

**Content of data conditions information**. The project or the organization must decide whether other conditions apply to an individual data module. Refer to Para 2.2.3.2.4.

## 3.10 Responsible partner company

**The use of the optional element and attribute.** As the element <enterpriseName> and the attribute enterpriseCode are both optional, projects must decide on at least one to use and must use it consistently throughout the project. Refer to Para 2.2.5.

**The use of the element <enterpriseName>**. The project or the organization must decide on whether this element is used or not. If used, then its use must be consistent and mandatory for the whole project. Refer to Para 2.2.5.

**Use of the CAGE**. The project or the organization must decide on the use of the optional attribute enterpriseCode to capture the CAGE code and the optional element <enterpriseName> to capture the company name. The company name, if the project decides to use it, is stored in the element <enterpriseName>. This decision point applies to both the originating company and the responsible partner company. Refer to Para 2.2.5.

**A list of permitted CAGE for Responsible Partner Company**. The project or the organization must decide on whether a list of acceptable responsible partner company CAGE codes is created. If the element <enterpriseName> is used, it is recommended that this be included on the list and that the responsible partner company CAGE values and the company name reflect exactly the responsible partner company list given in the business rules. Refer to Para 2.2.5.

## 3.11 Originator

**The use of the optional element and attribute.** The project or the organization must decide on at least one of <enterpriseName> or enterpriseCode to use and must use it consistently throughout the project. Refer to Para 2.2.6.

**Use of the element** <enterpriseName>. The project or the organization must decide on whether the element is used or not. The company name, if the project decides to use it, is stored in the element <enterpriseName>. If used, then its use must be consistent and mandatory for the whole project. Refer to Para 2.2.6.

**A list of allowed CAGE for originator**. The project or the organization must decide on whether a list of acceptable originator company CAGE codes is created. If the element <enterpriseName> is used, it is recommended that this be included on the list and that the originator company CAGE values and the company name reflect exactly the originator company list given in the business rules. Refer to Para 2.2.6.

## 3.12 Technical standard

**The use of the element** <techStandard>. The project or the organization must decide on whether the element is used or not. Refer to Para 2.2.10.

**Authority block values**. The project or the organization must decide on the descriptions of the format of the values in authority block, publications base line and authority exceptions. Refer to Para 2.2.10.2.

**The element** <authorityNotes>. The project or the organization must decide on suitable entries for this element, since the element <authorityNotes> is conditional. Refer to Para 2.2.10.5.

## 3.13 Business rules exchange

**BREXREF**. The project or the organization must decide if it needs to develop project specific business rules and, to that effect, develop its own BREX data module. If sufficient, a project can use the default BREX module that is supplied with each issue of S1000D. The BREX module and related aspects are described in Chap 4.10. Refer to Para 2.2.11.

## 3.14 Quality assurance

**Use of unverified data modules**. The project or the organization must decide on whether unverified data modules can be delivered to the customer. Projects must also consider the impact on issue details. Refer to Para 2.2.12.1.

**Implementation of second verification**. The project or the organization must decide on the requirements for second verification. Refer to Para 2.2.12.3.

**Use of applicability information**. The project or the organization must decide whether to use applicability on QA information. Refer to Para 2.2.12.3.

## 3.15 System breakdown, function item and functional item reference codes

**General use**. The project or the organization must decide on whether or not to use one of the elements <`systemBreakdownCode`>, <`functionalItemCode`>and <`functionalItemRef`>. When deciding the use of these elements projects must establish consistent population. Refer to Para 2.2.13.

## 3.16 Functional item reference

**Use of the attribute `functionalItemNumber` within the element** <`functionalItemRef`>. The project or the organization must decide how attribute `functionalItemNumber` is to be populated when the element <`functionalItemRef`>is used. Refer to Para 2.2.14.

**Use of manufacturer code within the element** <`functionalItemRef`>. The project or the organization must decide if attribute `manufacturerCodeValue` is used and the required contexts, when using the element <`functionalItemRef`>. Refer to Para 2.2.15.

## 3.17 Skill

**The use and definition of the element <`skillLevel`> for training**. The project or the organization must decide whether the data modules carry an indication of the performance level using the project definable available attribute values, as described in Chap 3.9.6.1. If used, it must be applied consistently to all data modules. Refer to Para 2.2.16.

## 3.18 Reason for update

**Use of reason for update**. The project or the organization must decide on defining standard reason for update sentences to be used. Reason for update can be used to automatically generate a highlights data module. Normally, a project will mandate its use from issue "`002`" upwards. Refer to Para 2.2.17.

Examples are:

- Revised to incorporate modification XYZ.
- Deleted. Data module no longer required.

**Use of reason for update in conjunction with the production process**. The project or the organization must decide on whether the element <reasonForUpdate> is to be used during the production process. Refer to Para 2.2.17.

**Use of applicability information**. The project or the organization must decide if it is permitted to differentiate reasons for update depending on Product configuration. Refer to Para 2.2.17.

## 3.19 Product safety

**Use of product safety**. The project must decide whether to use the product safety element and under what circumstances. Refer to Para 2.2.18.

**Definition of safety label attributes**. The project must decide what safety label attributes to use and their definitions. Refer to Para 2.2.18.

## 3.20 Remarks

**Use of the element <remarks>**. The project or the organization must decide on the use of this element. Be aware that remarks made will appear in the delivered data module, unless removed. The element <remarks> is optional and projects must define its use in the business rules and guidance on its content. Refer to Para 2.2.19.

**Use of applicability information**. The project or the organization must decide if it is permitted to differentiate general remarks depending on Product configuration. Refer to Para 2.2.19.

# 4 Examples

```
<identAndStatusSection>
<dmAddress>
<dmIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="3" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="720" infoCodeVariant="A" itemLocationCode="A">
</dmCode>
<language countryIsoCode="US" languageIsoCode="sx">
</language>
<issueInfo issueNumber="005" inWork="00"/>
</dmIdent><dmAddressItems>
<issueDate year="2007" month="07" day="31"/><dmTitle>
<techName>Headset</techName>
<infoName>Install procedures</infoName>
</dmTitle>
</dmAddressItems></dmAddress>
<dmStatus>
<security securityClassification="01"
commercialClassification="cc51" caveat="cv51"/>
<dataRestrictions>
<restrictionInstructions>
<dataDistribution>To be made available to all S1000D
users.</dataDistribution>
<exportControl><exportRegistrationStmt>
<simplePara>Export of this data module to all countries that are
the residence of organizations that are users of S1000D is
permitted. Storage of this data module is to be at the
discretion of the organization.</simplePara>
</exportRegistrationStmt></exportControl>
<dataHandling>There are no specific handling instructions for
```

```
this data module.</dataHandling>
<dataDestruction>Users may destroy this data module in
accordance with their own local procedures.</dataDestruction>
<dataDisclosure>There are no dissemination limitations that
apply to this data module.</dataDisclosure>
</restrictionInstructions>
<restrictionInfo>
<copyright>
<para>TPSMG UK, 2003-2010</para>
<para>Government License - TPSMG 001</para>
</copyright>
<policyStatement>TPSMG TOR 001</policyStatement>
<dataConds>There are no known conditions that would change the
data restrictions for, or security classification of, this data
module.</dataConds>
</restrictionInfo>
</dataRestrictions>
<responsiblePartnerCompany enterpriseCode="U8025">
<enterpriseName>UK
MoD</enterpriseName></responsiblePartnerCompany>
<originator enterpriseCode="U8025">
<enterpriseName>UK MoD</enterpriseName></originator>
<applicCrossRefTableRef>
<dmRef xlink:type="simple" xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="URN:S1000D:"><dmRefIdent><dmCode
modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00W" infoCodeVariant="A"
itemLocationCode="D"></dmCode>
</dmRefIdent></dmRef></applicCrossRefTableRef>
<applic>
<displayText><simplePara>Mountain bicycle and (Mountain storm
Mk1 or Brook trekker Mk9)</simplePara></displayText>
<evaluate andOr="and">
<assert applicPropertyIdent="type" applicPropertyType="prodattr"
applicPropertyValues="Mountain bicycle"/>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
</evaluate>
</applic>
<techStandard>
<authorityInfoAndTp>
<authorityInfo>20010131</authorityInfo>
<techPubBase>Bike book</techPubBase>
```

```
</authorityInfoAndTp>
<authorityExceptions/>
<authorityNotes/>
</techStandard>
<brexDmRef>
<dmRef xlink:type="simple" xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="URN:S1000D:"><dmRefIdent><dmCode
modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="022" infoCodeVariant="A" itemLocationCode="D"/>
<issueInfo issueNumber="005" inWork="00"/>
</dmRefIdent></dmRef></brexDmRef>
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
<systemBreakdownCode>BY143</systemBreakdownCode>
<skillLevel skillLevelCode="sk02"/>
<reasonForUpdate>
<simplePara>CPF 2006-47AA: Applicability structure change and
addition of actref element</simplePara>
<simplePara>CPF 2006-48AA: Export control structure change,
addition of container elements</simplePara>
</reasonForUpdate>
</dmStatus>
</identAndStatusSection>
```

# Chapter 3.9.5.1.1

## *Identification and status section - Export control*

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| ISO 3166-1 | Codes for the representation of names of countries and their subdivisions – Part 1: Country codes |

## 1 General

This chapter contains information and guidance on the use of export controls. These controls are required to contain a statement regarding the regulations that apply to the data contained within a data module. The controls also contain an indicator that shows which government gives authority to the regulations defined. This information can be required by companies, government departments and their delivery systems to control the release of data to authorized users. In addition it can be required by authorized users so they can further control transmittal and use of the data, as required by many export control regulations.

When using export controls, projects must consider the statutory requirements of their government and the end data users and their data management requirements. Other items to consider are the display of this data within the user interface. Projects are responsible for ensuring that the export controls applied are correct for the data content and that they comply with the relevant regulations pertaining to export controls.

# 2 Export control

**Description:** This element is used to define any government regulations concerning access to the data module.

**Markup element:** <exportControl> (O)

**Attributes:**

- id (O), the identifier of the <exportControl> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- exportRegulationType (O), the identification of the regulation type that governs the use of the data contained in the data module
- governmentAuthority (O), the identification of the government that controls the use of the data contained in the data module. It is recommended to use the two character country code as defined in International Standards Organisation (ISO) 3166-1
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <exportRegistrationStmt> (C), Refer to Para 2.1.
- <exportRegistrationCode> (O), Refer to Para 2.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<exportControl exportRegulationType="EAR">
...
</exportControl>
```

## 2.1 Export statement

**Description:** This element is used to specify either a full or partial export control statement describing the export status of the data module content.

**Markup element:** <exportRegistrationStmt> (C)

**Attributes:**

- exportRole (O), the description of whether this statement is a full statement or partial statement. Valid values are:
  - "full"
  - "partial"

**Child elements:**

- <simplePara> (O), Refer to Chap 3.9.5.2.1.10
- <dmRef> (O), Refer to Chap 3.9.5.2.1.2

**Note**

The content of the statement is made up of a choice of a combination of multiple instances of the child elements.

**Business rules decisions:**

– None identified

**Markup example:**

```
<exportRegistrationStmt exportRole="partial">
This information contains technology controlled under EAR.
Transfer of this data to a Foreign Person without Export
approval is expressly prohibited.
</exportRegistrationStmt>
```

## 2.2 Export registration code

**Description:** This element is used to indicate a coded value representing an export control property that applies to the content of the data module.

**Markup element:** <exportRegistrationCode> (O)

**Attributes:**

– exportRegulationCodeType (O), this attribute defines the type of the regulation code. In the case of Export Administration Regulations (EAR), the value of the attribute can be "ECCN". In the case of International Traffic in Arms Regulations (ITAR), the value can relate to a program code related to the Project.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<exportRegistrationCode exportRegulationCodeType="ECCN">
1E001
</exportRegistrationCode>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of export control**. The project or organization must decide whether export control regulations apply. Refer to Para 2.

# 4 Examples

The following example shows an example of an export control statement:

```
<exportControl exportRegulationType="EAR">
<exportRegistrationStmt exportRole="partial"> This information
contains technology controlled under EAR. Transfer of this data
to a Foreign Person without Export approval is expressly
prohibited.</exportRegistrationStmt>
<exportRegistrationStmt exportRole="full">Export of this
technology is controlled under the United States Export
Administration Regulations (EAR) (15 CFR 730-774). An export
license may be required before it is used for development,
production or use by foreign persons from specific countries.
The controller of this data has the individual responsibility to
abide by all export laws.</exportRegistrationStmt>
```

```
<exportRegistrationCode
exportRegulationCodeType="ECCN">1E001</exportRegistrationCode>
<exportRegistrationCode
exportRegulationCodeType="ECCN">5A101</exportRegistrationCode>
<exportRegistrationCode
exportRegulationCodeType="ECCN">9A991</exportRegistrationCode>
</exportControl>
```

# Chapter 3.9.5.2

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## 1 General

The S1000D Schemas provide the capability to capture operator, maintenance and training content.

## 2 Content section

The content section of a data module must be structured in accordance with one of the following information types:

- Descriptive information, refer to Chap 3.9.5.2.2
- Procedural information, refer to Chap 3.9.5.2.3
- Fault isolation information, refer to Chap 3.9.5.2.4
- Maintenance planning information, refer to Chap 3.9.5.2.5
- Crew/Operator information, refer to Chap 3.9.5.2.6
- IPD information, refer to Chap 3.9.5.2.7
- Battle damage assessment and repair information (to be included in a future change), refer to Chap 3.9.5.2.8
- Wiring data, refer to Chap 3.9.5.2.9
- Process data module, refer to Chap 3.9.5.2.10
- Technical information repository data module, refer to Chap 3.9.5.2.11
- Container data module, refer to Chap 3.9.5.2.12
- Learning data module, refer to Chap 3.9.5.2.13
- Maintenance checklists and inspections, refer to Chap 3.9.5.2.14

Among these information types there are many common constructs. These are described in Chap 3.9.5.2.1.

# Chapter 3.9.5.2.1

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# 1 General

The content of a data module must be structured in accordance with the appropriate Schema and must be authored in line with the requirements given in the following:

- warnings cautions and notes (refer to Chap 3.9.3)
- security classification (refer to Chap 3.9.5.1)
- simple paragraph (refer to Chap 3.9.5.1)
- change marking (refer to Chap 3.9.5.2.1.1)
- referencing (refer to Chap 3.9.5.2.1.2)
- lists (refer to Chap 3.9.5.2.1.3)
- captions (refer to Chap 3.9.5.2.1.4)
- titles (refer to Chap 3.9.5.2.1.5)
- tables (refer to Chap 3.9.5.2.1.6)
- figures and foldouts (refer to Chap 3.9.5.2.1.7)
- hotspots (refer to Chap 3.9.5.2.1.8)
- preliminary requirements (refer to Chap 3.9.5.2.1.9)
- paragraphs (refer to Chap 3.9.5.2.1.10)
- controlled content (refer to Chap 3.9.5.2.1.11)
- descriptive information (refer to Chap 3.9.5.2.2)
- procedural information (refer to Chap 3.9.5.2.3)
- fault information (refer to Chap 3.9.5.2.4)
- maintenance planning information (refer to Chap 3.9.5.2.5)
- crew/operator information (refer to Chap 3.9.5.2.6)
- parts information (refer to Chap 3.9.5.2.7)
- battle damage assessment and repair information (refer to Chap 3.9.5.2.8)
- wiring information (refer to Chap 3.9.5.2.9)
- process data module (refer to Chap 3.9.5.2.10)
- technical information repository data module (refer to Chap 3.9.5.2.11)

- container data module (refer to Chap 3.9.5.2.12)
- learning data module (refer to Chap 3.9.5.2.13)
- maintenance checklists and inspections (refer to Chap 3.9.5.2.14)
- applicability (refer to Chap 3.9.5.3)
- training information (refer to Chap 3.9.7)

The rules for the presentation of the text, including tables and figures are given in Chap 6.2 and Chap 6.3.

# Chapter 3.9.5.2.1.1

## *Common constructs - Change marking*

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# 1 General

This chapter gives rules and guidance for the marking of changes within data modules. The rules also apply to other CSDB objects where change markers are available.

General rules for change markings are covered in Para 2.1. Para 2.2 provides the rules that apply to change marking for the reason for update. General rules for marking elements and text as changed are given in Para 2.3. The rules for inserting new elements are given in Para 2.4. Para 2.5 provides rules for deleting elements, and Para 2.6 describes how to mark modifications. Para 2.7 gives specific rules for the marking of changes in tables, Para 2.8 gives the rules for marking changes that apply to warnings and cautions, and Para 2.9 provides the rules that apply to figures.

According to the rules of S1000D, only data modules that are changed can contain change markers. These data modules must have their issue type set to `changed` or `rinstate-changed`. In this chapter, these are referred to as changed data modules (ie data modules that have their issue status marked by setting the attribute `issueType` of the `issueInfo` element that is found within the identification and status section set to the value "`changed`" or "`rinstate-changed`").

# 2 Requirements for change marking

## 2.1 General rules for marking changes

Except when the data module is totally revised or new, all changes, except editorial changes, must be marked, and the Reason For Update (RFU) must be given in the data module's identification and status section. For data modules, the RFU information can be used to automatically generate the highlights data module. When the data module is revised, the RFU must contain the words "totally revised". RFU must not be used on Issue 001 of a data module.

The S1000D change mark model allows changes to be indicated and this is achieved by using elements and attributes provided by the S1000D Schema. Changes are only be marked in data modules that are Issue 002 and above and are of issue type changed

When they are used, change markers must be applied to reflect changes since the last issue of the data module, and not between the in-work issues.

The generated tables of contents that are displayed at the front of a data module (including the list of figures and tables) must not have changes applied or indicated. The author must make sure that there are no cross-references elsewhere in the data module or in other data modules which refer to deleted information. To indicate a change to a mark up element (ie the insertion of a new element, the deletion of an element, or the modification of an element), the factorized method described in Para 2.2 is used. To indicate change at word or sentence level, the element <`changeInline`> is used.

## 2.2 The reason for update

**Description:** The element <reasonForUpdate> contains a reason for update for a data module, and from Issue 002, one or more reasons for update should be captured in the identification and status section. The reason for update is a summary of the changes and / or the reasons for the change made within the data module is explained in Chap 3.2 and Chap 3.9.5.1. A data module can have been updated for a number of reasons. To specify each reason, use a separate <reasonForUpdate> element. For issue 002 and upwards, the reason for update is mandatory, and there must be at least one reason for update that will appear in the highlights data module (this means that at least one <reasonForUpdate> element must have its attribute updateHighlight set to the value "1"). If the data module is of issue type changed, then it must have changes indicated by change elements and attributes.

For changed data modules, the project or the organization can decide to provide a link from the places in the data module where the changes occur to the corresponding reason for update which is given in the status section, and this is achieved by using cross-references.

The Schema provides a cross-reference mechanism that can be applied to a change marked element and the corresponding reason for update. This is achieved through the use of the attribute reasonForUpdateRefIds.

The same reason for update can apply to many different elements (and changed text) by specifying the cross-reference identifier for it on all applicable elements. When a change has been made for different reasons, and each reason has a separate reason for update, the identifiers of each of the reasons must be specified in the element's attribute reasonForUpdateIds (which allows more one or more identifiers to be specified).

Data modules that are not of issue type changed must also have at least one reason for update element if the issue number is greater than "001". For example, revised data modules must have a reason for update value of "Totally revised", and reinstated data modules must contain a reason for the reinstatement. Any data module that is not of issue type changed and has an issue number that is greater than "001" must not have change markings, and this implies that there will be no cross-references to any reason for update element.

The element <reasonForUpdate> is located in the data module's identification and status section (refer to Chap 3.9.5.1), and can contain the optional and repeatable element <simplePara>.

**Markup element:** <reasonForUpdate> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the reason for update element. Refer to Chap 3.9.5.2.1.2.
- updateReasonType (O), this attribute is used to indicate the type of the reason for update that it applies to, and us a configurable attribute (refer to Chap 3.9.6.1). If this attribute is not used, it implies that the change type is technical. The values that follow are predefined in S1000D:
  - "urt01", this value means that the changes are editorial (and therefore there must be no change markers in the data module that relate to this reason for update). There must be no technical changes in a data module that has this value set.
  - "urt02", this value means that the changes are technical, and provided that the data module is not totally revised (refer to Chap 3.9.5.1), there must be change markers that relate to this reason for update.

- "urt03", this means that the changes are related to mark up only and if these changes affect the technical content of the data module, and the data module is of issue type changed, the changes that relate to this reason for update must be marked.
- "urt04", this means that the changes are to applicability markings only and if these changes do not affect the technical content (or the issue type is not changed), then there must be no change markings in the data module that relate to this reason for update.

**Note**

The value of the attribute issueType of the element <issueInfo> must be set in accordance with the rules given in Para. 2. If there are over a certain percentage of changes (where the percentage is set by the project or the organization (in their business rules documentation) (refer to Chap 3.9.5.1), then the issueType attribute must be set to the value revised and if the changes affect the technical content of the data module, the changes that relate to this reason for update must be marked.

– updateHighlight (O), if this attribute is set to the value "1", this indicates that the reason for update must appear in the highlights data module. If the attribute is not used or its value is "0", it means that the reason for update must not appear in the highlights data module.

**Child elements:**

A reason for update can either contain text, or it can contain the element that follows:

– <simplePara> (O), which allows a single reason for update to contain multiple paragraphs, which can contain text and optional super- or sub-scripts. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the cross-reference method for the reason for update
– format of reason for update identifiers
– definition of project specific change types
– standard statements for reason for update
– use of reason for update
– use of reason for update in conjunction with the production process
– use of applicability information
– types of changes to mark up

**Markup example:**

```
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-001">
<simplePara>CPF 2006-47AA: Applicability structure change and
addition of actref element</simplePara>
</reasonForUpdate>
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-002">
<simplePara>CPF 2006-48AA: Export control structure change,
addition of container elements</simplePara>
</reasonForUpdate>
```

## 2.3 Marking elements and text as changed

### 2.3.1 General rules for both elements and text

When a data module is of type changed, then all change specifications that apply to the data module must have a corresponding reason for update (refer to Para 2.2). For projects or organizations that are using the cross-reference to reason for update method, at the location where a specific change applies, the change is indicated by a reference to the appropriate reason for update which is located in the data module or publication module identification and status section. A change can be made to a data module for different reasons; therefore a change marker can reference multiple reasons for update.

### 2.3.2 Rules for marking elements as changed

**Description:** The change attributes detailed below are used when an element has been added, deleted or modified, and the data module is of type changed.

The changes are hierarchical in nature. This means that if, for example, the element <`proceduralStep`> is added, its change marks also apply to any contained elements (eg the element <`figure`>, the element <`table`>, etc). The contained elements can also have their change marker attributes applied, but this is not mandatory. If they are there, they are to be ignored.

**Markup element:** All elements that contain the attributes that follow.

**Attributes:**

- `changeMark` (O), a value of "`1`" for this attribute indicates that a change bar or mark (or some other visual representation) is to be displayed next to the entire content of an element being added, deleted or modified. A value of "`0`" or if the attribute is not used, means that the change, although marked, is not to be physically indicated by a change bar.
- `changeType` (M), this attribute is used to specify the type of the change (ie "`add`", "`modify`" or "`delete`") (refer to Para 2.4 for details about the decision to mark deletions in a data module). If this attribute is not used, and the attribute `changeMark` is used, the change will be assumed to be an addition.
- `reasonForUpdateRefIds` (O), this attribute must be used when the cross-reference method as described in Para 2.2 is used by the project or the organization. if specific reasons for update apply to the change that is to be indicated for this element, then the values of the `id` attribute for all applicable <`reasonForUpdate`> elements must be given in this attribute.

**Business rules decisions:**

- None identified

### 2.3.3 General rules for marking text as changed

**Description:** The element <`changeInline`> must be used for changed data modules when changing parts of text within certain elements (eg paragraphs, titles etc) that contain the <`changeInline`> element.

The element <`changeInline`> must not be used to indicate that a complete element has been inserted (or modified) as shown in the incorrect markup example below.

**Markup element:** <`changeInline`> (O)

**Attributes:**

- `id` (O), the identifier of the change inline element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Para 2.3.2.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`functionalItemRef`> (O). Refer to Chap 3.9.5.2.1.10
- <`circuitBreakerRef`> (O). Refer to Chap 3.9.5.2.1.10
- <`controlIndicatorRef`> (O). Refer to Chap 3.9.5.2.1.10
- <`inlineSignificantData`> (O). Refer to Chap 3.9.5.2.1.10
- <`quantity`> (O). Refer to Chap 3.9.5.2.1.10
- <`zoneRef`>* (O). Refer to Chap 3.9.5.2.1.10
- <`accessPointRef`>* (O). Refer to Chap 3.9.5.2.1.10
- <`identNumber`>* (O). Refer to Chap 3.9.5.2.1.10
- <`internalRef`> (O). Refer to Chap 3.9.5.2.1.2
- <`indexFlag`>* (O). Refer to Chap 3.9.5.2.1.10
- <`changeInline`> (O). Refer to Chap 3.9.5.2.1.1
- <`emphasis`> (O). Refer to Chap 3.9.5.2.1.10
- <`symbol`> (O). Refer to Chap 3.9.5.2.1.10
- <`subScript`> (O). Refer to Chap 3.9.5.2.1.10
- <`superScript`> (O). Refer to Chap 3.9.5.2.1.10
- <`dmRef`> (O). Refer to Chap 3.9.5.2.1.2
- <`pmRef`>* (O). Refer to Chap 3.9.5.2.1.2
- <`externalPubRef`> (O). Refer to Chap 3.9.5.2.1.2
- <`footnote`> (O). Refer to Chap 3.9.5.2.1.10
- <`footnoteRef`>* (O). Refer to Chap 3.9.5.2.1.10
- <`acronym`> (O). Refer to Chap 3.9.5.2.1.10
- <`acronymTerm`> (O). Refer to Chap 3.9.5.2.1.10
- <`caption`>* (O). Refer to Chap 3.9.5.2.1.4
- <`captionGroup`>* (O). Refer to Chap 3.9.5.2.1.4
- <`verbatimText`> (O). Refer to Chap 3.9.5.2.1.10
- <`sequentialList`> (O). Refer to Chap 3.9.5.2.1.3
- <`randomList`> (O). Refer to Chap 3.9.5.2.1.3
- <`definitionList`> (O). Refer to Chap 3.9.5.2.1.3

**Note**

The elements marked with an asterisk (*) are not available in all data modules. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

The first example shows incorrect markup. It shows markup that is being incorrectly used to indicate that a procedural step has been inserted. The correct mark up is shown in the second example.

The example that follows shows the correct method to be used to indicate that a procedural step has been added. It also shows how to use the cross-reference method to refer to a reason for the change. The example shows the reason for update is a technical change (because the

updateReasonType is set to the value "urt02"), it is to appear in the highlights data module (because the updateHighlight attribute is set to "1").

```
<proceduralStep changeType="add" reasonForUpdateRefIds="rfu-0005
rfu-0006" changeMark="1">
<para>Remove the four bolts (<internalRef internalRefId="SP0232"
internalRefTargetType="spares"></internalRef>).</para>
</proceduralStep>
```

The two corresponding reason for update entries in the identification and status section could be:

```
<reasonForUpdate id="rfu-0005" updateReasonType="urt02"
updateHighlight="1">
<simplePara>Updated to include the requirements of Brook Trekker
Modification PO-RT1/ON (extended length bottom-bracket shaft
bolts).</simplePara>
</reasonForUpdate>
```

```
<reasonForUpdate id="rfu-0006" updateReasonType="urt02"
updateHighlight="1">
<simplePara>Updated to include the requirements of Brook Trekker
Modification ME-BABB/1E-BCFC (bottom-bracket shaft bolts replace
welds).</simplePara>
</reasonForUpdate>
```

The example that follows shows that the number of bolts has been changed. There is no reasonForUpdateRefIds attribute used because, in this example, the project or the organization has decided to apply the business rule that the cross-reference method described in Para 2.2 is not to be used.

```
<proceduralStep>
<para>Remove the <changeInline changeType="modify"
changeMark="1">four</changeInline> bolts (<internalRef
internalRefId="SP0232"
internalRefTargetType="spares">></internalRef>.</para>
</proceduralStep>
```

The two corresponding reason for update entries in the identification and status section could be:

```
<reasonForUpdate updateHighlight="1" updateReasonType="urt02">
<simplePara>Updated to include the requirements of Brook Trekker
Modification OW/B1ST (Four bolt system).</simplePara>
<simplePara>The bolts are changed to self-locking double hexagon
head (part number WURZ31) in accordance with Mod. ATEY0-
1</simplePara>
</reasonForUpdate>
```

## 2.4 Marking insertions

To mark added elements, use the attribute changeMark with a value "add" To mark text added within existing text, use the element <changeInline> and set its changeType attribute to the value "add". In both cases, if the cross-reference method described in Para 3 is used, use the reasonForUpdateIds attribute as appropriate.

### 2.4.1 Marking inserted elements

**Description:** To mark an element as inserted, set its change attributes as appropriate (refer to Para 2.3.3). The `changeType` attribute must be set to the value "`add`".

There is no need to set the change attributes on the element's child because this is implied. Any change markings on child are ignored by the presentation system.

**Markup elements:** these rules apply to all elements that contain the change mark attributes that are described in Para 2.3.3.

**Attributes:**

– The change attributes must be set as described in Para 2.3.3. The attribute `changeType` must be set to the value "`add`".

**Business rules decisions:**

– None identified

**Markup example:**

The example that follows shows an added element <`proceduralStep`>. The change mark attributes settings on this element imply that the child element <`para`>, the two child elements <`proceduralStep`> and the element <`figure`> have also been added. In this example, a reference to a reason for update is shown as a technical change.

```
<proceduralStep reasonForUpdateRefIds="rfu-0006" changeMark="1">
<para>This is a new step</para>
<proceduralStep>
<para>This is a sub-step</para>
</proceduralStep>
<proceduralStep>
<para>This is a sub-step</para>
<figure>
<title>LP Compressor removal details</title>
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-01234-A-01-1">
</graphic>
</figure>
</proceduralStep>
</proceduralStep>
```

The corresponding change specification is the status section would show that this is a technical change as indicated by the attribute `updateReasonType` value "`urt02`", and the reason for update will appear in the highlights data module because the attribute `updateHighlight` is set to the value "`1`".

```
<reasonForUpdate id="rfu-0006" updateReasonType="urt02"
updateHighlight="1">
<simplePara>Incorporation of mod XYZ</simplePara>
</reasonForUpdate>
```

**Note**

For formatting, the change bar (or other visible recognition) is applied to the complete content of the element <proceduralStep> as shown below. This layout applies to changes that are modifications as well.

**1. This is a new step**
**1.1 This is a sub-step**
**1.2 This is a sub-step**
**(graphic appears here)**
**Fig 2 - LP Compressor removal details**

### 2.4.2 Marking inserted text (for example, within a paragraph)

**Description:** The element <changeInline> is used to mark inserted text. If a cross-reference to a reason for update is required, its attribute reasonForUpdateRefIds must refer to an appropriate element <reasonForUpdate>. For inserted text, the attribute changeType must be set to the value "add".

**Markup element:** <changeInline> (O)

**Attributes:**

– The change attributes must be set as described in Para 2.3.3

**Child elements:**

– As described in Para 2.3.3

**Business rules decisions:**

– None identified

**Markup example:**

The example that follows shows that the torque value has been added. In this example, a reference to a reason for update is applied. The change will be marked by a change bar (or other visual representation) because the changeMark attribute is set to the value "1"

```
<proceduralStep>
<para>Use the
<internalRef internalRefId="seq-0001"
internalRefTargetType="supequip">wrench</internalRef>
to tighten the bolts
<changeInline changeType="add" reasonForUpdateRefIds="rfu-0007"
changeMark="1">to 16 lb/sq in
<superScript>2</superScript>
</changeInline>.
</para>
</proceduralStep>
```

The corresponding change specification is the status section shows that this is a technical change as indicated by the reasonType attribute value "urt02". The reason for update will appear in the highlights data module because the attribute updateHighlight is set to the value "1".

```
<reasonForUpdate id="rfu-0007" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The torque value is added</simplePara>
</reasonForUpdate>
```

## 2.5 Marking deletions

### 2.5.1 Definition

S1000D strongly recommends that a project physically removes deleted information from a data module. If a project decides to mark up deleted information, then the rules in this paragraph must be applied. Note that even if the project or the organization decides not to mark deletions, an indication of what has been deleted and a reason for the deletion must be specified in a reason for update for data modules that are of issue type changed.

If deleted markers are required by the project or the organization, then S1000D recommends that the deleted elements and text are not rendered for formatting.

S1000D defines writing rules. There is a risk that some of these can be broken due to deleted information being present. For example, normal writing practice is to use two subordinate steps when a step is further broken down. This rule could be compromised if the second substep is deleted.

To mark deleted elements, use the attribute `changeType` with a value set to "`delete`". Refer to Para 2.4.1. To mark deleted text, use the element <`changeInline`> as described above, with its attribute `changeType` attribute set to "`delete`". Refer to Para 2.4.2.

### 2.5.2 Marking deleted elements

**Description:** The attribute `changeType` on the deleted element must be set to the value "`delete`".

The content of the element that contains the deleted change mark attribute must be preserved.

If an element's parent element is marked as deleted, this implies that its child elements are also deleted. Marking the element's subelements as deleted is therefore not required. Any change markings on subelements are to be ignored by the formatting system.

For data modules, the author must make sure that there are no cross-references elsewhere in the data module or in other data modules which refer to deleted information.

**Markup elements:** all that contain the change mark attributes that are described in Para 2.3.3.

**Attributes:**

– The change attributes must be set as described in Para 2.3.3. The attribute `changeType` must be set to the value `delete`.

**Child elements:**

– As described in Para 2.3.3

**Business rules decisions**

Business rules decisions include, but are not limited to, the following:

– marking deletions
– rendering deleted information

**Markup example:**

In the example that follows the second sub-step element <`proceduralStep`> and its contained element <`table`> have been deleted.

```
<proceduralStep>
<para>This is a step.</para>
<proceduralStep>
<para>This is a sub-step.</para>
```

```
</proceduralStep>
<proceduralStep reasonForUpdateRefIds="rfu-0008" changeMark="0"
changeType="delete">
<para>This is a deleted sub-step.</para>
<table>...</table>
</proceduralStep >
<proceduralStep>
<para>This is another sub-step.</para>
</proceduralStep>
</proceduralStep>
```

The corresponding change specification in the status section would show:

```
<reasonForUpdate id="rfu-0008" updateReasonType="urt02"
updateHighlight="1">
<simplePara>Step XX and table YY are deleted</simplePara>
</reasonForUpdate>
```

### 2.5.3 Marking text as deleted

**Description:** To mark the text within an element as deleted, use the element <changeInline> with the attribute changeType set to the value delete.

When marking text as deleted, the content of the deleted text must be preserved.

**Markup element:** <changeInline> (O)

**Attributes:**

– The change attributes must be set as described in Para 2.3.3. The attribute changeType must be set to the value "delete".

**Child elements:**

– As described in Para 2.3.3

**Business rules decisions**

Business rules decisions include, but are not limited to, the following:

– marking deletions
– rendering deleted information

**Markup example:**

The example that follows shows that a reference to a data module and the reference has been deleted.

```
<levelledPara><para>The values displayed on the HUD are 1,2,3 or
4.
<changeInline reasonForUpdateRefIds="rfu-0009" changeMark="0"
changeType="delete"> Full details are given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="E2" systemDiffCode="A"
systemCode="15" subSystemCode="0" subSubSystemCode="1"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="043" infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>.</changeInline>
</para></levelledPara>
```

The corresponding change specification in the status section would show:

```
<reasonForUpdate id="rfu-0009" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The reference to data module E2-A-15-01-00-00A-043A-
D is deleted.</simplePara>
</reasonForUpdate>
```

## 2.6 Marking modified (amended) information

### 2.6.1 Definition

To mark modified elements, use the attribute `changeMark` and set the attribute `changeType` to the value "`modify`" on the modified element. Refer to Para 2.5.2.

To mark text modified within existing text, use the element <`changeInline`> and set its attribute `changeType` to the value `modify`. Refer to Para 2.5.3.

### 2.6.2 Marking modified elements

**Description:** To mark an element as modified, the attribute `changeType` is set to the value "`modify`".

Marking the element's subelement's attribute `changeType` to the value "`modify`" is not required since this is implied. Any change markings on subelements are ignored by the processing system.

**Markup elements:** these rules apply to all elements that contain the change mark attributes that are described in Para 2.3.3.

**Attributes:**

– The change attributes must be set as described in Para 2.3.3. The attribute `changeType` must be set to the value "`modify`".

**Child elements:**

– As described in Para 2.3.3

**Markup example:**

The example that follows shows that the element <`proceduralStep`> has been modified.

```
<proceduralStep reasonForUpdateRefIds="rfu-0010" changeMark="1"
changeType="modify">
<para>This is a modified step</para>
<proceduralStep>
<para>This is a contained sub-step</para>
</proceduralStep>
<proceduralStep>
<para>This is another contained sub-step</para>
</proceduralStep>
</proceduralStep>
```

The corresponding change specification in the identification and status section would show:

```
<reasonForUpdate id="rfu-0010" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The step xxx is modified</simplePara>
</reasonForUpdate>
```

The example that follows shows that the complete text in the element <para> has been modified.

```
<levelledPara>
<para reasonForUpdateRefIds="rfu-0012" changeMark="1"
changeType="modify">Mike from Russia to Mike from Poland:
Hello!</para>
<para>This is continued text</para>
</levelledPara>
```

The corresponding change specification is the status section would show:

```
<reasonForUpdate id="rfu-0012" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The text in the first paragraph of Para xxx is
modified in accordance with technical note MDOM-
E0N.</simplePara>
</reasonForUpdate>
```

### 2.6.3 Marking modified text

**Description:** To mark the text within an element as modified, use the element <changeInline> with the attribute changeType set to the value "modify".

**Markup element:** <changeInline> (O)

**Attributes:**

– The change attributes must be set as described in Para 2.3.3. The attribute changeType must be set to the value" modify".

**Child elements:**

– As described in Para 2.3.3

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the value "modify"

**Markup example:**

This example shows that a torque value within a procedural step has been modified. It is a technical change and the updateReasonType attribute on element <reasonForUpdate> has been set to indicate this.

```
<proceduralStep>
<para>Use the
<internalRef internalRefId="seq-0001"
internalRefTargetType="supequip">wrench</internalRef>
to tighten the bolts to
<changeInline reasonForUpdateRefIds="rfu-0011" changeMark="1"
changeType="modify">18 lbf/in
<superScript>2</superScript>
</changeInline>.
</para>
</proceduralStep>
```

The corresponding change specification is the status section would show:

```
<reasonForUpdate id="rfu-0011" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The torque value is changed to 18 lbf/in
<superScript>2</superScript>.
</simplePara>
</reasonForUpdate>
```

## 2.7 Special rules for indicating change in tables

Change markings, when applied to a table that is marked up with the element `<table>`, must be displayed against the whole table and not individual rows and columns. To achieve this, projects are advised to mark changes within tables by applying the change mark attributes to individual rows and entries. The stylesheet is then able to apply the physical change marking against the whole table by examining the elements and attributes within it.

These rules apply also to tables within foldouts.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– display of change markings in tables

### 2.7.1 Marking inserted, deleted or modified table rows

To mark a table row as being inserted, apply the change mark attributes to the affected row.

**Markup example:**

The following example, a row that has been added (the attribute `changeType` of an element `<reasonForUpdate>` set to the value "`add`").

```
<row reasonForUpdateRefIds="rfu-0021" changeMark="1"
changeType="add">
<entry><para>A</para></entry>
<entry><para>Bike spoke kit</para></entry>
</row>
```

The corresponding change specification is the status section would show:

```
<reasonForUpdate id="rfu-0021" updateReasonType="urt02"
updateHighlight="1">
<simplePara>The third table row is added</simplePara>
</reasonForUpdate>
```

### 2.7.2 Marking changes within table cells (entries)

Tables are changed when you add, modify or delete entries from a table. The Schema does not allow the author to mark that a table entry has been added or modified. To do this, apply the change markers to the subelements of the element `<entry>`. To indicate that elements have been inserted or modified within an entry, use the change attributes for the affected elements as described above. To indicate changes, within the text of an element, use the element `<changeInline>` as described in Para 2.3.3.

## 2.8 Special rules for indicating changes in Warnings and Cautions

It is vital that the user reads a complete warning and caution when performing the maintenance task. Therefore, change marks should be applied to the complete warning or caution and not to individual words or paragraphs that it contains.

### 2.8.1 Markup example:

The following example shows how to markup a warning that has changed.

```
<warning changeMark="1" changeType="modify"
reasonForUpdateRefIds="rfu-0022">
<warningAndCautionPara>Do not drink the oil or allow it to spill
on your skin. It can kill you.</warningAndCautionPara>
</warning>
```

The corresponding change specification is the status section would show:

```
<reasonForUpdate id="rfu-0022" updateHighlight="1"
updateReasonType="urt02">
<simplePara>Warning changed in accordance with the new
requirements of HAZMAT001.</simplePara>
</reasonForUpdate>
```

## 2.9 Special rules for indicating change in figures

The project or the organization must decide to mark changes against an entire figure or against its sheets.

If the element <figure> is to be change marked, the change attributes on the element <graphic> of multi-sheet figures must not be used. This does not prevent the use of the element <reasonForAmendment> on a single illustration sheet of multi-sheet figures to indicate changes in the illustration itself (refer to Para 2.8.1).

If change marking is to be indicated on individual illustration sheets of a multi-sheet figure, then the appropriate change marker attributes must be applied to the element <graphic> , and in this case, the change attributes on the element <figure> must not be used.

The status section element <reasonForUpdate> that is referenced by the element <figure> or the element <graphic> is used as described in Para 2.2, and contains general reasons why the figure (or illustration sheet) has been changed, modified or deleted.

**Business rules decisions:**

– **Use of change marking on individual illustration sheets of a multi-sheet figure.** projects must decide if change attributes are allowed on individual illustration sheets of a multi-sheet figure. This decision involves either marking an entire figure as changed (element <figure>), or marking the individual sheets as changed (element <graphic>).

**Markup example:**

This example shows the first method and indicates that a complete figure has been added.

```
<figure id="F023" changeMark="1" changeType="add">
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-12345-A-02-
1"></graphic>
</figure>
```

The next example shows the second method and indicates that the figure has had a second sheet added.

```
<figure id="F023">
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-12345-A-02-
1"></graphic>

<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-12395-A-02-1"
```

```
changeMark="1" changeType="add" reasonForUpdateRefIds="rfu-
011"></graphic>
</figure>
```

The corresponding reason for update in the status section might show:

```
<reasonForUpdate id="rfu-011" updateReasonType="urt02"
updateHighlight="1">
<simplePara>Illustration sheet 2 is added (ICN-E2-A-723200-R-
K0378-12395-A-01-1).</simplePara>
</reasonForUpdate>
```

### 2.9.1 Reason for amendment

**Description:** If used, the element <reasonForAmendment> must record the reason for amendment of either a complete figure, or of individual illustration sheets of a multi-sheet figure. This is to be used to indicate changes made to the illustration itself, for example, "location view has been added", or "cross-section view has been added for Mod. XYZ".

If the element <reasonForAmendment> is to be used for multi-sheet figures, then it must be given, and its content will, in general, be different for each affected illustration sheet.

If the element <figure> is change marked, the change attributes on the element <graphic> of multi-sheet figures must not be used. This does not prevent the use of the element <reasonForAmendment> on a single illustration sheet of multi-sheet figures to indicate changes in the illustration itself.

If change marking is to be indicated on individual illustration sheets of a multi-sheet figure, then the appropriate change marker attributes must be applied to the element <graphic> , and in this case, the change attributes on the element <figure> must not be used.

The status section element <reasonForUpdate> that is referenced by the element <figure> or the element <graphic> is used as described in Para 2.2, and contains general reasons why the figure (or illustration sheet) has been changed, modified or deleted.

**Mark up element:** <reasonForAmendment> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– As described in Para 2.3.3

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– relationship between the element <reasonForAmendment> and the element <reasonForUpdate>
– use of standard texts for the reason for amendment

**Markup example:**

The example that follows shows the use of the element <reasonForAmendment>.

```
<figure id="fig007" changeMark="1" changeType="modify"
reasonForUpdateRefIds="rfu-0098">
<graphic infoEntityIdent="ICN-E2-A-723277-R-K0378-34152-A-01-1">
```

```
<reasonForAmendment>Location view modified. Section A-A changed
to include post mod. XYZ conditions.</reasonForAmendment>
</graphic>
</figure>
```

The corresponding change specification in the status section might show:

```
<reasonForUpdate id="rfu-0098" updateHighlight="1"
updateReasonType="urt02">
<simplePara>Figure changed to post-mod. XYZ
standard</simplePara>
</reasonForUpdate>
```

The example that follows shows a multi-sheet figure with each sheet having a separate reason for amendment.

```
<figure id="fig008" changeMark="1" reasonForUpdateRefIds="rfu-
0001">
<graphic infoEntityIdent="ICN-E2-A-723277-R-K0378-34152-A-01-1">
<reasonForAmendment>Location view modified. Section A-A changed
to include post mod. XYZ conditions.</reasonForAmendment>
</graphic>
<graphic infoEntityIdent="ICN-E2-A-723277-R-K0378-34153-A-01-1">
<reasonForAmendment>Location view modified. Section B-B changed
to include post mod. XYZ conditions.</reasonForAmendment>
</graphic>
</figure>
```

The corresponding change specification in the status section might show:

```
<reasonForUpdate id="rfu-0001" updateHighlight="1"
updateReasonType="urt02">
<simplePara>Figure changed to post-mod. XYZ
standard</simplePara>
</reasonForUpdate>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the cross-reference method for the reason for update.** The project or the organization must decide whether to use the cross-reference method for linking changes to reasons for update or not. The method used must be applied consistently in the project. Refer to Para 2.2.

**Format of reason for update identifiers.** It is considered good practice to apply meaningful identifiers to id attributes and the project or the organization is advised to define a format in their business rules documentation (for example: `rfu-001`). Refer to Para 2.2.

**Definition of project specific change types.** The project or the organization must decide if any of the project configurable attributes (values "`urt51`" to "`urt99`") are to be used on the `<reasonForUpdate>` element, and apply meanings for them to make sure that they are consistently used in the project. Refer to Para 2.2.

**Standard statements for reason for update.** The project or the organization must consider the use of standard reason for update statements. For example:

– Revised to incorporate the requirements of modification XYZ.

– Deleted because the data module is no longer needed. Refer to Para 2.2.

**Use of reason for update.** Reason for update can be used to automatically generate highlights data module. Normally, a project will mandate its use from issue 002 upwards. This will imply that the reason for update must not be used for issue 001. Refer to Para 2.2.

**Use of reason for update in conjunction with the production process.** The project or the organization must decide if the element <`reasonForUpdate`> is to be used during the production process. Refer to Para 2.2.

**Use of applicability information.** The project or the organization must decide if it is permitted to differentiate reasons for update depending on Product configuration information. Refer to Para 2.2.

**Types of changes to mark up.** The project or the organization must decide if the reason for update types "`urt01`" (editorial), "`urt03`" (mark up) and "`urt04`" (applicability) are to be used. Irrespective of the decision made, all projects must follow the rules that change markers should only be included if the change is a technical change, and editorial changes must not be marked. Further, no change markers must appear if the issue type is not changed. Refer to Para 2.2.

**Use of the `id` attribute on the <`changeInline`> element**. The project or the organization must decide if the id attribute is allowed to be used on the <`changeInline`> element. The purpose of the attribute must be defined and it is considered good practice to define a format o the identifier (refer to Chap 3.9.5.2.1.2). Refer to Para 2.3.3.

**Marking deletions.** The project or the organization must decide if deletions are to be change marked. S1000D strongly recommends that deleted information is physically removed from an up-issued data module, and deleted change markers are not used. If a project decides to mark deletions, the rules given in Para 2.4 must be applied. Refer to Para 2.5.2 and Para 2.5.3.

**Rendering deleted information.** The project or the organization must consider how deleted information is rendered. S1000D recommends that deletions are not rendered and that no change markings appear. Refer to Para 2.5.2 and Para 2.5.3.

**Use of the value "`modify`"**. Use of the value "`modify`" and the value `add` in change markers must be consistent across the project. The rules for use must be specified in the project or the organization's business rules documentation. Refer to Para 2.6.

**Display of change markings in tables.** The project or the organization must decide, if change markings are to be displayed for parts of a table, for page-oriented output, the change is displayed next to the row that contains the change. Refer to Para 2.7.

**Relationship between the element <`reasonForAmendment`> and the element <`reasonForUpdate`>.** The project or the organization must decide if the reason for amendment details for a figure (or the individual illustration sheets of a multi-sheet figure are also reflected in the data module status element <`reasonForUpdate`> and subsequently used in the generation of the highlights data module. Refer to Para 2.9.1.

**Use of standard texts for the reason for amendment.** It is recommended that projects define a standard set of statements for a reason for amendment. Refer to Para 2.9.1.

# Chapter 3.9.5.2.1.2

## *Common constructs - Referencing*

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# 1 General

This chapter gives the rules, definitions and handling of references and cross-references from an author's point of view. It gives the details about the available elements and attributes and how to use and populate them.

The rules for the presentation of references and cross-references in page-oriented publications and IETP are given in Chap 6.2 and in Chap 6.3 respectively.

References are used to direct the reader to another document or to a certain place within the document. Thus, there are two types of references used in S1000D:

- Cross-references - Internal references (eg to other places within the same data module). Refer to Para 2.1.
- References - External references. Refer to Para 2.2 for a general description of the references to other data modules, refer to Para 2.3 for a general description of references to publication modules and, refer to Para 2.4 for a general description of references to other

external documents Refer to Para 2.5 for rules regarding presentation of references in the reference table of the data module. Refer to Para 2.6 for rules regarding use of "inline" references.

# 2 Use of references

## 2.1 Cross-references within a data module

**Description:** The element <`internalRef`> is used to mark up a cross-reference from one point in a data module to another point in the same data module. This is achieved using the normal ID/IDREF mechanism, refer to Para 2.1.1.1.

**Markup element:** <`internalRef`> (O)

ICN-83007-0000000001-001-01

*Fig 1 Element <`internalRef`>*

Hotspot areas within graphics can also be cross-referenced from within a data module and back using the element <`internalRef`>. A graphical hotspot can also point at another graphical hotspot within the same graphic. Refer to Chap 3.9.5.2.1.8 for details.

**Note**

In order to allow more flexibility for element <`internalRef`> in data module text, it can have textual content including sub and super scripts to highlight link anchors to the end user in viewer applications.

Cross-references to eg, paragraphs, steps, figures and tables must be preceded with the captions "Para", "Step", "Fig" and "Table", respectively when presented. For details, refer to Chap 6.2.2.

The author must enter all "separators" like comma [,], spaces [ ], parenthesis [(], [)], "and" and "or".

**Note**

The captions are normally not entered in the data modules when data modules are written, since tools will automatically generate the captions, either by analyzing the reference or by using the attribute `internalRefTargetType`. Also refer to project or organization decisions below.

*Table 2 Cross-references - Examples*

| Cross-reference to | Method of presentation | Note |
|---|---|---|
| Para <`levelledPara`> | Para 3.2.1 (for <`levelledPara`> at third level) | This method is the usual method in documents using sideheads. |
| A number of paragraphs | Para 2.1 and Para 3.4 | |

| Cross-reference to | Method of presentation | Note |
|---|---|---|
| Table | Table 3 | |
| Figure as a whole | Fig 1 | |
| A number of figures as a whole | Fig 1, Fig 3 and Fig 5 | |
| Cross-reference to a callout in a figure | Fig 1 [2] | |
| Cross-reference to several callouts in the same figure | Fig 6 [1], Fig 6 [3], Fig 6 [5] | |

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `internalRefId` (O), the target id, refer to recommendation below.
- `internalRefTargetType` (O), must be used indicate the type of destination of the reference. The following attribute values are available:
  - "`figure`", used when the reference target is a figure
  - "`table`", used when the reference target is a table
  - "`multimedia`", used when the reference target is multimedia (containing one or more objects)
  - "`supply`", used when the reference target is a supply
  - "`supequip`", used when the reference target is support equipment
  - "`spares`", used when the reference target is a spare
  - "`para`", used when the reference target is a paragraph
  - "`step`", used when the reference target is a step
  - "`graphic`", used when the reference target is a graphic
  - "`multimediaobject`", used when the reference target is a single multimedia object
  - "`hotspot`", used when the reference target is a hotspot
  - "`param`", used when the reference target is a parameter
  - "`other`", used when the reference target is something other than listed above
- `referredFragment` (O), is in this context used to cross-refer to item numbers of hotspots in illustrations within the data module. Refer to Chap 3.9.5.2.1.8.
- `targetTitle` (O), used to provide a human-readable label for the link destination, which could be presented after the target identifier (eg "Hub function") or be displayed when for instance the cursor is hovering over the target identifier.
- `xlink:type` (O), specifies the link type, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:href` (O), specifies the link address, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:title` (O), specifies the link title, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:show` (O), specifies the link appearance, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:actuate` (O), specifies the link behavior, if an XLink link is established. Refer to Chap 7.4.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <subScript> (O). Refer to Chap 3.9.5.2.1.
- <superScript> (O) . Refer to Chap 3.9.5.2.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- extent of cross-referencing
- define the format of the cross-reference attribute id and attribute internalRefId
- use of element <internalRef> in titles
- use of title in the references
- use of the attribute internalRefTargetType

**Markup example:**

The following example shows a cross-reference to a step within the same data module.

```
<internalRef internalRefId="stp-0001"
internalRefTargetType="step">This is a link to another place in
the same data module.</internalRef>
```

The following markup example shows a cross-reference from a paragraph to a figure.

```
<para>Clean the bicycle with water to remove all dirt. Refer to
<internalRef internalRefId="fig-0001"
internalRefTargetType="figure"></internalRef>.</para>
...
<figure id="fig-0001">
<title>Cleaning the bike</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-
00502-A-03-1">
</graphic>
</figure>
```

The following markup example shows a cross-reference from a paragraph to a callout in a figure.

```
<para>Clean the bicycle with water to remove all dirt. Refer to
<internalRef internalRefId="fig-0001-gra-0001-hot-0009"
internalRefTargetType="hotspot"></internalRef>
</para>
...
<figure id="fig-0001">
<title>Complete bicycle</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-
00536-A-03-1">
<hotspot id="fig-0001-gra-0001-hot-0001"
applicationStructureIdent="hot001" applicationStructureName="1"
hotspotType="CALLOUT"></hotspot>
<hotspot id="fig-0001-gra-0001-hot-0003"
applicationStructureIdent="hot003" applicationStructureName="3"
hotspotType="CALLOUT"></hotspot>
<hotspot id="fig-0001-gra-0001-hot-0009"
applicationStructureIdent="hot009" applicationStructureName="9"
hotspotType="CALLOUT"></hotspot>
</graphic>
</figure>
```

For markup examples of hotspot linking, refer to Chap 3.9.5.2.1.8.

2.1.1.1 Use and function of ID/IDREF references

There are a couple of standardized means to establish links in an XML document. The traditional one is usually referred to as ID/IDREF linking, which is the method used in S1000D to establish links within CSDB text objects, such as data module. These links are defined by use of two attributes

- an attribute of the generic type ID. The attribute is declared/available for elements that are supposed to be targets of a reference/link from some other locations in the data module
- an attribute of either of the generic types IDREF or IDREFS. This type of attribute is declared/available for elements from which there can be a reference/link to some other element(s). The value of an IDREF type attribute must be the value of the ID type attribute of the target element. When there are several potential targets, the attribute type IDREFS is used, which can contain several space separated target IDs.

A link can be representing a cross reference within a data module, such as described in Para 2.1. However, there are a number of possible implicit links in a data module that do not show as cross references. Examples are references from some content location to an applicability annotation located in the status section, or a reference from some location in the data module content to a change note in a element <`reasonForUpdate`>, also located in the status information block.

To enable the various uses of ID/IDREF references/links within the data module, a great number of elements are equipped with an ID type attribute. These are always named `id`.

Since the ID/IDREF mechanism is inherent XML functionality, in most implementations of S1000D, population of the element identities (ie `id` attributes) is cared for automatically. Depending on the type of references (cross reference or others), the behavior of the ID/IDREF references can vary completely. Refer also to Chap 7.4.1.1 and Chap 7.4.

## 2.2 References to data modules

**Description:** The element <`dmRef`> contains details of the destination data module that is referred from some other S1000D context, such as a data module, a publication module etc.

**Markup element:** <`dmRef`> (O)

ICN-83007-0000000002-001-01

*Fig 2 Element <`dmRef`>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the reference to data module element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- `referredFragment` (O), contains the identification of an exact target within a data module when a reference addresses a specific location within another data module rather than the whole data module. The target must be an element in the destination data module and the target identification is the `id` attribute of the target element.
- `xlink:type` (O), specifies the link type, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:href` (O), specifies the link address, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:title` (O), specifies the link title, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:show` (O), specifies the link appearance, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:actuate` (O), specifies the link behavior, if an XLink link is established. Refer to Chap 7.4.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`dmRefIdent`> (M), contains the items forming a unique identification of a destination data module. Refer to Para 2.2.1.1
- <`dmRefAddressItems`> (O), contains additional information about the destination data module. Refer to Para 2.2.1.2.
- <`behavior`> (O), specifies how a link corresponding to the reference operates. Refer to Para 2.2.1.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use and format of the attribute `referredFragment`

**Markup example:**

The following example shows a reference to another data module including its title and issue number (subelements are described below):

```
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="2" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="520" infoCodeVariant="A" itemLocationCode="A" />
<issueInfo issueNumber="002" inWork="00"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techName>Handlebar</techName>
<infoName>Remove procedures</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
```

2.2.1.1 Identification of a referred data module

**Description:** The element <dmRefIdent> contains the items forming a unique identification of the destination data module.

**Markup element:** <dmRefIdent> (M)

ICN-83007-0000000003-001-01

*Fig 3 Element <dmRefIdent>*

**Attributes:**

– None

**Child elements:**

– <identExtension> (O), contains the additional parameters needed to establish a unique identification of a data module in those cases when data module code, issue and in-work numbers together with the language and country are insufficient to form a universally unique identity. Refer to Chap 3.9.5.1 and Chap 4.12.
– <dmCode> (M), contains the data module code of the destination data module. Refer to Chap 3.9.5.1 and Chap 4.3.
– <issueInfo> (O), contains issue information needed to address a particular destination data module issue. Refer to Chap 3.9.5.1.
– <language> (O), specifies the language of the destination data module. Refer to Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of issue information and language

**Markup example:**

```
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="2" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="520" infoCodeVariant="A" itemLocationCode="A" />
<issueInfo issueNumber="002" inWork="00"/>
</dmRefIdent>
```

2.2.1.2 Complementary identifying information for a data module

**Description:** The element <dmRefAddressItems> contains additional identifying information about the destination data module.

**Markup element:** <dmRefAddressItems> (O)

ICN-83007-0000000004-001-01

*Fig 4 Element <dmRefAddressItems>*

**Attributes:**

– None

**Child elements:**

– <dmTitle> (O), contains the data module title of the destination data module. Refer to Chap 3.9.5.1.
– <issueDate> (O), specifies the issue date of the destination data module. Refer to Chap 3.9.5.1.

**Business rules decisions:**

– Use of title and issue date

**Markup example:**

```
<dmRefAddressItems>
<dmTitle>
<techName>Handlebar</techName>
<infoName>Remove procedures</infoName>
</dmTitle>
</dmRefAddressItems>
```

2.2.1.3 Link behavior information

**Description:** The element <behavior> specifies how the link operates, when a reference is supposed to be realized as a link.

**Markup element:** <behavior> (O)

ICN-83007-0000000005-001-01

*Fig 5 Element <behavior>*

**Attributes:**

– linkShow (O), specifies the link appearance, if an xlink link is established. Refer to Chap 7.4.1.1.

- "newPane", show the referred context in a new pane
- "embedInContext", embed the referred context in the current context
- "replaceAndReturnToSource", show the referred context instead of the current context, and return automatically to the current context when the referred context has been viewed
- "replaceAndNoReturn", show the referred context instead of the current context, but do not automatically return to the current context when the referred context has been viewed

– linkActuate (O), specifies the link behavior, if an XLink link is established. Refer to Chap 7.4.1.1.
  - "onLoad", present the referred context automatically when the link is loaded (ie when the link appears in the currently viewed context)
  - "onRequest", present the referred context on user request only

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

The following example illustrates how to markup a reference/link that will cause the reference target to show in a separate pane on the screen as soon as the link appears in the viewing context.

```
<behavior linkShow="newPane" linkActuate="onLoad"/>
```

## 2.3 References to publications

**Description:** The element <pmRef> contains details of the destination publication module that is referred from some other S1000D context, such as a data module, another publication module etc.

**Markup element:** <pmRef> (O)

ICN-83007-0000000006-001-01

*Fig 6 Element <pmRef>*

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the reference to publication element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- xlink:type (O), specifies the link type, if an XLink link is established. Refer to Chap 7.4.1.1.
- xlink:href (O), specifies the link address, if an XLink link is established. Refer to Chap 7.4.1.1.
- xlink:title (O), specifies the link title, if an XLink link is established. Refer to Chap 7.4.1.1.
- xlink:show (O), specifies the link appearance, if an XLink link is established. Refer to Chap 7.4.1.1.
- xlink:actuate (O), specifies the link behavior, if an XLink link is established. Refer to Chap 7.4.1.1.
- authorityName (O), and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <pmRefIdent> (M), contains the items forming a unique identification of a destination publication module. Refer to Para 2.3.1.1.
- <pmRefAddressItems> (O), contains additional information about the destination publication module. Refer to Para 2.3.1.2.
- <behavior> (O), specifies how a link corresponding to the reference operates. Refer to Para 2.2.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

The following example shows a reference to S1000D publication by using element <pmRefIdent> and <pmRefAddressItems> (subelements are described below):

```
<pmRef>
<pmRefIdent>
<pmCode modelIdentCode="S1000DBIKE" pmIssuer="SF518"
pmNumber="00003" pmVolume="00"/>
</pmRefIdent>
<pmRefAddressItems>
<pmTitle>Bike manuals</pmTitle>
<issueDate year="2007" month="02" day="28"/>
</pmRefAddressItems>
</pmRef>
```

2.3.1.1 Identification of a referred publication module

**Description:** The element <pmRefIdent> contains the items forming a unique identification of the destination data module.

**Markup element:** <pmRefIdent> (M)

ICN-83007-0000000007-001-01

*Fig 7 Element <pmRefIdent>*

**Attributes:**

– None

**Child elements:**

– <identExtension> (O), contains the additional parameters needed to establish a unique identification of a data module in those cases when data module code, issue and in-work numbers together with the language and country are insufficient to form a universally unique identity. Refer to Chap 3.9.5.1 and Chap 4.12.
– <pmCode> (M), contains the data module code of the destination data module. Refer to Chap 4.9.1.
– <issueInfo> (O), contains issue information needed to address a particular destination data module issue. Refer to Chap 3.9.5.1.
– <language> (O), specifies the language of the destination data module. Refer to Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of issue information and language

**Markup example:**

```
<pmRefIdent>
<pmCode modelIdentCode="S1000DBIKE" pmIssuer="SF518"
pmNumber="00003" pmVolume="00"/>
</pmRefIdent>
```

2.3.1.2 Complementary identifying information for a publication module

**Description:** The element <pmRefAddressItems> contains additional identifying information about the destination publication module.

**Note**

Only the publication module code, the publication module title, and the issue number will be presented in page-oriented publications. Refer to Chap 6.2.2.

**Markup element:** <pmRefAddressItems> (O)

ICN-83007-0000000008-001-01

*Fig 8 Element <pmRefAddressItems>*

**Attributes:**

- `xlink:type` (O) specifies the link type, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:href` (O) specifies the link address, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:title` (O) specifies the link title, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:show` (O) specifies the link appearance, if an XLink link is established. Refer to Chap 7.4.1.1.
- `xlink:actuate` (O) specifies the link behavior, if an XLink link is established. Refer to Chap 7.4.1.1.

**Child elements:**

- <`pmTitle`> (O), contains the publication module title of the destination publication. Refer to Chap 4.9.1
- <`issueDate`> (O), specifies the issue date of the destination data module. Refer to Chap 3.9.5.1
- <`security`> (O), contains the publication module security as described Chap 3.9.5.1
- <`responsiblePartnerCompany`> (O), to give the Responsible Partner Company of the non publication module as described in Chap 3.9.5.1
- <`pubMedia`> (O), contains the media of the publication module as described in Chap 4.9.1
- <`shortPmTitle`> (O), contains an abbreviated alternate publication title corresponding to the <`pmTitle`>. This short form for the publication title is meant to be presented in the narrative of the data module to make the reading easier. Refer to Chap 6.2.2 for presentation.

**Business rules decisions:**

– None identified

**Markup example:**

```
<pmRefAddressItems>
<pmTitle>Bike manuals</pmTitle>
<issueDate year="2007" month="02" day="28"/>
</pmRefAddressItems>
```

## 2.4 References to external documents

**Description:** The element <externalPubRef> contains the identification of a referenced non S10000D publication or document.

**Markup element:** <externalPubRef> (O)

ICN-83007-0000000009-001-01

*Fig 9 Element <externalPubRef>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the reference to external document element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- xlink:type (O), specifies the link type, if an xlink link is established. Refer to Chap 7.4.1.1
- xlink:href (O), specifies the link address, if an xlink link is established. Refer to Chap 7.4.1.1
- xlink:title (O), specifies the link title, if an xlink link is established. Refer to Chap 7.4.1.1
- xlink:show (O), specifies the link appearance, if an xlink link is established. Refer to Chap 7.4.1.1
- xlink:actuate (O), specifies the link behavior, if an xlink link is established. Refer to Chap 7.4.1.1
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <externalPubRefIdent> (M), contains the identification of the non S1000D publication or document. Refer to Para 2.4.1.1
- <externalPubRefAddressItems> (O), contains additional information about the destination publication or document. Refer to Para 2.4.1.5
- <behavior> (O), specifies how the link operates by means of two attributes. Refer to Para 2.3.

**Business rules decisions:**

- None identified

**Markup example:**

The following example shows a reference to another technical publication by using the element <pubCode> as free text:

```
<externalPubRef>
<externalPubRefIdent>
<externalPubCode pubCodingScheme="ISBN">9999999999
</externalPubCode>
<externalPubTitle>Effective Cycling</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
```

2.4.1.1 Identification of an external document

**Description:** The element <externalPubRefIdent> contains the identification of the non S1000D publication or document.

**Markup element:** <externalPubRefIdent> (M)

ICN-83007-0000000010-001-01

*Fig 10 Element <externalPubRefIdent>*

**Attributes:**

- None

**Child elements:**

- <externalPubCode> (O). Refer to Para 2.4.1.2.
- <externalPubTitle> (O). Refer to Para 2.4.1.3.
- <externalPubIssueInfo> (O). Refer to Para 2.4.1.4.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubRefIdent>
<externalPubCode pubCodingScheme="ISBN">9999999999
</externalPubCode>
<externalPubTitle>Effective Cycling</externalPubTitle>
</externalPubRefIdent>
```

2.4.1.2 Identifying code of an external document

**Description:** The element <externalPubCode> contains, as text content, a code that identifies a non S1000D document, such as an ISBN code or similar.

**Markup element:** <externalPubCode> (O)

**Attributes:**

– pubCodingScheme (O). Provides a reference to specification of the syntax of the identity given, such as "ISBN".

**Child elements:**

– <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
– <subScript> (O). Refer to Chap 3.9.5.2.1.10.
– <superScript> (O). Refer to Chap 3.9.5.2.1.10.
– <acronym> (O). Refer to Chap 3.9.5.2.1.10.
– <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
– <verbatimText> (O) . Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubCode pubCodingScheme="ISBN">9999999999
</externalPubCode>
```

2.4.1.3 Title of an external document

**Description:** The element <externalPubTitle> contains, as text content, a code that identifies a non S1000D document, such as an ISBN code or similar.

**Markup element:** <externalPubTitle> (O)

**Attributes:**

– None

**Child elements:**

– <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
– <subScript> (O). Refer to Chap 3.9.5.2.1.10.
– <superScript> (O). Refer to Chap 3.9.5.2.1.10.
– <acronym> (O). Refer to Chap 3.9.5.2.1.10.
– <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
– <verbatimText> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubTitle>Effective Cycling</externalPubTitle>
```

2.4.1.4 Issue information of an external document

**Description:** The element <externalPubIssueInfo> contains issue information concerning e referred non S1000D document.

**Markup element:** <externalPubIssueInfo> (O)

**Attributes:**

– None

**Child elements:**

– <externalPubIssue> (O). Refer to Para 2.4.1.4.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubIssueInfo>
<externalPubIssue>...</externalPubIssue>
</externalPubIssueInfo>
```

*2.4.1.4.1 Issue information of an external document*

**Description:** The element <externalPubIssue> contains, as text content, issue designation of a non S1000D document.

**Markup element:** <externalPubIssue> (O)

**Attributes:**

– None

**Child elements:**

– <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
– <subScript> (O). Refer to Chap 3.9.5.2.1.10.
– <superScript> (O). Refer to Chap 3.9.5.2.1.10.
– <acronym> (O). Refer to Chap 3.9.5.2.1.10.
– <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
– <verbatimText> (O) . Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubIssue>...</externalPubIssue>
```

2.4.1.5 Complementary identifying information for an external document

**Description:** The element <externalPubRefAddressItems> contains, as text content, additional information potentially useful to identify the external destination publication or document.

**Note**

Only the publication code, title and date will be presented in page-oriented publications. Refer to Chap 6.2.2.

**Markup element:** <externalPubRefAddressItems> (O)

ICN-83007-0000000011-001-01

*Fig 11 Element <externalPubRefAddressItems>*

**Attributes:**

– None

**Child elements:**

– <issueDate> (O), specifies the issue date of the destination document. Refer to Chap 3.9.5.1
– <security> (O), specifies the external document security as described Chap 3.9.5.1
– <responsiblePartnerCompany> (O), specifies the Responsible Partner Company of the external document as described in Chap 3.9.5.1
– <pubMedia> (O), specifies the media of the external document as described in Chap 4.9.1
– <shortExternalPubTitle> (O), specifies as text content an abbreviated alternate title (of the external document) corresponding to the <externalPubTitle>. This short form for the publication title is meant to be presented in the narrative of the data module to make the reading easier. Refer to Chap 6.2.2 for presentation.

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalPubRefAddressItems>
<issueDate year="2007" month="02" day="28"/>
</externalPubRefAddressItems>
```

## 2.5 References presented in the reference table of a data module

**Description:** The element <refs> is used to populate the standardized tabular list "Table 1 References". This paragraph gives the rules and recommendations for inclusion of the standardized tabular list "Table 1 References" at the beginning of the data module content section.

**Markup element:** <refs> (O)

ICN-83007-0000000012-001-01

*Fig 12 Element <refs>*

Absence of element <refs> indicates that there are no references to other data modules or technical publications.

**Note**

The absence of the element <refs> will be presented in the standardized table References with "None" in the left hand column. Refer to Chap 6.2.2 for presentation rules and examples.

When the element <refs> is used, the referenced data modules, publication modules and non S1000D publications, must be listed in lexical order, with data modules first, publication modules second and non S1000D publications last.

Each referenced data module, document or other publication, must be listed only once in the element <refs>.

References must only be given to a complete document, a complete set of documents or to a complete publication.

When referring to documents or publications without a data module code, the reference must give an appropriate identification of the referred document or publication.

**Attributes:**

– None

**Child elements:**

– <dmRef> (O). Refer to Para 2.2
– <pmRef> (O). Refer to Para 2.3

– <externalPubRef> (O). Refer to Para 2.4

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– population of the element <refs>

**Markup example:**

The following example shows a reference table including a reference to a data module, a publication module and to two non S1000D documents of which one is identified by an ISBN code:

```
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA2" subSystemCode="2" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="520" infoCodeVariant="A" itemLocationCode="A" />
<issueInfo issueNumber="002" inWork="00"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle><techName>Handlebar</techName>
<infoName>Remove procedures</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
<pmRef>
<pmRefIdent>
<pmCode modelIdentCode="S1000DBIKE" pmIssuer="SF518"
pmNumber="00003" pmVolume="00"/>
</pmRefIdent>
<pmRefAddressItems>
<pmTitle>Bike manuals</pmTitle>
<issueDate year="2007" month="02" day="28"/>
</pmRefAddressItems>
</pmRef>
<externalPubRef>
<externalPubRefIdent>
<externalPubTitle>Local Disposal Procedures</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
<externalPubRef>
<externalPubRefIdent>
<externalPubCode pubCodingScheme="ISBN">9999999999
</externalPubCode>
<externalPubTitle>Effective Cycling</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
</refs>
```

## 2.6 Inline use of references to other documents

**Description:** This paragraph gives the rules and recommendations for use of element <dmRef>, element <pmRef> and element <externalPubRef> when they are used inline.

Referring to information not contained in the current context is achieved by using the element <dmRef> for data modules, element <pmRef> for publication modules or element

<externalPubRef> for non S1000D publications or documents. The element <dmRef>, element <pmRef> and element <externalPubRef> must be populated as described at Para 3.

References can be made to a part of a data module using the attribute referredFragment in element <dmRef>. However, references to a part of a data module is only allowed into the following data modules, IPD, schedules, technical repositories, as described in Chap 4.13.2, and from training data modules into procedural data modules but only then when the safety case is taken into account Refer to Chap 3.9.7 and Chap 5.2.1.19. See markup example below.

**Note**

Only the data module code and the issue number will be presented in page-oriented publications. Refer to Chap 6.2.2.

**Note**

Only the publication module code (element <pmCode>) will be presented in page-oriented publications. Refer to Chap 6.2.2.

Excessive linking, by references to data modules without real content apart from just another element <dmRef>, must be avoided.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– define words before and after the reference elements

**Markup example:**

The following example shows a reference to another data module, without including the issue number and title.

```
... Refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="041" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
 for a functional ...
```

The following example shows a reference to a data module including the issue number and title.

```
...
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA3" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="041" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techName>Frame</techName>
<infoName>Description of how it is made</infoName>
</dmTitle>
</dmRefAddressItems>
```

```
</dmRef>
...
```

The following example shows a reference to paragraph in another data module, without including the issue number and title.

```
<proceduralStep>
<para>Use the
<internalRef internalRefId="seq-0002"
internalRefTargetType="supequip"></internalRef>
from the
<internalRef internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef>
and attach the new
<internalRef internalRefId="spa-0001"
internalRefTargetType="spares"></internalRef>
to the wheel. Refer to
<dmRef referredFragment="par-0003">
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="041" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>.</para>
</proceduralStep>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Extent of cross-referencing**. Projects or organizations must decide on the extent of cross-referencing within data modules and the methods used for populating the various attributes. The results of these decisions must be recorded in the project or organization business rules. Refer to Para 2.

**Define the format of the cross-reference attribute `id` and attribute `internalRefId`**. A project or organization can decide that the cross-references must be prefixed by alpha characters that identify the type of element to which is being referred. Example:

- Structure: prefix followed by a hyphen and a four digits number to make it unique within the data module, eg "`par-0001`"
- Prefixes:
  - "`par`" for paragraphs
  - "`stp`" for steps of procedure, fault isolation, etc
  - "`fig`" for figures
  - "`tab`" for tables
  - "`seq`" for support equipment
  - "`spa`" for spares
  - "`sup`" for supplies
  - "`ftn`" for footnotes
  - "`accpnl`" for access points, refer to Chap 3.9.5.2.1.9
  - "`hot`" for hotspots, eg "fig-0001-hot-0002"

**Note**

The four digits number has no connection to, eg the figure or table number. Eg "Fig 1" could be "`fig-0345`". Refer to Para 2.1.

**Use of element <`internalRef`> in titles**. The use of element <`internalRef`> in titles is strongly discouraged. The project or organization must decide if cross-references in titles are to be used. Refer to Para 2.1.

**Use of title in the references**. The project or organization must decide if the titles (attribute `targetTitle`) are to be used. Refer to Para 2.1.

**Use of the attribute `internalRefTargetType`**. Projects or organizations must decide whether to use the attribute `internalRefTargetType`. If projects or organizations do not use the attribute `internalRefTargetType` then the text caption "Fig", "Table", etc, can be entered by the author. Refer to Para 2.1.

**Use and format of the attribute referredFragment of element <`dmRef`>**. Projects or organizations must decide on the use of and list the precautions if it is used. Refer to Para 2.2.

**Use of issue information and language in data module references**. A data module reference can contain issue and in-work numbers, as well as language and country codes. The project or organization must decide if these are to be used or not. In making this decision, the project or organization must be aware of the implications of using the items when referenced data modules are updated. Refer to Para 2.2.

**Use of issue information and language in references to publication modules**. A data module reference can contain issue and in-work numbers, as well as language and country codes. The project or organization must decide if these are to be used or not. In making this decision, the project or organization must be aware of the implications of using the items when referenced data modules are updated. Refer to Para 2.3.

**Use of title and issue date in data module references**. A data module reference can contain title and issue date of the referenced data module. The project or organization must decide if these are to be used or not. Refer to Para 2.2.1.2.

**Population of the element <`refs`>**. Projects or organizations must decide if and how this element is to be populated. If the element is populated, the order of items in the list must be specified in the project business rules. Refer to Para 2.5.

**Define words before and after the element <`dmRef`>, element <`pmRef`> and element <`externalPubRef`>**. This is important as it has implications on the stylesheets used in the IETP. For one implementation, the stylesheet can automatically generate the words eg "Refer to data module:" when it sees the element <`dmRef`>, this will cause problems if the author has written "refer to" within the paragraph before the element <`dmRef`>. Refer to Para 2.6.

# Chapter 3.9.5.2.1.3

## *Common constructs - Lists*

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# 1 General

This chapter contains the definition and handling of lists from an author's point of view. It gives details about the available elements and attributes for:

- sequential lists
- random lists
- definition lists

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*Fig 1 The* `listElementGroup`

Lists consist of two main parts, a title and the list items. The title is optional.

There must be no full stops after any list items if the items are not full sentences.

# 2 Lists

## 2.1 Sequential lists

**Description:** The element <`sequentialList`> contains sequential lists, which are also known as ordered lists. It can contain applicability information, a title and the list items themselves.

In a sequential list, a list item can consist of one or more paragraphs. A sequential list, when formatted, is numbered with Arabic numerals. Refer to Chap 6.2.2.

Sequential lists must not be used to provide procedural step information.

Only one level of sequential (ordered) lists must be placed under a numbered title or paragraph (subheading).

Sequential lists are limited to a maximum of two levels.

**Note**

Sequential lists are not available in warnings and cautions. Refer to Chap 3.9.3.

**Markup element:** <sequentialList> (O)

ICN-S3627-S1000D0542-001-01

*Fig 2 Element <sequentialList>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <sequentialList> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <listItem> (C). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <title>

**Markup example:**

```
<sequentialList>
<title>
...
</title>
<listItem>
...
</listItem>
</sequentialList>
```

### 2.1.1 List items

**Description:** This element <listItem> is used to contain the list items themselves. It can contain text, or notes and paragraphs.

**Markup element:** <listItem> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <listItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <note> (O). Refer to Chap 3.9.3.
- <para> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<listItem>
<note>
...
</note>
<para>
...
</para>
</listItem>
```

### 2.1.2 Sequential lists in warnings and cautions

Refer to Chap 3.9.3 for details of the element <attentionSequentialList>.

## 2.2 Random list

**Description:** The element <randomList> contains random lists. It can contain applicability information, a title and the list items themselves.

There are two types of random lists:

- simple - recognized by the value "pf01" of the attribute prefix
- unordered - the lists recognized by the default value "pf02" of the attribute prefix giving the following default sequence of prefix: [-][●][-]

The difference between a simple random list and an unordered random list is in the presentation. Refer to Chap 6.2.2.

Each list item, on any level, can consist of one or more paragraphs.

**Markup element:** <randomList> (O)

**Attributes:**

- Includes the same set of attributes as the element <seqentialList>. Refer to Para 2.1, and
- listItemPrefix (O), this element is used to indicate whether the list is a simple list or an unordered list. This attribute can have the following values:
  - "pf01" - "pf99" where "pf02" is the default value. Refer to Chap 3.9.6.1.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <listItem> (C). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <title>
- use of the attribute listItemPrefix

**Markup example:**

```
<randomList>
<title>
...
</title>
<listItem>
...
</listItem>
</randomList>
```

### 2.2.1 Random list in warnings and cautions

Refer to Chap 3.9.3 for details of the element <attentionRandomList>.

### 2.2.2 Random lists in notes

Refer to Chap 3.9.3 for details of the element <attentionRandomList>.

## 2.3 Definition list

**Description:** The element <definitionList> contains a list of terms and definitions. It can contain applicability information, a title and a definition list header. The body of the definition list comprises one or more definition list items, each containing a term and its definition.

It is possible to have more than one paragraph in a definition.

When formatted the definition list is presented as a two column table that contains terms and definitions. Examples for use are definition of terms and legends. Refer to Chap 6.2.2.

**Note**

Definition lists are not available in warnings, cautions and notes. Refer to Chap 3.9.3.

**Markup element:** <definitionList> (O)

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*Fig 3 Element <definitionList>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the < definitionList> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <definitionListHeader> (O). Refer to Para 2.3.1.
- <definitionListItem> (C). Refer to Para 2.3.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <title>
- use of the element <definitionListHeader>

**Markup example:**

```
<definitionList>
<title>
...
</title>
<definitionListHeader>
...
```

```
</definitionListHeader>
<definitionListItem>
...
</definitionListItem>
</definitionList>
```

### 2.3.1 Definition list headers

**Description:** The element <`definitionListHeader`> contains the column header of the definition list. It can contain the term title and the definition title.

**Markup element:** <`definitionListHeader`> (O)

**Attributes:**

– None

**Child elements:**

– <`termTitle`> (C). The column title for the terms. Refer to Para 2.3.1.1.
– <`definitionTitle`> (C). The column title for the definition. Refer to Para 2.3.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<definitionListHeader>
<termTitle>
...
</termTitle>
<definitionTitle>
...
</definitionTitle>
</definitionListHeader>
```

#### 2.3.1.1 Term title

**Description:** The element <`termTitle`> contains the column title for the term.

**Markup element:** <`termTitle`> (C)

**Attributes:**

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– Includes the same set of child elements as the `textElementGroup` applicable for the actual data module type. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<termTitle>Attribute</termTitle>
```

2.3.1.2 Definition title

**Description:** The element <`definitionTitle`> contains the column title for the definition.

**Markup element:** <`definitionTitle`> (C)

**Attributes:**

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– Includes the same set of child elements as the `textElementGroup` applicable for the actual data module type. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<definitionTitle>Value</definitionTitle>
```

**2.3.2 Definition list item**

**Description:** The element <`definitionListItem`> contains the body of the definition list.

**Markup element:** <`definitionListItem`> (M)

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*Fig 4 Element <`definitionListItem`>*

**Attributes:**

– Includes the same set of attributes as the element <`seqentialList`>. Refer to Para 2.1.

**Child elements:**

– <`listItemTerm`> (M). Refer to Para 2.3.2.1.
– <`listItemDefinition`> (M). Refer to Para 2.3.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<definitionListItem>
<listItemTerm>
...
</listItemTerm>
<listItemDefinition>
...
</listItemDefinition>
</definitionListItem>
```

2.3.2.1 List item term

**Description:** This element is used to contain the term to be defined.

**Markup element:** <`listItemTerm`> (M)

**Attributes:**

– Includes the same set of attributes as the element <`seqentialList`>. Refer to Para 2.1.

**Child elements:**

– Includes the same set of child elements as the `textElementGroup` applicable for the actual data module type. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<listItemTerm>emph</listItemTerm>
```

2.3.2.2 List item definition

**Description:** The element <`listItemDefinition`> contains the term to be defined. It can contain text, or one or more paragraphs.

**Markup element:** <`listItemDefinition`> (M)

**Attributes:**

– `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
– `id` (O), the identifier of the <`listItemDefinition`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`para`> (O). Refer to Chap 3.9.5.2.1.10.

If the element contains text, the child elements are:

- the same set of child elements as the `textElementGroup` applicable for the actual data module type (refer to Chap 3.9.5.2.1.10) and
- <`sequentialList`> (O). Refer to Para 2.1.
- <`randomList`> (O). Refer to Para. 2.2.
- <`definitionList`> (O). Refer to Para. 2.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<listItemDefinition>em01</listItemDefinition>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the element <`title`>.** For all three list types, the project or the organization must decide whether to use list titles or not. Refer to Para 2.1 and Para 2.2.

**Simple or unordered lists.** For random lists, the project or the organization must define simple and unordered lists and their usage. Refer to Para 2.2.

**Use of the element <`definitionListHeader`>.** For the definition list, the project or the organization must decide whether to use the definition list header or not. Refer to Para 2.3.1.

# 4 Examples

## 4.1 Sequential list

The following example shows a sequential list.

```
<para>This is an example of a sequential list with two
items:<sequentialList>
<listItem>This is the first list item.</listItem>
<listItem>This is the second list item.</listItem>
</sequentialList>
</para>
```

## 4.2 Random list

### 4.2.1 Unordered

The following example shows an unordered random list.

```
<para>This is an example of an unordered random list with two
items:<randomList listItemPrefix="pf02">
<listItem>This is the first list item.</listItem>
<listItem>This is the second list item.</listItem>
</randomList>
</para>
```

### 4.2.2 Simple

The following shows a simple random list.

```
<randomList listItemPrefix="pf01">
<listItem>This is the first item.</listItem>
<listItem>
<para>This is the second item with two paras.</para>
<para>This is the second para of the second item.</para>
</listItem>
</randomList>
```

## 4.3 Definition list

The following is an example of a definition list.

```
<definitionList>
<definitionListItem>
<listItemTerm>Frame</listItemTerm>
<listItemDefinition>The frame is the skeleton of the
bicycle.</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Wheel</listItemTerm>
<listItemDefinition>The wheel is the point of contact between
the bicycle and the road for the bicycle to have movement.
</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Spokes</listItemTerm>
<listItemDefinition>The spokes are thick wires with tension
applied that connect the hub to the rim. You can adjust the
tension with the nipple on the rim side.</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Hub</listItemTerm>
<listItemDefinition>The hub attaches to the center of the wheel
where the axle and the bearings are.</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Metal rim</listItemTerm>
<listItemDefinition>The metal rim is a metal ring that has a U-
shaped cross section to hold the spokes on the inner side and
the tire on the outer side.</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Seat</listItemTerm>
<listItemDefinition>The Seat, which is also known as the
'saddle', is used as the support platform for the person to sit
on the bicycle.</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>Seat post</listItemTerm>
<listItemDefinition>The Seat post is used as a support post for
the seat and to change the eight of the seat for the rider.
</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>...</listItemTerm>
<listItemDefinition>...</listItemDefinition>
</definitionListItem>
</definitionList>
```

# Chapter 3.9.5.2.1.4

## *Common constructs - Caption groups*

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# 1 General

This chapter contains the definition and handling of caption groups and captions from an author's point of view. It gives details about the available elements and attributes for:

- Caption groups
- Captions

# 2 Caption groups and captions

## 2.1 Caption groups

### 2.1.1 Definition

The element <captionGroup> can be used to represent blocks of illuminated warning lights, push buttons, annunciators, or display captions. The tabular <captionGroup> structure has been designed to provide limited control of formatting. By correctly applying the relevant attributes it is possible to create caption groups that are visually similar to the real object. Refer to Fig 1. The captions are normally rendered with a colored background that matches the color of the illuminated text.

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*Fig 1 Caption group comparison*

The <`captionGroup`> structure is based on the Continuous Acquisition and Life-cycle Support (CALS) table model with similar element names and attributes. Refer to Chap 3.9.5.2.1.6.

### 2.1.2 Caption group

**Description:** The element <captionGroup> is equivalent to a CALS table element <table>. It is used to represent blocks of illuminated warning lights, push buttons, annunciators, or display captions.

**Markup element:** <captionGroup> (O)

**Attributes:**

- alignCaption (O), sets the horizontal alignment of the text content of each <captionEntry> unless overridden by the align attribute the ancestor elements <colspec>, <spanspec>, <caption> or <captionText>. This attribute can have one of the following values:
  - "left", this means that the text is left justified (quad flush left),
  - "right", this means that the text is right justified (quad flush right),
  - "center", this means that the text is center justified (text is centered around the middle of the column).
- cols (M), The number of columns in the <captionGroup> table. This attribute can have a numeric value, greater than "0"
- colsep (O), A non-zero value for this attribute will draw a rule to the right of each <captionEntry> to which it applies. If the <captionEntry> is in the first column a rule will also be drawn on the left side. If the attribute is zero, then no column ruling will appear on either side of the <captionEntry> to which it applies. If the colsep attribute is not used, this implies that a column rule will not be drawn for the applicable columns. To set the column rulings for the complete column, set the colsep attribute on the colspec element that represents the column. Any values that are given in the <captionEntry> within a column will override the values given in a colspec element or a <captionGroup> element.
- rowsep (O), A non-zero value for this attribute will draw a rule below each <captionEntry> to which it applies. If the <captionEntry> is in the first <captionRow> a rule will also be drawn above. If the attribute is zero, then no row ruling will appear below the entries to which it applies. If the rowsep attribute is not used, this implies that a row rule will not be drawn for the applicable rows. To set the row rulings for the complete row, set the rowsep attribute on the row element that represents the row. Any values that are given in the entries of the row will override the values given in the <captionRow> or a <captionGroup> element.
- tableOfContentType (O), is used when generating Caption color based Tables of Contents, or color Table of Contents (TOC)s. This attribute can have one of the following values:
  - "none"(D)
  - "redtoc",
  - "comdtoc",
  - "ambertoc",
  - "greentoc",
  - "yelowtoc".
- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <captionGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`colspec`> (O). Refer to Chap 3.9.5.2.1.6.
– <`spanspec`> (O). Refer to Chap 3.9.5.2.1.6.
– <`captionBody`> (M). Refer to Para 2.1.3.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

### 2.1.3 Caption body

**Description:** The element <`captionBody`> is equivalent to a CALS table element <`tbody`>. Refer to Chap 3.9.5.2.1.6.

**Markup element:** <`captionBody`> (O)

**Attributes:**

– `valign` (O), Sets the vertical alignment of the contents of each <`captionEntry`>, unless overridden by the attribute `valign` on element <`captionEntry`>. The `valign` attribute's value defines the vertical position of a caption within its <`captionEntry`>, it does not affect the alignment of the text within a caption. This attribute can have one of the following values:
  - "`top`" (D),
  - "`bottom`" ,
  - "`middle`".
– `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <`captionRow`> (M), Refer to Para 2.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

### 2.1.4 Caption row

**Description:** The element <`captionRow`> represents a caption table row and is equivalent to a CALS table element <`row`>. Refer to Chap 3.9.5.2.1.6.

**Markup element:** <`captionRow`> (O)

**Attributes:**

– `rowsep` (O), Refer to Para 2.1.2. A non-zero value for this attribute will draw a rule. If the `rowsep` attribute is not used, it implies that a column rule will be drawn.
– `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.

- id (O), the identifier of the <captionRow> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <captionEntry> (M), Refer to Para 2.1.5.

**Business rules decisions:**

- None identified

**Markup example:**

- Refer to Para 4.

### 2.1.5 Caption entry

**Description:** The element <captionEntry> represents the table cells that contain the captions or caption text; it is equivalent to a CALS table element <entry>. Refer to Chap 3.9.5.2.1.6.

**Markup element:** <captionEntry> (O)

**Attributes:**

- colname (O), this attribute is used to relate the element <captionEntry> to its column definition in the element <colspec>. The width of each <captionEntry> can only be defined in the <colspec>. If this attribute is missing, the column width should be wide enough to contain any child caption element. The value is the name of a column defined in a <colspec> element in the current <captionGroup>
- namest (O), this attribute locally defines the start column of a horizontal span of merged <captionEntry> elements. The value must be the name of a column defined in a <colspec> element in the current <captionGroup>.
- nameend (O), locally defines the end column of a horizontal span of merged <captionEntry> elements. The value must be the name of a column defined in a <colspec> element in the current <captionGroup>
- spanname (O), this attribute is a named, reusable span specification for merged <captionEntry> elements. The value must be the name of a span defined in a <spanspec> element in the current <captionGroup>
- morerows (O), this attribute locally defines the number of additional rows in a vertical span of merged <captionEntry> elements. The value must be the number of spanned rows minus 1.
- captionAlign (O), this attribute sets the horizontal alignment of each <caption>. The attribute's value defines the horizontal position of a caption within its <captionEntry>, it does not affect the alignment of the text within a caption. This attribute can have one of the following values:
  - "left" (D),
  - "right",
  - "center". The default value is "left".
- valign (O), this attribute sets the vertical alignment of the contents of each <captionEntry> in the row, unless overridden by the attribute valign on an

element <captionEntry>. The valign attribute's value defines the vertical position of a caption within its <captionEntry>, it does not affect the alignment of the text within a caption. This attribute can have one of the following values:
- "top" (D)
- "bottom"
- "middle"

– colsep (O). Refer to Para 2.1.2. This attribute is used to display rules to the right of the column to which it applies. A colsep that is set on a <captionEntry> will determine if a rule is drawn for the height of the entry only. A non-zero value for this attribute will draw a rule. If the colsep attribute is not used, it implies that a row rule will not be drawn.
– rowsep (O). Refer to Para 2.1.2. This attribute is used to display rules below the row to which it applies. A rowsep that is set on a <captionEntry> element determines if a rule is drawn for the width of the entry only. A non-zero value for this attribute will draw a rule. If the rowsep attribute is not used, it implies that a column rule will not be drawn.
– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <caption> (O), (See Para 2.2.1) or
– <captionText> (O), (Refer to Para 2.1.6).

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

### 2.1.6 Caption text

**Description:** The element <captionText> allows text to be added to a <captionGroup>.

**Markup element:** <captionText> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

The element can contain text mixed with the following elements:

– <internalRef> (O). Refer to Chap 3.9.5.2.1.2.
– <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
– <changeInline> (O). Refer to Chap 3.9.5.2.1.1.
– <emphasis> (O). Refer to Chap 3.9.5.2.1.10.
– <subScript> (O). Refer to Chap 3.9.5.2.1.10.
– <superScript> (O). Refer to Chap 3.9.5.2.1.10.
– <dmRef> (O). Refer to Chap 3.9.5.2.1.1.
– <pmRef> (O). Refer to Chap 3.9.5.2.1.1.
– <externalPubRef> (O). Refer to Chap 3.9.5.2.1.1.
– <acronym> (O). Refer to Chap 3.9.5.2.1.10.
– <acronymTerm> (O). refer to Chap 3.9.5.2.1.10

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

### 2.1.7 Formatting options

The effect of the formatting attributes is shown in Fig 2, with the markup for each element <`captionEntry`> given in

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*Fig 2 <`captionGroup`> formatting options*

The four element <`captionEntry`> table cells in Fig 2 are formatted as shown in Table 2 . The light blue cell borders simply show the outline of each element <`captionEntry`>, but would not be visible in the output.

*Table 2 <`captionGroup`> formatting options*

| <captionEntry> | Formatting attribute settings |
|---|---|
| 1 | `<captionEntry colname="col1">`<br>`<caption captionWidth="30mm" captionHeight="10mm" color="co04">`<br>`<captionLine>CAPTION LINE</captionLine>`<br>`</caption>`<br>`</captionEntry>` |
| 2 | `<captionEntry colname="col1">`<br>`<caption captionWidth="30mm" captionHeight="30mm" color="co03">`<br>`<captionLine>CAPTION LINE</captionLine>`<br>`<captionLine>CAPTION LINE</captionLine>`<br>`</caption>`<br>`</captionEntry>` |
| 3 | `<captionEntry colname="col2" align="right">`<br>`<caption captionWidth="25mm" captionHeight="10mm" color="co04"`<br>` align="right">`<br>`<captionLine>CAPTION LINE</captionLine>`<br>`</caption>`<br>`</captionEntry>` |

| <captionEntry> | Formatting attribute settings |
|---|---|
| 4 | `<captionEntry colname="col2" valign="middle" colsep="1" rowsep="1">`<br>`<caption captionWidth="30mm" captionHeight="10mm" color="co01" align="left">`<br>`<captionLine>CAPTION LINE</captionLine>`<br>`</caption>`<br>`</captionEntry>` |

## 2.2 Captions

### 2.2.1 Caption

**Description:** This element <caption> represents a single illuminated warning light, push button, annunciator, or display caption. It can be used inline within text content elements such as <para>, or grouped within the element <captionGroup> structure as given in Para 2.

Each caption can contain lines of text in individual <captionLine> elements.

**Markup element:** <caption> (O)

**Attributes:**

- color (O). The color of the caption object. The definitions for the colors are stored in the project or default BREX data module. This element can have the following values:
  - "co00" thru "co99". The default value is "co09". Refer to Chap 3.9.6.
- captionWidth (O), the width of the caption object. The value must be a positive number, plus a unit of measure.
- captionHeight (O), the height of the caption object. The value must be a positive number, plus a unit of measure.
- systemIdentCode (O), the system identification code as defined by the project
- align (O), See Para 2.1.2.
- tableOfContentType (O), is used when generating Caption color based Tables of Contents, or color TOCs. This attribute can have one of the following values:
  - "none"(D)
  - "redtoc"
  - "comdtoc"
  - "ambertoc"
  - "greentoc"
  - "yelowtoc".
- captionType (O), as defined by the project. This elements can have the one of the following values:
  - "primary" (D)
  - "secondary".
- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <caption> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <captionLine> (M), Refer to Para 2.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

### 2.2.2 Caption line

**Description:** This element represents a single line of text, so its text content should not wrap to second or subsequent lines.

**Markup element:** <captionLine> (M)

**Attributes:**

– None

**Child elements**: The element can contain text mixed with the element

– <acronymTerm> (O), Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of presentation settings

**Markup example:**

```
<para>This is an example caption <caption color="co04"
captionWidth="25mm"><captionLine>SPEED</captionLine>
</caption> embedded in a paragraph.</para>
```

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of applicability information.** The project or the organization must decide if the indication of applicability information is permitted on various captionGroup subelements depending on the Product configuration. If permitted, then the project or the organization must also decide on the use of the attribute applicRefId for this purpose. Refer to Para 2.1.2.

**Use of presentation settings.** The project or the organization must decide:

– Whether the attribute rowsep and the attribute colsep rules between <captionEntry> elements are required or not.
– Whether element <captionEntry> spans are to be defined locally or by element <spanspec>.
– Whether the attribute tableOfContentType is required or not.
– The definition of any of the attribute color in the range "co51" to "co99".
– How to encode the attribute systemIdentCode if used.
– Whether the attribute tableOfContentType is required or not.
– If inline captions affect the text line spacing and how this is defined.
– If element <captionLine> text color should be adjusted depending on the caption color to provide adequate contrast. Refer to Para 2.2.2.

# 4 Examples

```
<captionGroup cols="2" applicRefId="appl-001"
changeMark="1" changeType="add" reasonForUpdateRefIds="rfu-01">
<colspec colnum="1" colname="col1" colwidth="30mm"/>
<colspec colnum="2" colname="col2" colwidth="30mm"/>
<captionBody>
<captionRow>
<captionEntry colname="col1">
<caption color="co04" captionWidth "30mm">
<captionLine>ALTITUDE</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 miles</captionLine>
</caption>
</captionEntry>
</captionRow>
<captionRow>
<captionEntry colname="col1">
<caption color="co04" captionWidth="30mm">
<captionLine>SPEED</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 mph</captionLine>
</caption>
</captionEntry>
</captionRow>
<captionRow>
<captionEntry colname="col1">
<caption color="co04" captionWidth="30mm">
<captionLine>DISTANCE</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 miles</captionLine>
</caption>
</captionEntry>
</captionRow>
</captionBody>
</captionGroup>
```

# Chapter 3.9.5.2.1.5

## *Common constructs - Titles*

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## 1 General

This chapter contains the definition and use of titles from an author's point of view.

## 2 Titles

**Description:** The element <title> contains the title for a paragraph, step, table or figure, etc.

In descriptive data modules, titles can be included for the element <levelledPara> from sublevel one thru five, but must be included for element <figure> and element <table> for formal tables. Refer to Chap 6.2.2.

In procedural, process, crew and fault data modules, titles must be included for <figure> and <table> for formal tables. Titles can also be included for the element <proceduralStep> from sublevel one thru five. Refer to Chap 6.2.2.

All titles must be presented in sentence case. Refer to Chap 3.9.1.

**Markup element:** <title> (O)

**Attributes:**

– `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

– Includes the same set of child elements as the `textElementGroup` applicable for the actual data module type. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element <`title`>
– cross-references in titles
– use of titles for non-S1000D data

**Markup example:**

```
<title>This is a title</title>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the element <`title`>**. The project or the organization must provide rules for the use of titles within the elements where they are optional in the schema. These should include rules for when an optional title is mandatory for a project, and the contexts in which these rules apply. For example, a project can decide that titles are always required on level one and level two paragraphs in a descriptive data module because they appear in the table of contents, or that they must be used in certain circumstances for procedural data modules. Refer to Para 2.

**Cross-references in titles**. In situations where the title can be extracted from the data module and used, for example, within a table of contents data module, or a list of illustrations, the project should enforce the rule that cross-references to locations within the same data module are not used in the title text because the item being referred to can not be in the auto-generated data module. Refer to Para 2.

**Use of titles for non-S1000D data.** The project or the organization must decide on the use of titles for non-S1000D data. Titles can be included for the elements <`levelledPara`> and <`proceduralStep`> from sublevel six thru eight. However, the use of titles on these subparagraphs and step levels is discouraged and their use and presentation are project decisions. Refer to Para 2.

# 4 Examples

```
<description>
<levelledPara>
<title>Brake system</title>
<para>The most important part of the bicycle is the brake
system. Only a minimum maintenance of the brake system is
necessary. But, when a problem does occur, make sure you
do the necessary maintenance as quickly as possible.
If you do not do this the bicycle will be dangerous to
use.</para>
<para>There are nine different types of brake systems. The
one found on most bicycles is the cantilever brake (refer to
<internalRef internalRefId="par-0001"
```

```
internalRefTargetType="para"></internalRef>).</para>
<levelledPara id="par-0001">
<title>Cantilever brake</title>
<para>The brake system (refer to
<internalRef internalRefId="fig-0001"
internalRefTargetType="figure"></internalRef>) has
these primary components:
<randomList listItemPrefix="pf01" changeMark="1">
<listItem>
<para>the brake lever (refer to
<internalRef internalRefId="par-0003"
internalRefTargetType="para"></internalRef>)</para>
</listItem>
<listItem>
<para>the brake cable</para>
</listItem>
<listItem>
<para>the brake arm</para>
</listItem>
<listItem>
<para>the brake clamp (also known as callipers)</para>
</listItem>
<listItem>
<para>the brake pads (refer to
<internalRef internalRefId="par-0002"
internalRefTargetType="para"></internalRef>)</para>
</listItem>
</randomList>
</para>
<figure id="fig-0001">
<title>Cantilever brake with straddle cable</title>
<graphic
infoEntityIdent="ICN-S1000DBIKE-AAA-DA10000-0-U8025-00512-A-03-
1">
</graphic>
</figure>
<para>A cable that goes from the brake levers on the
handlebars pulls the two levers on the brakes together.
This presses the brake pads against the outer rim of the
wheel, which decreases the speed of the bicycle.</para>
</levelledPara>
....
</levelledPara>
</description>
```

# Chapter 3.9.5.2.1.6

## *Common constructs - Tables*

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| Chap 6.3.1 | IETP - Output specification |
| http://www.oasis-open.org/specs/a502.htm | OASIS Technical Memorandum TM 9502:1995 (CALS Table Model Document Type Definition) |

# 1 General

This chapter contains the definition and handling of tables from an author's point of view. It gives details about the available elements and attributes and how to use them to create tables in a data module. It also serves as a guide to stylesheet designers who will have to create the templates for presenting the tables in a page-oriented output or an IETP where a table must be presented by using the formatting information contained in the table's presentation attributes that have been set by the author.

The rules for the presentation of tables in page-oriented publications and IETP are given in Chap 6.2.2 and Chap 6.3.1, respectively.

Parts of this chapter have been derived from the Oasis information about the Continuous Acquisition and Life-cycle Support (CALS) table model which can be found at http://www.oasis-open.org/specs/a502.htm.

# 2 Tables

## 2.1 Definition

There are two types of tables:

- Formal
- Informal

A formal table consists of four parts, the table title, the table head, the optional table footer and the table body. Each of these parts contains the rows and entries that comprise the table.

An informal table is a short, simple table, which does not need a table title, table head and table footer. These tables are typically small and contain only a few columns and rows.

Table titles must be written in sentence case and have no period [.] at the end.

When formatted, table titles must not exceed two lines.

A formal table can be column-width or image-width. A column width table is one which starts at the left type limit (ie taking into account any indents) and covers the remaining space available to the right type limit. An image width table starts at the left margin and covers the space up to the right margin. To define a column-width or image-width table, use the attribute `pgwide` as defined in Para 2.5.

**Note**

For page-oriented publications, if it is not possible to fit a table into the full image width (170 mm), the table must be presented on a fold-out page (ie by wrapping the <`table`> in the element <`foldout`> (refer to Chap 3.9.5.2.1.7)).

## 2.2 Specific Tables

Chap 6.2.2 details the required presentation for seven specific tables and each of these has its own mark up element. The rest of this chapter discusses tables that are marked up using the <`table`> element. The seven specific tables are:

1 References (O). Used in all data modules (element <`refs`>). Refer to Chap 3.9.5.2.1.2

2 Required conditions (C). Used in procedural, schedule, and fault isolation procedure data modules (element <`reqCondGroup`>). Refer to Chap 3.9.5.2.1.9.

3 Required persons (O). Used in procedural, schedule and fault isolation procedure data modules (element <`reqPersons`>). Refer to Chap 3.9.5.2.1.9.

4 Support equipment (C). Used in procedural, schedule and fault isolation data modules (element <`reqSupportEquips`>). Refer to Chap Chap 3.9.5.2.1.9.

5 Consumables, materials and expendables (C). Used in procedural, schedule and fault isolation data modules (element <`reqSupplies`>). Refer to Chap Chap 3.9.5.2.1.9.

6 Spares (C). Used in procedural, schedule and fault isolation data modules (element: <`reqSpares`>). Refer to Chap Chap 3.9.5.2.1.9.

7 Caption group (O). Used in all data modules. Refer to Chap 3.9.5.2.1.4.

## 2.3 Tables as graphics

Tables normally are marked up using the elements and attributes which define the table heading, the footer and the body which contain rows and entries. It is also possible to present a table using the graphic element (although this is discouraged).

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of tables as graphics

## 2.4 Attribute inheritance

In order to understand the CALS table model, the concept of attribute inheritance needs to be explained. This applies to the table presentation attributes such as `rowsep` and `colsep` (which determine if table rulings are required) and alignments etc. Attributes on higher level elements set formatting defaults that can be overridden by the same attributes set on lower level elements. For example, a default row separation can be specified for the complete table on the <`table`> element, and this applies to the complete table, unless values are expressed on contained table groups, column specifications, rows, entries etc. A presentation attribute value expressed at a level applies to that level and to its children (unless any child element's attributes override it). As an example, a `rowsep` value of "`1`" applies to all entries in the row, except any <`entry`> with a `rowsep` value specified.

## 2.5 Table markup

**Description:** The element <table> is used to contain information which is to be presented in a tabular form. The element is used for both formal and informal tables.

**Markup element:** <table> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the table element. Refer to Chap 3.9.5.2.1.2. It must only be used for tables that have a title (and hence have an enumerated table number).
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- tabstyle (O), defines a style for the table. Although the CALS table model allows the value of this attribute to determine the presentation style of the table (in terms of the table rulings, the frame, the orientation etc), S1000D mandates that the presentation attributes are populated with the correct values to make the table display correctly in any application. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2).
- tocentry (O), determines whether the table will appear in the list of tables. If the value of this attribute is "0," the table's title will not appear in the automatically generated list of tables at the front of the data module. If the value is not "0," or the attribute is not used, and the table has a title, it will appear in the list of tables. If the table has a title and you do not wish it to appear in the list of tables, you must specify a tocentry value of "0."
- frame (O), defines the style of the outside rulings of the table. It can have the values that follow:
  - "all" (D), draws a rule above and below the table, and to the left and right.
  - "sides", draws a rule on the left and right of the table, but not on the top and bottom
  - "top", draws a rule above the table, but not below, or to the left or right of the table
  - "topbot", draws a rule above and below the table (this is the setting to be used for S1000D formal tables)
  - "bottom", draws a rule below the table
  - "none", indicates no rules will be drawn for the frame of the table

  **Note**

  If the attribute frame is not used, then this implies that all frame rulings will be drawn (ie equivalent to the value "all"). It is important to set frame="topbot" for S1000D formal tables. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2).

- colsep (O),defines the column separator setting. A non-zero value for this attribute will draw a rule to the right of the table entries to which it applies. If the attribute is zero, then no column ruling will appear to the right of the entries to which it applies. The value of colsep is ignored for the rightmost column because the rulings for this column are given by the setting of the frame attribute. If the attribute colsep is not used, this implies that a column rule will be drawn for the applicable columns. To set the column rulings for the complete column, set the attribute colsep on the element <colspec> that represents the column. Any values that are given in the entries of the column will override the values given in a <colspec> element. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2).
- rowsep (O), defines the row separator setting. A non-zero value for this attribute will draw a rule below the table entries to which it applies. If the attribute is zero, then no row ruling will appear below the entries to which it applies. The value of rowsep is ignored for the last row because the rulings for this row are given by the setting of the frame attribute. If the

rowsep attribute is not used, this implies that a row rule will be drawn for the applicable rows. To set the row rulings for the complete row, set the attribute rowsep on the row element that represents the row. Any values that are given in the entries of the row will override the values given in the row element. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2).

- orient (O), defines the orientation of the table. The default setting (when the attribute is not used) is portrait. The attribute can contain the values "port" (representing a portrait orientation) or "land" (representing a landscape orientation). A landscape orientation is one that is 90 degrees counter-clockwise to the normal writing direction. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2).
- pgwide (O), defines the width of the table relative to the page. A value other than zero for this attribute defines that the table is to span the width of the page (or the display area) and will ignore any indentation settings that can be in place where the table element appears A value of 0 (or if the attribute is not used) means that the table will span the page but be within the current indentation settings. The correct setting of this attribute for S1000D tables that are image-wide is a non-zero value. For column-wide tables, this attribute must not be used or set. This attribute must not be used for tables that only contain a graphic (refer to Para 2.2). The value of attribute pgwide is ignored if the orientation of the table is landscape (because landscape tables have an implied to be image-width.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). This element is mandatory for formal tables and optional for informal tables. Refer to Chap 3.9.5.2.1.5.
- <tgroup> (O). Refer to Para 2.5.1.
- <graphic> (O). Refer to Chap 3.9.5.2.1.7.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of tables marked up as graphics are allowed
- use of applicability information

**Markup example:**

The markup example that follows, shows a table that contains a graphic (refer to Para 2.2).

```
<table id="T0002">
<title>Widget - inspection limits</title>
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-01234-A-01-1">
...
</graphic>
</table>
```

### 2.5.1 Table group

**Description:** A table can contain one or more table group <tgroup> elements. Normally, there will be one table group. Multiple table groups are used to define portions of the table that have different presentation requirements (eg column and row specifications).

**Markup element:** <tgroup> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `cols` (M), defines the number of columns in the table.
- `tgstyle` (O), the table group style. This defines that a specified style (eg column and row specifications) is to be applied to the table group. Although the CALS table model allows the value of this attribute to determine the presentation style of the table (in terms of the table rulings, the frame, the orientation etc), S1000D mandates that the presentation attributes are populated with the correct values to make the table display correctly in any application.
- `colsep` (O), the column separator default setting. Refer to Para 2.5 for the description of `colsep` on <`table`>. In the context of <`tgroup`>, this is the default setting for column rulings for the table group and takes precedence over defaults set using `colsep` on <`table`>. A non-zero value means that column rulings will appear to the right of all columns of the table group unless there are is a 0 value given in the child `entry` elements (which will override the settings for that entry only). A value of 0 means that there are to be no column rulings for the table group. If the attribute `colsep` is not specified for the table group, this implies that column rulings are required (unless `colsep` values on individual <`entry`> elements state otherwise).
- `rowsep` (O), the column separator default setting. Refer to Para 2.5. for the description of `rowsep` on <`table`>. In the context of <`tgroup`>, this is the default setting for row rulings for the table group and takes precedence over defaults set using `rowsep` on <`table`>. A non-zero value means that row rulings will be appear beneath each row of the table group unless there are values given in the child <`entry`>. A value of 0 means that there will be no row rulings. If the attribute `rowsep` is not specified for the table group, this implies that row rulings are required (unless `rowsep` values on individual <`row`> elements state otherwise).
- `align` (O), alignment. This attribute provides the default alignment setting for the table group (which is the horizontal position of the text within the column) and applies to all entries in the table group that do not have an alignment specified by their own `align` attribute, or in their parent table <`row`> element. The values for `align` are:
  - "`left`" means that the text is left justified (quad flush left)
  - "`right`" means that the text is right justified (quad flush right)
  - "`center`" means that the text is center justified (text is centered around the middle of the column)
  - "`justify`" means that the text is justified (both quad left and right)
  - "`char`" means that text is aligned to the leftmost occurrence of the value of the attribute `char` value. When the attribute `align` is set to "`char`", attributes `char` and `charoff` must be used. The attribute `char` is the single character that is used to align the text. The most common use is to align on a '.' (a full stop, or period) for decimal alignment of a column of numbers as shown in Fig 1:

```
1002.23
 675.34
   0.002
```

ICN-83007-0000000062-001-01

*Fig 1 Example of "`char`" alignment*

This causes the text to range left or right around the fixed location of the decimal point.

The attribute charoff is used to position the alignment character within the width of the cell. This is given as a percentage of the cell width and must only be used when the attribute align is set to "char."

- charoff (C), the value is used when the value of the align attribute is "char". It is a number that represents the percentage of the column width to the left of the alignment character specified in the attribute char and must only be used when the attribute align is set to "char".
- char (C), the value is used when the value of the align attribute is "char". The value is the single alignment character source for any implied char values and must only be used when the align attribute is set to "char".

**Child elements:**

- <colspec> (O). Refer to Para 2.5.5.
- <spanspec> (O). Refer to Para 2.5.6.
- <thead> (O), defines the header of the table in terms of its rows and entries (refer to Para 2.5.2). For page-oriented output, the header will be replicated on each page when the table spans multiple pages. S1000D formal tables must always have a table header.
- <tfoot> (O), contains the rows and entries (refer to Para 2.5.3) that define the footer of the table when one is needed.
- <tbody> (M), contains the rows and entries (refer to Para 2.5.4) that define the body of the table.

**Business rules decisions:**

- None identified

**Markup example:**

```
<tgroup cols="2">
<colspec colname="col1" colwidth="1*"/>
<colspec colname="col2" colwidth="1*"/>
<tbody>
<row>
<entry><para>row 1, column 1</para></entry>
<entry><para>row 1, column 2</para></entry>
</row>
<row>
<entry><para>row 2, column 1</para></entry>
<entry><para>row 2, column 2</para></entry>
</row>
</tbody>
</tgroup>
```

### 2.5.2 Table header

**Description:** The element <thead> (table header) contains the rows of the table that provide the column headings and is mandatory for S1000D formal tables. The table header is displayed in bold type face and, for page-oriented output, will be displayed at the top of each page on which the table appears. The table header must contain at least one table row. There is no need to use emphasis to make a table header bold.

**Markup element:** <thead> (O)

**Attributes:**

- valign (O), specifies how the text is to be presented in each <entry> that does not have its own valign attribute set. It has one of the values that follow, and the default

setting if the attribute is not used is top. The value of valign on the <thead> element supplies the default alignment for the entire table header. These values are overridden by values that are contained in the table header's entries (if they are present). This attribute can have one of the following values:

- "top" for the text to be presented at the top of the <entry>
- "middle" for the text to presented in the middle of the <entry>
- "bottom" for the text to be presented at the bottom of the <entry>

**Child elements:**

– <colspec> (O). Refer to Para 2.5.5.This specifies the presentation information of each column in the table header and, if present, overrides any column specifications found in the table group (refer to Para 2.5.1).
– <row> (M). Refer to Para 2.5.7. The table header must contain at least one row. For S1000D formal tables, the last row of the table header must have its rowsep attribute set to a non-zero value.

**Business rules decisions:**

– None identified

**Markup example:**

```
<thead>
<row rowsep="1">
<entry><para>Area</para></entry>
<entry><para>Maximum blend depth</para></entry>
<entry><para>Maximum blend length</para></entry>
<entry><para>Maximum blend width</para></entry>
<entry><para>Maximum number of blends</para></entry>
</row>
</thead>
```

### 2.5.3 Table footer

**Description:** The element <tfoot> (table footer) contains the rows and entries that represent the table footer. The table footer is to appear at the end of the table (ie after the last table body row). For page-oriented publications, the table footer is to appear after the last row of each page on which the table appears.

**Markup element:** <tfoot> (O)

**Attributes:**

– valign (O), specifies how the text is to be presented in each entry that does not have its own valign attribute set. It has one of the values that follow, and the default setting if the attribute is not used is top.
  - "top", the text is presented at the top of the entry
  - "middle", the text is presented in the middle of the entry
  - "bottom", the text is presented at the bottom of the entry.

**Child elements:**

– <colspec> (O). Refer to Para 2.5.5.This specifies the presentation information of each column in the table footer and, if present, overrides any column specifications found in the table group (refer to Para 2.5.1).
– <row> (M). Refer to Para 2.5.7. The table footer must contain at least one row.

**Business rules decisions:**

– None identified

**Markup example:**

```
<tfoot>
<row>
<entry spanname="all5"><para>Example footnote</para></entry>
</row>
</tfoot>
```

### 2.5.4 Table body

**Description:** The element <tbody> (table body) contains the rows of the table that provide the primary content and is mandatory for all tables. The table body must contain at least one table row.

**Markup element:** <tbody> (M)

**Attributes:**

– valign (O), specifies the default within the body of the table for how the text is to be presented in each entry that does not have its own valign attribute set. If the attribute is not used, the default setting is top. The value of valign on the <tbody> element supplies the default alignment for the entire table body. These values are overridden by values that are contained in the table header's entries (if they are present). This attribute can have one of the following values:
  - "top" for the text to be presented at the top of the entry
  - "middle" for the text to presented in the middle of the entry
  - "bottom" for the text to be presented at the bottom of the entry

**Child elements:**

– <row> (M). Refer to Para 2.5.7. The table header must contain at least one row. For S1000D formal tables, the last row of the table header must have its rowsep attribute set to a non-zero value.

**Business rules decisions:**

– None identified

**Markup example:**

```
<tbody>
<row>
<entry><para>row 1, column 1</para></entry>
<entry><para>row 1, column 2</para></entry>
</row>
<row>
<entry><para>row 2, column 1</para></entry>
<entry><para>row 2, column 2</para></entry>
</row>
</tbody>
```

### 2.5.5 Column specification

**Description:** The element <colspec> (column specification) is used in the table group (<tgroup>, refer to Para 2.5.1) and can be overridden by <colspec> elements in the table header (<thead>, refer to Para 2.5.2), table footer (<tfoot>, refer to Para 2.5.3) and the table body (<tbody>, refer to Para 2.5.4). When used in the table header, table footer and

table body, the values specified override those that can be present on the table group and these values are in turn overridden by the settings of the same attributes on individual rows and entries

**Markup element:** <colspec> (O)

**Attributes:**

- colnum (O), represents the number of the column starting at 1 which represents the leftmost row. The column number is not used in any span specification (refer to Para 2.5.6) and simply serves as a consistency check for the authoring and / or software.
- colname (O), is the name of the column that is used to specify the position or horizontal span of columns in a row. It can also be used in the <entry> element (refer to Para 2.5.8) using the colname, or the namest with nameend attributes. It can also used by the <spanspec> element in its namest and nameend attributes (refer to Para 2.5.6).
- align (O), is the default alignment for entries in the table body. Refer to Para 2.5.1
- charoff (O), is the default character offset for alignment of entries in the table body. Refer to Para 2.5.1:
- char (O), is the character on which to align. Refer to Para 2.5.1.
- colwidth (O), is the column width setting. Column width can be specified using either ar proportional measure, a fixed measure, or a mixed measure.
  - A proportional measure is of the form "number*" (eg 10*), and means that the column width is the number times the proportion.
  - A fixed measure is of the form number and unit (eg 25pt, 25mm, 16.2in). The units are case insensitive and can be "pt" (points), "cm" (centimeters), "mm" (millimeters), "pi" (picas), and "in" (inches). The default fixed unit should be interpreted as "pt" if neither a proportion nor a fixed unit is specified. An example of a mixed measure is 10*+3pt.
  - If no column width is specified for a column specification, this implies that the column has the proportional width "1*", and hence, if no column widths are specified for any column, the column widths will be the same for each column and will be an equal proportion of the available width.
- colsep (O), is the column separator setting. Refer to Para 2.5.
- rowsep (O), is the row separator setting. Refer to Para 2.5.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<colspec colname="col1" colwidth="1*"/>
<colspec colname="col2" colwidth="1*"/>
<colspec colname="col3" colwidth="1*"/>
<colspec colname="col4" colwidth="1*"/>
<colspec colname="col5"/>
```

### 2.5.6 Span specification

**Description:** The element <spanspec> (span specification) identifies a horizontal span of columns and associated attributes that can subsequently be referenced by its spanname for repeated use in a table's <entry> elements. A <spanspec> uses column names from <colspec>s defined in that context. It gets default values from the <colspec> that provides the namest. namest and nameend identify the first and last columns in

increasing left-to-right order that identify the span. The reason colname is used rather than colnum in identifying <spanspec> is that the names are independent of revisions that can change the number of inserted/deleted columns, as long as namest remains to the left of (has a smaller colnum than) nameend. In a <thead> or <tfoot>, if any <colspec>s are redefined, the <tgroup> <spanspec>s are ignored in references to spanname from <entry>s within this <thead> or <tfoot>. When such redefinition occurs, any spanning should be by namest and nameend.

**Markup element:** <spanspec> (M)

**Attributes:**

- namest (M), contains the name of leftmost column of span (as defined in the column's colname attribute of its <colspec> element).
- nameend (M), contains the name of rightmost column of span (as defined in the column's colname attribute of its <colspec> element).
- spanname (M), uniquely identifies the span, and is the name that is applied in an <entry> element's spanname attribute (refer to Para 2.5.8).
- align (O), the alignment. Refer to Para 2.5.1.
- charoff (O), the character offset. Refer to Para 2.5.1.
- char (O), the character on which to align. Refer to Para 2.5.1.
- colsep (O), determines if the columns covered by the span are to have column rulings (this value is overridden by the colsep attribute on the <entry> elements if they are present (refer to Para 2.5.5)
- rowsep (O), determines if the rows covered by the span are to have row rulings (this value is overridden by the attribute rowsep on the <entry> and on the <row> elements if they are present (refer to Para 2.5.7).

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<spanspec namest="col1" nameend="col2" spanname="col1-2"/>
<spanspec namest="col1" nameend="col5" spanname="all5"/>
```

### 2.5.7 Table row

**Description:** The element <row> (table row) represents a row in a table header (refer to Para 2.5.2), a table footer (refer to Para 2.5.3), or a table body (refer to Para 2.5.4). The table row contains at least one <entry> (refer to Para 2.5.8). The values specified for the attributes rowsep and valign override any values for these attributes given in a parent element. These values are also overridden by any settings applied to <entry> elements.

**Markup element:** <row> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the row element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- rowsep (O), the default row separator setting for the row. Refer to Para 2.5.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <entry> (M). Refer to Para 2.5.8.

**Business rules decisions:**

- None identified

**Markup example:**

```
<row>
<entry><para>row 1, column 1</para></entry>
<entry><para>row 1, column 2</para></entry>
</row>
```

### 2.5.8 Table entry

**Description:** The element <entry> (table entry) represents a table cell.

**Markup element:** <entry> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the entry element. Refer to Chap 3.9.5.2.1.2.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- colname (O), is used to specify the column name for the <entry>. If this attribute is used, and there is also a spanname or nameset value used, then the attribute is ignored. It is an error if a column name is specified that does not have a corresponding definition in a <colspec> element.
- namest (O), is used to define the start column of the entry for entries that are spanned across multiple columns (the nameend attribute defines the column in which the entry ends). The value entered in namest must have a corresponding column definition (<colspec>). If namest is specified with no nameend, then the entry will span a single column. Standard spans can also be defined by using the <spanspec> element and referencing it using the spanname attribute. Refer to Para 2.5.6.
- nameend (O), is used to define the end column for spanned entries.
- spanname (O), is used to apply a standard span to the entry that is defined in the corresponding <spanspec> element. Refer to Para 2.5.6.
- morerows (O), defines the vertical straddling of the entry (ie the number of rows that the entry spans). For example, a morerows value of 1 means that the entry will straddle the current and the next row. There must be at least as many rows in the <tbody>, <thead> or <tfoot> to cover the number of rows straddled by the entry. If there is a rowsep attribute specified, it applies to the first row that is straddled by the entry.

- colsep (O), is the column separator setting for the entry. Refer to Para 2.5.
- rowsep (O), is the row separator setting for the entry. Refer to Para 2.5.
- rotate (O), can be zero or non-zero and is used to specify that the contents of the entry are to be rotated. If the value is0, or the attribute is not used, then the text in the entry is presented in the orientation of the table (as set by the orient attribute – refer to Para 2.5). If the orientation is landscape, and the value of the rotate attribute is 1, the resulting text is displayed upside-down to the page's headers and footers.
- valign (O), the vertical alignment of the entry. Refer to Para 2.5.8.
- align (O), the horizontal alignment of the entry. Refer to Para 2.5.1.
- charoff (O), the character offset. Refer to Para 2.5.1.
- char (O), the character on which to align. Refer to Para 2.5.1.

**Child elements:**

- <para> (O) Refer to Chap 3.9.5.2.1.10.
- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <legend> (O). Refer to Chap 3.9.5.2.1.7.
- Text
  - <functionalItemRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <circuitBreakerRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <controlIndicatorRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <inlineSignificantData> (O). Refer to Chap 3.9.5.2.1.10.
  - <quantity> (O). Refer to Chap 3.9.5.2.1.10.
  - <zoneRef> (O). Refer to Chap 3.9.5.2.1.10
  - <accessPointRef> (O). Refer to Chap 3.9.5.2.1.10
  - <identNumber> (O). Refer to Chap 3.9.5.2.1.10
  - <internalRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
  - <changeInline> (O). Refer to Chap 3.9.5.2.1.10.
  - <emphasis> (O). Refer to Chap 3.9.5.2.1.10.
  - <symbol> (O). Refer to Chap 3.9.5.2.1.10.
  - <subScript> (O). Refer to Chap 3.9.5.2.1.10.
  - <superScript> (O). Refer to Chap 3.9.5.2.1.10.
  - <dmRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <pmRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <externalPubRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <footnote> (O). Refer to Chap 3.9.5.2.1.10.
  - <footnoteRef> (O). Refer to Chap 3.9.5.2.1.10.
  - <acronym> (O). Refer to Chap 3.9.5.2.1.10.
  - <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
  - <caption> (O). Refer to Chap 3.9.5.2.1.10.
  - <captionGroup> (O). Refer to Chap 3.9.5.2.1.10.
  - <verbatimText> (O). Refer to Chap 3.9.5.2.1.10.
- Lists
  - <orderedList> (O). Refer to Chap 3.9.5.2.1.3.
  - <randomList> (O). Refer to Chap 3.9.5.2.1.3.
  - <definitionList> (O). Refer to Chap 3.9.5.2.1.3.

**Business rules decisions:**

– None identified

**Markup example:**

```
<entry colsep="0"><para>25,00 mm</para></entry>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of tables as graphics**. The project or the organization must decide if tables represented as graphics are allowed, and if they are the situations in which they can be used. Refer to Para 2.3.

**Use of presentation attributes**. The project or the organization must decide whether or not to include table presentation settings in the authored markup for the element <table> or allow the presentation system to deal with that. Refer to Para 2.5.

**Note**

Basic presentation styles for six specific tables are given in Chap 6.2.2 and Chap 6.2.3 and these should be followed whether the styles are authored or rendered by the display system.

**Use of applicability information**. The project or the organization must decide if the indication of applicability information is permitted on various table subelements depending on the Product configuration. If permitted, then the project or the organization must also decide on the use of the attribute applicRefId for this purpose. Refer to Para 2.5.

# 4 Examples

The following example shows the markup of an S1000D formal table that has five columns and rules as defined in Chap 6.2.2 and Chap 6.3.1. Note that the attributes colsep and rowsep on the element <table> set the default rulings for the entire table (ie no rulings). The attribute frame value of "topbot" draws a rule above and below the table, and the rowsep value of "1" on the <row> of the table header draws a rule before after the header (if the table header contains more than one row, for S1000D formal tables, the rowsep must be on the last row of the table header only. This table will be numbered (because it has a title), and it will appear in the data module's list of tables (because the attribute tocentry is set to a non-zero value).

```
<table frame="topbot" id="tab-0001" colsep="0" rowsep="0"
tocentry="1">
<title>Ring, Bearing Inner (No. 1) - Repair Data</title>
<tgroup cols="5">
<colspec colname="col1" colwidth="1*"/>
<colspec colname="col2" colwidth="1*"/>
<colspec colname="col3" colwidth="1*"/>
<colspec colname="col4" colwidth="1*"/>
<colspec colname="col5"/>
<thead>
<row rowsep="1">
<entry><para>Area</para></entry>
<entry><para>Maximum blend depth</para></entry>
<entry><para>Maximum blend length</para></entry>
<entry><para>Maximum blend width</para></entry>
<entry><para>Maximum number of blends</para></entry>
</row>
</thead>
<tbody>
```

```
<row>
<entry><para>All areas (unless specified differently)
</para></entry>
<entry><para>None</para></entry>
<entry><para>None</para></entry>
<entry><para>None</para></entry>
<entry colsep="0"><para>Blends are not permitted</para></entry>
</row>
<row rowsep="0">
<entry><para>A1</para></entry>
<entry><para>0,60 mm</para></entry>
<entry><para>10,00 mm</para></entry>
<entry><para>10,00 mm</para></entry>
<entry><para>Four</para></entry>
</row>
<row rowsep="0">
<entry><para>A2</para></entry>
<entry><para>1,00 mm</para></entry>
<entry colsep="0"><para>25,00 mm</para></entry>
<entry><para>17,00 mm</para></entry>
<entry><para>Six</para></entry>
</row>
</tbody>
</tgroup>
</table>
```

The example below shows the markup of a formal, image width table.

```
<table frame="topbot" pgwide="1" id="tab-0002">
<title>Ring, Bearing Inner (No. 1) - Repair Data</title>
<tgroup cols="5">
<colspec colname="col1"/>
<colspec colname="col2"/>
<colspec colname="col3"/>
<colspec colname="col4"/>
<colspec colname="col5"/>
<thead>
<row rowsep="1">
<entry colname="col1" colsep="0"><para>Area</para></entry>
<entry colname="col2" colsep="0"><para>Maximum blend
depth</para></entry>
<entry colname="col3" colsep="0"><para>Maximum blend
length</para></entry>
<entry colname="col4" colsep="0"><para>Maximum blend
width</para></entry>
<entry colname="col5" colsep="0"><para>Maximum number of
blends</para></entry>
</row>
</thead>
<tbody>
<row rowsep="0">
<entry colsep="0"><para>A3</para></entry>
<entry colsep="0"><para>0,60 mm</para></entry>
<entry colsep="0"><para>10,00 mm</para></entry>
<entry colsep="0"><para>10,00 mm</para></entry>
<entry colsep="0"><para>Four</para></entry>
</row>
<row rowsep="0">
<entry colsep="0"><para>A4</para></entry>
<entry colsep="0"><para>0,10 mm</para></entry>
```

```
<entry colsep="0"><para>Not applicable</para></entry>
<entry colsep="0"><para>Not applicable</para></entry>
<entry colsep="0"><para>No limit to the quantity. Remove the
high metal only.</para></entry>
</row>
</tbody>
</tgroup>
</table>
```

The example below shows the markup of a column width, informal table.

```
<table id="tab-0003">
<tgroup cols="2">
<colspec colname="col1"/>
<colspec colname="col2"/>
<tbody>
<row rowsep="0">
<entry colsep="0"><para>A3460</para></entry>
<entry colsep="0"><para>Avio</para></entry>
</row>
<row rowsep="0">
<entry colsep="0"><para>D3309</para></entry>
<entry colsep="0"><para>MTU</para></entry>
</row>
<row rowsep="0">
<entry colsep="0"><para>8338B</para></entry>
<entry colsep="0"><para>ITP</para></entry>
</row>
<row rowsep="0">
<entry colsep="0"><para>K0378</para></entry>
<entry colsep="0"><para>RR</para></entry>
</row>
</tbody>
</tgroup>
</table>
```

Refer to Chap 3.9.5.2.1.10 for additional examples of table markup.

# Chapter 3.9.5.2.1.7

## *Common constructs - Figures and foldouts*

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# 1 General

This chapter contains the definition and use of figures and foldouts from an author's point of view. It gives details about the available elements and attributes and how to use them to establish a connection between data module text and figures.

# 2 Figures and foldouts

## 2.1 Figures

**Description:** This element contains the figure. The figure consists of a title and one or more illustrations sheets and a figure title. It can also contain a legend.

For specific rules and guidance for the preparation of illustrations, refer to Chap 3.9.2.

In all cases, figures must be placed as near as possible to, and preferably immediately following, the related text.

Figure titles must be written in sentence case and must not have a period [.] at the end.

Figure titles must not exceed two lines.

**Note**

For paper based publications and documents, which are produced from data modules, the placement of the figure is given in the data module. There must be no manual attempt to move the figure to another page due to an automatic page break.

An ICN is used to control the production of the illustration. This ICN is used within the data module to identify the associated graphic as described below. Refer to Chap 4.4.

Where appropriate, figures can be divided over a number of illustration sheets. This is achieved using multiple occurrences of the element <graphic> within the element <figure>.

**Markup element**: <figure> (O)

ICN-83007-S1000DXXX-001-01

*Fig 1 Element <figure>*

**Attributes:**

- `applicRefId` (O) , the applicability information. Refer to Chap 3.9.5.3
- `id` (O), the identifier of the <figure> element. Refer to Chap 3.9.5.2.1.2
- `changeMark` (O), `changeType` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <title> (M). Refer to Chap 3.9.5.2.1.5
- <graphic> (M). Refer to Para 2.1.1
- <legend> (O) used to contain the legend information related to the figure. Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

```
<figure>
<title>This is a figure title</title>
<graphic>
...
</graphic>
<legend>
...
```

```
</legend>
</figure>
```

### 2.1.1 Graphic

**Description:** This element contains the external entity reference to the illustration file.

**Markup element**: <graphic> (O)

**Attributes:**

- applicRefId (O) , the applicability information. Refer to Chap 3.9.5.3
- id (O), the identifier of the <graphic> element
- changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- infoEntityIdent (M), the link to the external entity declaration, which points to the illustration file. The population of this attribute must include the complete ICN with the prefix "ICN-"
- reproductionWidth (O), used to indicate the presentation width to the presentation system
- reproductionHeight (O), used to indicate the presentation height to the presentation system
- reproductionScale (O), used to indicate the presentation scale to the presentation system
- xlink:type (O), specifies the link type, if an xlink link is established. Refer to Chap 7.7.4.
- xlink:href (O), specifies the link address, if an xlink link is established. Refer to Chap 7.7.4.
- xlink:title (O), specifies the link title, if an xlink link is established. Refer to Chap 7.7.4.
- xlink:show (O), specifies the link appearance, if an xlink link is established. Refer to Chap 7.7.4.
- xlink:actuate (O), specifies the link behavior, if an xlink link is established. Refer to Chap 7.7.4.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <hotspot> (O), used for hotspotting. Refer to Chap 3.9.5.2.1.8.
- <reasonForAmendment> (O), used to contain the reason for amendment information. Refer to Chap 3.9.5.2.1.1.

**Business rules decisions:**

- Use of hotspots

**Markup example:**

```
<graphic>
<hotspot>
...
</hotspot>
<reasonForAmendment>
...
```

```
</reasonForAmendment>
</graphic>
```

### 2.1.2 Legend

**Description:** The element <legend> contains the legend or explanatory list.

**Note**

In the case of multi-sheet illustrations, only one legend is permitted.

**Markup element:** <legend> (O)

**Attributes:**

- id (O), the identifier of the <legend> element. Refer to Chap 3.9.5.2.1.2
- changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <definitionList> (C). Refer to Chap 3.9.5.2.1.3.

**Business rules decisions:**

- Use of legends
- Decide on the format of entries in the legend

**Markup example:**

```
<legend>
<definitionList>
...
</definitionList>
</legend>
```

## 2.2 Foldouts

**Description:** The element <foldout> is used to contain a figure, or table which is larger than the default size.

**Note**

Use of foldouts for tables is to be avoided.

**Markup element**: <foldout> (O)

**Attributes:**

- None

**Child elements:**

- <figure> (O). Refer to Para 2.1.
- <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

- Use of foldouts

**Markup example:**

```
<foldout>
<figure>
...
</figure>
</foldout>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of hotspots**. The project or the organization must decide whether to use hotspots or not. Refer to Para 2.1.

**Use of applicability**. The project or the organization must decide whether and how to use the attribute `applicRefId` for complete figures and illustration sheets. Refer to Para 2.1.

**Type of legend**. The project or the organization must decide on the strategy for legends. Legends can appear as part of the illustration or as text using the element <`legend`>. The advantage of making the legend part of the text is that:

- the same illustration can have different legends wherever it appears (eg in multi-language projects)
- the text of the element <`legend`> can be searched. This might not be the case if the legend is part of the illustration
- items in the illustration can be linked to the legend by the use of hotspots
- the legend in the text can save space on the illustration (particularly when the legends are long). Refer to Para 2.1.2.

**Format of the entries in the legend**. The project or the organization must define:

- whether the text in the legend is in sentence case (D), uppercase or mixed case
- whether the element <`listItemTerm`> is to contain a leading zero when using callout/item numbers or not. The default is no leading zero. Refer to Para 2.1.2.

**Use of foldout**. The project or the organization must decide whether this element is only used for page-oriented publications, as it will not have an effect in the screen view of an IETP. Refer to Para 2.2.

# 4 Markup examples

## 4.1 Single illustration

The following example shows the markup for a data module that contains a single CGM illustration using the complete ICN in the attribute `infoEntityIdent` and example `ids`.

```
<!DOCTYPE dmodule [
<!ENTITY ICN-S1000DBIKE-AAA-D000000-0-U8025-00536-A-04-1 SYSTEM
"../../../illustrations/ICN-S1000DBIKE-AAA-D000000-0-U8025-
00536-A-04-1.CGM" NDATA cgm>
]>
...
<figure id="fig-0001">
<title>Complete bicycle</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-
00536-A-04-1">
</graphic>
</figure>
```

## 4.2 Multiple illustrations

The following example shows the markup for a multiple illustration sheet figure:

```
<figure id="fig-0001">
<title>LP compressor - Removal</title>
<graphic id="fig-0001-gra-0001" infoEntityIdent="ICN-E2-A-
723200-R-K0378-00232-A-01-1">
</graphic>
<graphic id="fig-0001-gra-0002" infoEntityIdent="ICN-E2-A-
723200-R-K0378-00233-A-01-1">
</graphic>
</figure>
```

## 4.3 Legend

The following example shows the markup for a legend:

```
<figure id="fig-0001">
<title>LP compressor - Removal</title>
<graphic id="fig-0001-gra-0001" infoEntityIdent="ICN-E2-A-
723200-R-K0378-00232-A-01-1">
</graphic>
<graphic id="fig-0001-gra-0002" infoEntityIdent="ICN-E2-A-
723200-R-K0378-00233-A-01-1">
</graphic>
<legend>
<definitionList>
<title>Legend for <internalRef internalRefId="fig-0001">
</internalRef>
</title>
<definitionListItem>
<listItemTerm>1</listItemTerm>
<listItemDefinition>DISPLAY</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>2</listItemTerm>
<listItemDefinition>BUTTON</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>3</listItemTerm>
<listItemDefinition>WIDGET</listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>4</listItemTerm>
<listItemDefinition>ADAPTOR</listItemDefinition>
</definitionListItem>
...
<definitionListItem>
<listItemTerm>102</listItemTerm>
<listItemDefinition>RETAINER</listItemDefinition>
</definitionListItem>
</definitionList>
</legend>
</figure>
```

## 4.4 Foldout

The following example shows the markup for a foldout illustration:

```
<foldout>
<figure id="fig-0001">
<title>LP compressor - Removal</title>
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-00232-A-01-1">
</graphic>
<graphic infoEntityIdent="ICN-E2-A-723200-R-K0378-00233-A-01-1">
</graphic>
</figure>
</foldout>
```

# Chapter 3.9.5.2.1.8

## *Common constructs - Hotspots*

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# 1 General

This chapter contains the definition and handling of graphical hotspots from an author's point of view. It gives details about the available elements and attributes and how to use them to establish a connection between data module text and objects within a graphic.

Information and guidance on how to prepare graphics for hyperlinking and navigation, is given in Chap 7.3.2.

# 2 Content

## 2.1 Relationship to CGM V4

The content model of an S1000D CGM version 4 Application Structure (APS) can be described as a recursive definition of a CGM APS parameter `type` with value "`grobject`".

**Note**

All attributes of the CGM APS type value "`grobject`" correspond to CGM APS attributes, except CGM APS parameter `apsid`, which corresponds to the application structure identifier of the CGM APS itself.

## 2.2 Hotspot

**Description:** The element <`hotspot`> contains the definition of graphical regions in an illustration and contains information needed to navigate between graphical objects or between graphical objects and text. For use of the element <`hotspot`> in the context of a learning assessment, refer to Chap 3.9.5.2.13.5.

**Markup element:** <`hotspot`> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`hotspot`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `applicationStructureIdent` (O), corresponds to the CGM APS parameter "apsid" and defines a relationship between the hotspot and the graphical object in the illustration
- `applicationStructureName` (O), corresponds to the CGM APS attribute "name" and defines an alternate relationship between the hotspot and the graphical object in the illustration
- `hotspotType` (O), can be used to classify a graphical object. Example values are "`callout`" or "`detail`".
- `hotspotTitle` (O), can be used to provide a context dependent human readable label to be displayed when the graphical cursor passes over a graphical object (tool tip)
- `objectDescr` (O), associates more detailed information with a graphical object

- `objectCoordinates` (O), is used to hold the coordinates of the overlay region as a closed polygon, separated by commas in the form "$x_1$, $y_1$,...,$x_n$, $y_n$" where each (x,y)-pair defines a vertex point of the closed region in absolute pixel coordinates. The coordinate system has its origin (0,0) at the top/left corner of the raster image with the x-axis pointing to the right and the y-axis pointing down.

  **Note**

  The word "closed" means that the last point equals the first one. Thus, a rectangular region is defined by five coordinate pairs. Attribute `objectCoordinates` is only needed for defining externally sensible regions applicable to raster graphics that are not embedded in CGM graphics.

- `visibility` (O), is set to value "`hidden`" to turn off any graphical regions that are not be displayed for the current use of a graphic, otherwise the value is assumed to be "`visible`"

  **Note**

  Summary of visibility/interactivity values for a graphical region:

  - visible, not selectable:
    - Do not define in a hotspot, ie do nothing, or
    - Define a hotspot without any internal references, data module references, or CSN references, or
    - Define a hotspot without any internal references, data module references, or CSN references and attribute `visibility="visible"`
  - visible, selectable:
    - Define a hotspot with at least one internal references, data module references, or CSN reference, or
    - Define a hotspot with at least internal references, data module references, or CSN reference and attribute `visibility="visible"`
  - not visible, not selectable:
    - Define a hotspot with no internal references, data module references, or CSN references and attribute `visibility="hidden"`
  - not visible, selectable:
    - Disallowed
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`hotspot`> (O). Refer to Para 2.2.
- <`internalRef`> (O). Internal references must be populated in accordance with Chap 3.9.5.2.1.2.
- <`dmRef`> (O). Data module references must be populated in accordance with Chap 3.9.5.2.1.2.
- <`catalogSeqNumberRef`> (O). CSN references must be populated in accordance with Chap 3.9.5.2.7.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of hotspots

**Markup example:**

- Refer to Para 4.

## 2.3 Links to/from graphical objects

Graphical objects can be linked with text, other graphics or graphical objects, other data modules, and parts data in several ways. Links can originate from other objects linking to a graphical object. Links can also originate from graphical objects linking to other objects within the same data module (local), other data modules, or parts data.

If several links exist from the same object then the possible link destinations must be presented as a choice menu to the user when activating the object, eg by clicking on it.

### 2.3.1 Links to graphical objects originating from local text

Graphical objects are addressed from within data module text by using the element <`internalRef`>. The content model of element <`internalRef`> is as described in Chap 3.9.5.2.1.2.

**Note**

In order to allow more flexibility for element <`internalRef`> in data module text, it can have textual content including subscripts and superscripts to highlight link anchors to the end user in viewer applications. This expansion is not required when using element <`internalRef`> within the context of element <`hotspot`>.

Attribute `internalRefId` is used in cases where the link can be expressed by a simple XML ID/IDREF mechanism. This applies to all "outbound" links from data module text to graphical objects, all "inbound" links from a graphical object back to data module text (into the same data module where the graphical object is defined), and all "third-party" links from one graphical object to another.

In cases where attribute `internalRefId` cannot be used, the attribute `referredFragment` contains a Universal Resource Name (URN) reference (including a fragment identifier in the general case) which points to the destination of the link. An example of using attribute `referredFragment` would be to point into an audio/video data stream at a specific location. In this case, attribute `internalRefId` is not used.

The optional attribute `referredFragment` of element <`internalRef`> also covers the possibility of simultaneously addressing all graphical objects within a (multi-sheet) figure with the same value of attribute `applicationStructureName`. The optional attribute `applicationStructureName`, which is replicated in attribute `referredFragment` of element <`internalRef`>, can be used as a shorthand address for all graphical objects defined in a (multi-sheet) figure with that name. In this case, attribute `internalRefId` contains the value of attribute `id` of the corresponding element <`figure`>. This feature is especially useful in parts data modules by providing a link from the textual description of a part to each occurrence of that part in the figure.

The optional attribute `targetTitle` of element <`internalRef`> can be used to provide a human-readable label for the link destination, which will be displayed when for instance the graphical object is activated (eg by a mouse-down event). If element <`internalRef`> is attached to a graphical object more than once, then the possible link destinations (values of attribute `internalRefId` and/or attribute `referredFragment`) and/or the corresponding values of optional attribute `targetTitle` are presented as a choice menu to the user when activating the graphical object, eg by clicking on it.

The value "`hotspot`" of attribute `internalRefTargetType` is necessary to distinguish traditional references to a figure from references into it.

In case of multi-sheet figures, when cross-referencing to/into a single illustration sheet, the attribute `internalRefId` contains the value of attribute `id` of the referenced element <`graphic`>.

**Note**

The attribute `internalRefTargetType` is not mandatory. If the application is able to retrieve the name of the link destination element, then it can perform proper actions based on this looked-up name instead of using the value of the attribute `internalRefTargetType`. In this case, the attribute `internalRefTargetType` does not need to be given.

### 2.3.2 Links originating from graphical objects to local text or graphics

Links from graphical objects to objects within the same data module are expressed by using element <`internalRef`>. The links can be to data module text and/or to other graphic locations of a figure. The element <`internalRef`> is not used for references to another data module.

Use of the element <`internalRef`> follows the rules as described in Para 2.3.1 with the exception that the attribute `internalRefTargetType` is not limited to the value "`hotspot`". The value used accurately represents the type of the destination object.

In cases where attribute `internalRefId` cannot be used, the attribute `referredFragment` will contain a URN reference (including a fragment identifier in the general case) pointing to the destination of the link. An example of using attribute `referredFragment` is to point into an audio/video data stream at a specific location. In this case, attribute `internalRefId` is not used.

### 2.3.3 Links from graphical objects to other data modules

Links from graphical objects to other data modules are expressed by using the element <`dmRef`>.

The use of the element <`dmRef`> follows the rules as described in Chap 3.9.5.2.1.2.

Use of the optional attribute `referredFragment` of element <`dmRef`> covers the possibility of referencing into a figure within a different data module. This can be used, for instance, to provide a graphical navigation capability. Referencing into the middle of procedural data is strongly discouraged as critical warnings, cautions, and setup information can be skipped creating a hazardous condition for personnel and equipment. Refer to Chap 3.9.5.2.1.2.

### 2.3.4 Links from graphical objects to parts data

Links from graphical objects to parts data are expressed by using the element <`catalogSeqNumberRef`>.

The element <`catalogSeqNumberRef`> is used to contain a reference to a parts catalog entry. Refer to Chap 3.9.5.2.7.

## 2.4 XML "authoring"

The manual effort involved in authoring the definition of and the access to graphical objects within data modules and their associated illustrations can be minimized by the use of sufficiently powerful tools both in the CGM graphics and the textual XML environment. An example would be an existing tool, which automatically reads and transforms callout/item numbers/items in the graphic to addressable objects with names and unique identifiers. WebCGM 2.0 supports this approach through the Document Object Model (DOM) interface. Refer to Chap 7.3.2.

## 2.5 Hotspot definition

In general, the major manual effort required to define hotspots must be spent in the graphics environment. Leaving out the simple example above of only defining callout/item numbers/items as graphical objects, the illustrator has to group graphic primitives or has to define a geometric outline embracing them, and must associate address information (a unique identifier and possibly a name) to those potential hotspots.

Depending on the functionality of the CGM export facility in the graphic tool, this address information can be exposed to the textual XML environment for automated insertion of element <`hotspot`> in data module text.

Some further information to be associated with hotspots can be automatically retrievable from within the data module text, such as the value of attribute `hotspotTitle` of element <`hotspot`> (eg from the structural content of element <`legend`>) or predetermined context-dependent link ends originating from that graphical object (eg links back to part numbers in parts information data module text).

In case of separate raster graphics (not embedded in CGM), attribute `applicationStructureIdent` and attribute `applicationStructureName` have no predefined meaning in the graphics environment. As described above, attribute `objectCoordinates` of element <`hotspot`> is used to hold the coordinates of a sensible overlay region associated with the raster image and serves as the "address" for linking into the graphics environment.

**Note**

In the light of possible multiple use of a graphic in different data modules, it has to be clearly stated that not every object (APS in case of CGM) defined in the graphical environment needs to be inserted as element <`hotspot`> in a specific data module, ie only those graphical objects which are addressed by element <`internalRef`> in that specific data module must be defined therein. The graphic itself must not be copied and/or re-identified.

## 2.6 Cross-referencing

As opposed to the definition of hotspots, the insertion of cross-references cannot be automated to the same degree. Nevertheless, some support can be given to "link authors" by the XML editor or by a separate link tool.

**Note**

If the identifiers are semantically meaningful within the data module content (eg attribute `id` of element <`catalogSeqNumber`> in parts information data modules), then an automated cross-referencing process can be achieved.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of hotspots**. The project or the organization must decide on whether to use the hotspot mechanism to create intelligent graphics. Refer to Para 2.2.

# 4 Examples

The examples given below are to demonstrate the use of graphical hotspots in the data module text and the CGM illustration. The illustrations shown are not to scale.

## 4.1 Illustration example

ICN-1B-B-291101-M-C0419-00571-A-01-1

*Fig 1 Illustration example - Graphical hotspots*

## 4.2 CGM version 4 file

The following simple example is an extract from the CGM version 4 file of the illustration which shows the APS used for defining the two occurrences of callout number "6" and the single occurrence of callout number "8" as graphical objects. The APS parameter `id` values are "`hot001`", "`hot002`" and "`hot003`". The optional object names are "6" for both occurrences of callout number "6", whereas "`hot003`" is not named, and there are optional picking/highlighting regions (a continuous polybezier and two rectangles) defined for the three graphical objects.

```
BEGMF 'ICN-1B-B-291101-M-C0419-00571-A-001-01';
MFVERSION 4;
MFDESC '"ProfileId:S1000D",
"ProfileEd:2.3", "ColourClass:colour"';
MFELEMLIST 'VERSION4';
FONTLIST 'HELVETICA' 'HELVETICA_BOLD' 'HELVETICA_OBLIQUE'
'HELVETICA_BOLD_OBLIQUE';
CHARSETLIST STD94 'B' STD96 'A';
VDCTYPE REAL;
COLRPREC 255;
COLRINDEXPREC 255;
COLRVALUEEXT 0 0 0 255 255 255;
MAXCOLRINDEX 255;
INTEGERPREC -32767 32767;
REALPREC -2147483647 2147483647 4;
CHARCODING BASIC8BIT;
MAXVDCEXT 13.0581,41.3273 173.8012,259.1455;
BEGPIC 'Picture 1';
SCALEMODE METRIC 1;
VDCEXT 13.0581,41.3273 173.8012,259.1455;
COLRMODE INDEXED;
LINEWIDTHMODE ABS;
EDGEWIDTHMODE ABS;
LINEEDGETYPEDEF -22 5.75 10000 1333 111 1333;
BEGPICBODY;
LINECLIPMODE SHAPE;
% %
% All other primitives/elements deleted here %
% %
RESTRTEXTTYPE 2;
CHARSETINDEX 1;
ALTCHARSETINDEX 2;
TEXTALIGN CTR BASE 0 0;
CHARORI 0 1 1 0;
CHARHEIGHT 3.2844;
TEXTCOLR 1;
BEGAPS 'hot001' 'grobject' STLIST;
APSATTR 'name' "14 1 '6'";
APSATTR 'region' "11 1 4, 16 26 88.757 66.1349 88.757 66.1349
91.2264 66.1349 91.2264 66.1349 91.2264 66.1349 91.2264 70.0155
91.2264 70.0155 91.2264 70.0155 88.757 70.0155 88.757 70.0155
88.757 70.0155 88.757 66.1349 88.757 66.1349";
BEGAPSBODY;
```

```
RESTRTEXT 1.9476 3.2844 89.991,67.1933 final '6';
ENDAPS;
BEGAPS 'hot002' 'grobject' STLIST;
APSATTR 'name' "14 1 '6'";
APSATTR 'region' "11 1 1, 16 4 91 48 94 53";
BEGAPSBODY;
RESTRTEXT 1.9477 2.533 92.8528,49.9939 final '6';
ENDAPS;
BEGAPS 'hot003' 'grobject' STLIST;
APSATTR 'region' "11 1 1, 16 4 134 48 136 52";
BEGAPSBODY;
RESTRTEXT 1.9476 3.2844 135.3942,49.4756 final '8';
ENDAPS;
ENDPIC;
ENDMF;
```

The effect when highlighting these graphical objects and bringing them into view (possibly by defining an APS attribute `viewcontext` in addition) by a CGM viewer application can be as shown in the following illustration extract:

ICN-1B-B-291101-M-C0419-00571-B-01-1

*Fig 2 Illustration example - Highlighting graphical objects*

## 4.3 XML companion metadata

### 4.3.1 Hotspot definition

The original XML data module fragment, which defines the figure that corresponds to the illustration example above, looks as follows:

```
<figure id="fig-0001">
<title>Removal of solenoid valve, pump no. 1
```

```
(no. 2)</title>
<graphic infoEntityIdent="ICN-1B-B-291101-M-C0419-00571-A-001-
01">
</graphic>
<legend>
<definitionList>
<definitionListItem>
<listItemTerm>1</listItemTerm><listItemDefinition><para>Electric
al plug 3MRa (5MRa)</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>2</listItemTerm><listItemDefinition><para>Screw
</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>3</listItemTerm><listItemDefinition><para>Washer
</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>4</listItemTerm><listItemDefinition><para>Solenoid
valve</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>5</listItemTerm><listItemDefinition><para>Locating
pin</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm id="fig-0001-trm-
0001">6</listItemTerm><listItemDefinition><para>O-
Ring</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>7</listItemTerm><listItemDefinition><para>O-
Ring</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm id="fig-0001-trm-
0002">8</listItemTerm><listItemDefinition><para>Hydraulic
pump</para></listItemDefinition>
</definitionListItem>
</definitionList></legend></figure>
```

After automated insertion of the potential hotspots, the XML data module fragment for element <graphic> looks as follows, where the value "fig001" is the content of attribute id of the parent single-sheet element <figure>:

```
<graphic id="fig-001-gra-0000"
infoEntityIdent="ICN-1B-B-291101-M-C0419-00571-A-001-01">
<hotspot id="fig-0001-gra-0000-hot-0001"
applicationStructureIdent="hot001" applicationStructureName="6"
hotspotTitle="O-Ring">
<internalRef internalRefId="fig-0001-trm-0001"
targetTitle="Explanation"
internalRefTargetType="other"></internalRef></hotspot>
<hotspot id="fig-0001-gra-0000-hot-0002"
applicationStructureIdent="hot002" applicationStructureName="6"
hotspotTitle="O-Ring">
<internalRef internalRefId="fig-0001-trm-0001"
targetTitle="Explanation"
```

```
internalRefTargetType="other"></internalRef></hotspot>
<hotspot id="fig-0001-gra-0000-hot-0003"
applicationStructureIdent="hot003" hotspotTitle="Hydraulic
pump">
<internalRef internalRefId="fig-0001-trm-0002"
targetTitle="Explanation"
internalRefTargetType="other"></internalRef></hotspot></graphic>
```

This initial definition step can be performed, to a certain degree, without manual intervention by extracting the values of attribute `applicationStructureIdent` and optional attribute `applicationStructureName` from the CGM environment, and inserting them in the XML instance.

In this example, the individual value of attribute `hotspotTitle` of element <`hotspot`> is retrieved from element <`legend`>.

**Note**

The individual value of attribute `internalRefId` is an XML identifier that points (back) from the graphical object to the proper location within element <`legend`>.

### 4.3.2 Cross-referencing

For cross-referencing from within data module text to a single graphical object, the XML element <`internalRef`> can be used as follows:

```
<para>See <internalRef internalRefId="fig-0001-gra-0000-hot-
0003" internalRefTargetType="hotspot">item
8</internalRef></para>
```

In order to address both graphical objects named "6" at once, attribute `target` of element <`internalRef`> is used (in addition to attribute `internalRefId` which points to element <`figure`>) in the context of element <`legend`> as follows (emphasized in bold):

```
<legend>
<definitionList>
<definitionListItem>
<listItemTerm>1</listItemTerm><listItemDefinition><para>Electric
al plug 3MRa (5MRa)</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>2</listItemTerm><listItemDefinition><para>Screw</p
ara></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>3</listItemTerm><listItemDefinition><para>Washer</
para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>4</listItemTerm><listItemDefinition><para>Solenoid
valve</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>5</listItemTerm><listItemDefinition><para>Locating
pin</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm id="fig-0001-trm-0001">6</listItemTerm>
<listItemDefinition><internalRef internalRefId="fig-0001"
referredFragment="6" internalRefTargetType="hotspot">O-
```

```
Ring</internalRef></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm>7</listItemTerm><listItemDefinition><para>O-
Ring</para></listItemDefinition>
</definitionListItem>
<definitionListItem>
<listItemTerm id="fig-0001-trm-0002">8</listItemTerm>
<listItemDefinition><para>Hydraulic
pump</para></listItemDefinition>
</definitionListItem>
</definitionList>
</legend>
```

## 4.4 Separate raster graphics

In order to demonstrate the use of attributes of element <hotspot> in case of separate raster graphics (not embedded in CGM), it is assumed that the above illustration is only available as a TIF, CG4, GIF, PNG or JPG image file.

The XML data module fragment for the definition of the third element <hotspot> within element <graphic> looks then as follows:

```
<hotspot id="fig-0001-gra-0000-hot-0003" hotspotTitle="Hydraulic
pump" objectCoordinates="134,48,134,52,136,52,136,48,134,48">
<internalRef internalRefId="fig-0001-trm-0002"
targetTitle="Explanation"
internalRefTargetType="other"></internalRef></hotspot>
```

**Note**

Attribute `applicationStructureIdent` and attribute `applicationStructureName` are not used in this example.

## 4.5 References between graphical objects

For cross-referencing from one graphical object to another, the element <internalRef> is used within element <hotspot> as follows (building up on the example above):

```
<hotspot id="fig-0001-gra-0000-hot-0001"
applicationStructureIdent="hot001" applicationStructureName="6"
hotspotTitle="O-Ring">
<internalRef internalRefId="fig-0001-trm-0001"
targetTitle="Explanation"
internalRefTargetType="other">></internalRef>
<internalRef internalRefId="fig-0001-gra-0000-hot-0002"
internalRefTargetType="hotspot" targetTitle="Second occurrence
of catalogItemNumber 6"></internalRef></hotspot>
```

In this example, the link from the first to the second occurrence of item number "6" is expressed by another sub element <internalRef> of element <hotspot>.

## 4.6 References from within illustration sheets to other data modules

For cross-referencing from one graphical object to the figure and the XML text of another data module and to parts data, element <internalRef>, element <dmRef> and element <catalogSeqNumberRef> are used within element <hotspot> as follows (building up on the example above):

```
<hotspot id="fig-0001-gra-0000-hot-0003"
applicationStructureIdent="hot003" hotspotTitle="Hydraulic
```

```
pump">
<internalRef internalRefId="fig-0001-trm-0002"
targetTitle="Explanation"
internalRefTargetType="other"></internalRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B"
systemCode="24" subSystemCode="4" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="130" infoCodeVariant="B" itemLocationCode="A"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techName>Disconnection of power supply</techName>
<infoName>Normal operation</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
<dmRef referredFragment="URN:S1000D:ICN-1B-B-244000-M-C0419-
00123-A-001-01" xlink:type="simple" xlink:actuate="onRequest"
xlink:show="new" xlink:title="Disconnection of power supply -
Figure">
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B"
systemCode="24" subSystemCode="4" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="130" infoCodeVariant="B" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
<catalogSeqNumberRef xlink:type="simple"
xlink:actuate="onRequest" xlink:show="new"
xlink:title="Hydraulic pump XYZ" xlink:href="URN:S1000D:CSN-
53251001-001-00A"
catalogSeqNumberValue="53251001 001 "
itemSeqNumberValue="00A"></catalogSeqNumberRef>
</hotspot>
```

In this example, the second sub element <`dmRef`> of element <`hotspot`> demonstrates the possibility for link definitions from a graphical hotspot to another data module.

The third sub element <`dmRef`> of element <`hotspot`> demonstrates the possibility for link definitions from a graphical hotspot to other resources (ie to another figure), external to the context of a specific data module. This is accomplished by using the attribute `referredFragment` with standard S1000D URN name.

The fourth sub element <`catalogSeqNumberRef`> of element <`hotspot`> demonstrates the possibility for link definitions from a graphical hotspot to a part within an IPD data module. The example includes optional XLink attributes that describe the behavior and title of the link.

In this example, when the graphical hotspot is selected in an IETP, a list of four possible link destinations is presented:

- Explanation - Other
- Disconnection of power supply - Normal operation
- Disconnection of power supply - Figure
- Hydraulic pump XYZ - Parts data

# Chapter 3.9.5.2.1.9

## *Common constructs - Preliminary requirements and requirements after job completion*

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# 1 General

This chapter contains the definition and handling of the sections "Preliminary requirements" and "Requirements after job completion" from an author's point of view. It gives details about the available elements and attributes and how to use them to populate Preliminary requirements and Requirements after job completion.

The rules for the presentation of Preliminary requirements and Requirements after job completion in page-oriented publications and IETP are given in Chap 6.2.3.3 and Chap 6.3.1, respectively.

Preliminary requirements, element <preliminaryRqmts>:

- lists (Required conditions) the actions to be done or conditions that must be satisfied before the Main procedure, element <mainProcedure>, is started
- lists any personnel, required technical information, support equipment, supplies and spares that are needed to perform the Procedure
- gives the safety conditions that apply to the Main procedure and the Requirements after job completion

Basic production maintenance data can also be specified by using in the element <productionMaintData>.

Requirements after job completion, element <closeRqmts>, captures any actions that are required after the Main procedure is complete, to return the Product to a serviceable condition or the conditions that must be satisfied to have the Product in a serviceable condition.

Fig 1 shows the overall construct of the element <preliminaryRqmts> and the element <closeRqmts> in procedural, fault isolation and process data modules. The maintenance planning data modules use only the element <preliminaryRqmts>.

It is recommended to give references to complete data modules only, in Required conditions, element <reqCondGroup>, and in Requirements after job completion, element <closeRqmts>. This enables an automatically preparation of situation adopted maintenance procedures, by compiling all the Preliminary requirements data and actions, and the Requirements after job completion data and actions, together with all Main procedures, consolidated into one complete sequence.

To prescribe a condition by giving an action in the element <preliminaryRqmts> or the element <closeRqmts>, without a reference to a data module, can reduce the possibility for further automated preparation of situation adopted maintenance procedures. The same limitation appears where an action just refers to one or more steps in the referred data module or publication.

The markup examples given in this chapter are presented in Chap 6.2.3.3 in the S1000D standard layout for page oriented presentation.

The graphical representation of the XML schema fragments use specific symbols which are explained in Chap 3.9.5.

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*Fig 1 Element <`preliminaryRqmts`> and element <`closeRqmts`> in a procedural data module*

## 2 Preliminary requirements

**Description:** The element <`preliminaryRqmts`> contains all preliminary requirements for a procedure as described at Para 2.2 thru Para 2.8.

**Markup element:** <`preliminaryRqmts`> (M)

The element is mandatory in procedural and fault isolation data modules and optional in process and maintenance planning data modules. The use of (M/O/C) in the following paragraphs is based on the procedural Schema.

**Attributes:**

– None

**Child elements:**

- <productionMaintData> (O), repeatable. Production management data. Refer to Para 2.1.
- <reqCondGroup> (M), required conditions. Refer to Para 2.2.
- <reqPersons> (O), repeatable. Required persons. Refer to Para 2.3.
- <reqTechInfoGroup> (O), required technical information. Refer to Para 2.4.
- <reqSupportEquips> (M), support equipment. Refer to Para 2.5.
- <reqSupplies> (M), consumables, materials and expendables. Refer to Para 2.6.
- <reqSpares> (M), spares. Refer to Para 2.7.
- <reqSafety> (M), safety conditions. Refer to Para 2.8.

**Business rules decisions:**

- None identified

**Markup example:**

```
<preliminaryRqmts>
<reqCondGroup>
<noConds/>
</reqCondGroup>
<reqPersons>
<person man="A">
<personCategory personCategoryCode="Basic user"/>
<trade>Operator</trade>
<estimatedTime unitOfMeasure="h">0,3</estimatedTime></person>
</reqPersons>
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0001">
<name>Tire pressure gauge</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-01</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0002">
<name>Specialist toolset</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
<reqSupplies>
<supplyDescrGroup>
<supplyDescr id="sup-0001">
<name>General lubricant</name>
<identNumber>
<manufacturerCode>KZ222</manufacturerCode>
<partAndSerialNumber>
```

```
<partNumber>LL-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity>As required</reqQuantity>
</supplyDescr>
</supplyDescrGroup>
</reqSupplies>
<reqSpares>
<noSpares/>
</reqSpares>
<reqSafety>
<noSafety/>
</reqSafety>
</preliminaryRqmts>
```

## 2.1 Production maintenance data

**Description:** The element <`productionMaintData`> contains the basic information required for the planning and preparation of the task.

**Markup element:** <`productionMaintData`> (O)

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*Fig 2 Element <`productionMaintData`>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <`thresholdInterval`> (O), repeatable. The threshold intervals, Refer to Para 2.1.1.
- <`zoneRef`> (O), repeatable. The references to the zones. Refer to Para 2.1.2.
- <`accessPointRef`> (O), repeatable. The references to the access points. Refer to Para 2.1.3.
- <`workArea`> (O), the descriptive identifier of the area where work is accomplished that cannot be deduced from the names of the collection of zones. Refer to Para 2.1.4.
- <`taskDuration`> (O), the maintenance task duration. Refer to Para 2.1.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of production maintenance data

**Markup example:**

```
<productionMaintData>
<workArea>Stem</workArea>
</productionMaintData>
```

### 2.1.1 Threshold interval

**Description:** The element <thresholdInterval> contains any (one or more) threshold interval information that is relevant to the task. It is populated in the format of threshold or threshold interval value, eg 25 (followed by the value of the attribute unitOfMeasure, eg FH).

**Markup element:** <thresholdInterval> (O), repeatable

**Attributes:**

– thresholdUnitOfMeasure (M), the unit of measurement for the threshold interval. This attribute can have the following values:
  - "th01" thru "th99". Refer to Chap 3.9.6.1.

**Recommendation**: The use of the element <thresholdInterval> can interfere with the same data given in the maintenance planning information data modules. A close coordination must be taken if the same data is given in both the procedure and the maintenance planning information. It is recommended to use the maintenance planning information in preference of the element <thresholdInterval> in each procedural data module.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element <thresholdInterval>

**Markup example:**

The following example is a threshold interval indicating 25 flight hours. The attribute thresholdUnitOfMeasure set to "th01" indicates flight hours as specified in Chap 3.9.6.1.

```
<thresholdInterval
thresholdUnitOfMeasure="th01">25</thresholdInterval>
```

The following example is a threshold interval indicating 55 to 60 days. The attribute thresholdUnitOfMeasure set to "th06" indicates flight hours as specified in Chap 3.9.6.1.

```
<thresholdInterval thresholdUnitOfMeasure="th06">55 to
60</thresholdInterval>
```

### 2.1.2 Zone

**Description:** The element <zoneRef> contains the zoning information (one or more), as described in Chap 3.4. For the use of element <zoneRef> in connection with technical information repositories, refer to Chap 4.13.2.

**Markup element:** <zoneRef> (O), repeatable

**Attributes:**

- zoneNumber (O), the zone identifier
- id (O), the identifier of the <zoneRef> element. Refer to Chap 3.9.5.2.1.2.
- lsarData (O), a mark to identify if the reference is derived from a Logistics Support Analysis Record (LSAR) or not. This attribute can have the following values:
  - "0" (D) - No, when not derived from an LSAR
  - "1" - Yes, when derived from an LSAR
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <name> (O), the name of the zone. Refer to Chap 3.9.5.2.1.10.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <zoneRef>

**Markup example:**

Example of zone with a name, zone number and indicating the use of LSAR data.

```
<zoneRef lsarData="1" zoneNumber="500">
<name>Left wing</name>
</zoneRef>
```

### 2.1.3 Access point

**Description:** The element <accessPointRef> describe/identify any (one or more) access points like panels, doors, hatches. The identifier of the access point is given either through the attribute accessPointNumber or the element <name> element <refs>. For the use of element <accessPointRef> in connection with technical information repositories, refer to Chap 4.13.2.

**Markup element:** <accessPointRef> (O), repeatable

**Attributes:**

- id (O), the identifier of the <accessPointRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- accessPointNumber (O), the identifier of the access point

- accessPointTypeValue (O), the access point type. This attribute can have the following values:
  - "accpnl01" - "accpnl99". Refer to Chap 3.9.6.1.
- lsarData (C), a mark to identify if the reference is derived from an LSAR or not. This attribute can have the following values:
  - "0" (D) - No, when not derived from an LSAR
  - "1" - Yes, when derived from an LSAR
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <name> (O), the name of the zone. Refer to Chap 3.9.5.2.1.10.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <accessPointRef>

**Markup example:**

Example of an access point with a name, access point number, and indicating the use of LSAR data.

```
<accessPointRef accessPointNumber="2514VU" lsarData="1">
<name>Panel A</name>
</accessPointRef>
```

### 2.1.4 Work area

**Description:** The element <workArea> contains a descriptive identifier of the area where work is accomplished that cannot be deduced from the names of the collection of zones.

**Markup element:** <workArea> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <workArea>

**Markup example:**

```
<workArea>Nose cowl</workArea>
```

### 2.1.5 Maintenance task duration

**Description:** The element <taskDuration> contains the (one) elapsed time necessary to achieve the maintenance action.

**Markup element:** <taskDuration> (O)

**Attributes:**

- id (O), the identifier of the <taskDuration> element. Refer to Chap 3.9.5.2.1.2.
- unitOfMeasure (M), the unit of measure
- startupDuration (M), the duration for performing Preliminary requirements
- procedureDuration (M), the duration for performing the Procedure
- closeupDuration (M), the duration for performing the Requirements after job completion

The durations must be composed of maximum four numeric characters including the decimal separator. This value must be given in hours and tenths of an hour. The time unit is manhour corresponding to a workload for **one man** during one hour.

The total elapsed time for the maintenance task is built up by populating all three attributes startupDuration, procedureDuration and closeupDuration.

**Recommendation**: The use of the element <taskDuration> can interfere with the same data given in the maintenance planning information data modules. A close coordination must be taken if the same data is given in both the procedure and the maintenance planning information. It is recommended to use the maintenance planning information in preference of the element <taskDuration> in each procedural data module.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <taskDuration>

**Markup example:**

```
<taskDuration closeupDuration="0.5" procedureDuration="3.0"
startupDuration="1.5" unitOfMeasure="h"/>
```

## 2.2 Required conditions

**Description:** This element <reqCondGroup> contains any required conditions information. Required conditions are actions to be done and/or conditions that must be satisfied before the Procedure which is the subject of the data module is started.

**Markup element:** <reqCondGroup> (M)

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*Fig 3 Element <reqCondGroup>*

**Attributes:**

– None

**Child elements:**

– <noConds> (C). Refer to Para 2.2.1.

or one or more of the following:

– <reqCondNoRef> (C), any simple action/condition with no referenced data module or technical publication. Refer to Para 2.2.2.
– <reqCondCircuitBreaker> (C), the circuit breaker actions/conditions. Refer to Para 2.2.3.1.1.
– <reqCondDm> (C), any actions/conditions referenced to a data module. Refer to Para 2.2.3.
– <reqCondPm> (C), any actions/conditions referenced to a publication module. Refer to Para 2.2.6.
– <reqCondExternalPub> (C), any actions/conditions referenced to a non S1000D publication. Refer to Para 2.2.7.

In process data modules, each element can also include the element <variablePostSet> used to update the state information about the state of the Product. For example, if there were a required condition that Door 12 is Open, at some point an assertion can be made to the state information that Door 12 is open which can then impact maintenance instructions to follow. Refer to Chap 3.9.5.2.10.

**Note**

The required actions/conditions must be listed in the order that they must be carried out to accomplish the Procedure.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqCondGroup>
<reqCondNoRef>
<reqCond>The bicycle is outdoors.</reqCond>
```

```
</reqCondNoRef>
</reqCondGroup>
```

### 2.2.1 No conditions

**Description:** The element <noConds> contains the "marker" for no required actions/conditions. If there are no required actions/conditions for the Procedure then the element <noConds> must be used.

**Markup element:** <noConds> (C)

**Note**

When a data module is formatted, the element <noConds> generates the word "None".

For page-oriented presentation "None" is given in the Title/Condition column of the Required conditions table.

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqCondGroup>
<noConds/>
</reqCondGroup>
```

### 2.2.2 Required condition - simple action/condition

**Description:** The element <reqCondNoRef> contains the action/condition on its own with no referenced data module or technical publication to represent a simple one step action/condition that does not require further explanation.

The text of a required action must be written as an instruction that can be carried out, by a trained mechanic, without any additional information. For example, write "Remove the blanks from all orifices" or "Make sure the blanks are removed from all orifices".

The text of a required condition must be written as a statement that can be evaluated true or false. For example, write "The blanks are removed from all orifices".

**Markup element:** <reqCondNoRef> (C)

ICN- S3627-S1000D0526-A-01-1

*Fig 4 Element <reqCondNoRef>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`reqCondNoRef`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`reqCond`> (C), refer to Para 2.2.3.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<reqCondNoRef>
<reqCond>The bicycle is outdoors</reqCond>
</reqCondNoRef>
```

### 2.2.3 Required conditions - referenced data module

**Description:** The element <`reqCondDm`> contains the required action/condition when satisfied by completing a Procedure that is described in a separate data module.

The element <`reqCondDm`> is used to describe the required action/condition and the element <`dmRef`> to contain the reference to the data module that gives the Procedure to fulfill the condition.

The required action/condition must be equivalent to the full Procedure in the referenced data module.

The text of a required action must be written as a statement that can be carried out, by a trained mechanic, with support of the referenced data module if needed. For example, write "Make the engine safe for maintenance".

The text of a required condition must be written as a statement that can be evaluated true or false with support of the referenced data module if needed. For example, write "The engine is safe for maintenance" or "Make sure the engine is safe for maintenance".

**Markup element:** <reqCondDm> (C)

ICN- S3627-S1000D0527-001-01

*Fig 5 Element <reqCondDm>*

**Attributes:**

– Includes the same set of attributes as the element <reqCondNoRef>. Refer to Para 2.2.2.

**Child elements:**

– <reqCond> (C). Refer to Para 2.2.3.1.1.
– <dmRef> (C). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqCondDm>
<reqCond>The tire is removed.</reqCond>
<dmRef xlink:type="simple" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="URN:S1000D:">
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE"  systemDiffCode="AAA"
systemCode="DA0"  subSystemCode="1"  subSubSystemCode="0"
assyCode="20"  disassyCode="00"  disassyCodeVariant="AA"
infoCode="215"  infoCodeVariant="A"  itemLocationCode="A">
</dmCode>
</dmRefIdent>
</dmRef>
</reqCondDm>
```

*2.2.3.1.1 Required condition*

**Description:** The element <reqCond> contains the required action/condition statement, such as "Open the circuit breaker:" or "Make sure the circuit breaker is open, safetied/locked and tagged:" (which might require a separate Procedure).

**Markup element:** <reqCond> (C)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `reqCondCategory`, the category of the condition, eg special environmental conditions such as reduced lighting, ventilation, and temperature. The attribute can have the following values:
  - "`rcc01`" thru "`rcc99`". Refer to Chap 3.9.6.1.

**Child elements:**

- <`internalRef`> (O). Refer to Chap 3.9.5.2.1.10.
- <`indexFlag`>(O). Refer to Chap 3.9.5.2.1.10.
- <`symbol`>(O). Refer to Chap 3.9.5.2.1.10.
- <`subScript`>(O). Refer to Chap 3.9.5.2.1.10.
- <`superScript`>(O). Refer to Chap 3.9.5.2.1.10.
- <`footnoteRef`> (O). Refer to Chap 3.9.5.2.1.10.
- <`acronym`> (O). Refer to Chap 3.9.5.2.1.10.
- <`acronymTerm`> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<reqCond>The tire is removed.</reqCond>
```

### 2.2.4 Required conditions - circuit breaker list

**Description:** The element <`reqCondCircuitBreaker`> contains a set of circuit breaker actions (open or close)/conditions (open or closed) before the performance of the task.

**Markup element:** <`reqCondCircuitBreaker`> (C)

ICN- S3627-S1000D0528-001-01

*Fig 6 Element <`reqCondCircuitBreaker`>*

**Attributes:**

- Includes the same set of attributes as the element <`reqCondNoRef`>. Refer to Para 2.2.2.

**Child elements:**

- <`reqCond`> (C). Refer to Para 2.2.3.1.1.
- <`circuitBreakerDescrGroup`> (C). Refer to Para 2.2.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of list of the element <`reqCondCircuitBreaker`>

**Markup example:**

```
<reqCondCircuitBreaker>
<reqCond>Make sure the circuit breaker is open, safetied/locked
and tagged.</reqCond>
</reqCondCircuitBreaker>
```

### 2.2.5 Circuit breaker description group

**Description:** The element <circuitBreakerDescrGroup> contains the circuit breaker lists information.

**Markup element:** <circuitBreakerDescrGroup> (C)

ICN- S3627-S1000D0445-001-01

*Fig 7 Element <circuitBreakerDescrGroup>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <circuitBreakerDescrGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- circuitBreakerAction (O), the action to perform on the whole set of circuit breaker described in the table. This attribute can have the following values:
  - "open" - the action "to open"
  - "close" - the action "to close"
  - "verify-open" - the check of the condition: "is open"
  - "verify-closed" - the check of the condition: "is closed"
- checkSum (O), the entered data which allows potential integrity verification
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <circuitBreakerDescrSubGroup> (C)

**Business rules decisions:**

- None identified

**Markup example:**

```
<circuitBreakerDescrGroup circuitBreakerAction="open">
<circuitBreakerDescrSubGroup>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="42RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>MMR-1 (ILS+GPS)</name>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="800RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>GLIDE ANT2 SWGT RELAY</name>
<circuitBreakerLocation>SSPC</circuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
</circuitBreakerDescrGroup>
```

*2.2.5.1.1 Circuit breaker description subgroup*

**Description:** The element <`circuitBreakerDescrSubGroup`> contains one or more sub circuit breaker lists.

**Markup element:** <`circuitBreakerDescrSubGroup`> (C)

**Attributes:**

- `circuitBreakerAction` (O), the action to perform on the whole set of circuit breaker described in the table. This attribute can have the following values:
  - "`open`" - the action "to open"
  - "`close`" - the action "to close"
  - "`verify-open`" - the check of the condition: "is open"
  - "`verify-closed`" - the check of the condition: "is closed"
- `checkSum` (O), the entered data which allows potential integrity verification
- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`circuitBreakerDescrGroup`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`functionalItemRef`> (O) which indicates the particular context for this set of circuit breakers as described in Chap 3.9.5.1.
- <`circuitBreakerDescr`> (C) describing each circuit breaker. Refer to Para 2.2.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<circuitBreakerDescrSubGroup>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="42RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>MMR-1 (ILS+GPS)</name>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="800RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>GLIDE ANT2 SWGT RELAY</name>
<circuitBreakerLocation>SSPC</circuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
```

2.2.5.1.2 *Circuit breaker description*

**Description:** The element <`circuitBreakerDescr`> contains the information on individual circuit breakers.

**Markup element:** <`circuitBreakerDescr`> (C)

ICN- S3627-S1000D0529-001-01

*Fig 8 Element <`circuitBreakerDescr`>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`circuitBreakerDescr`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <circuitBreakerRef> (C), the circuit breaker number, circuit breaker action and circuit breaker type. Refer to Para 2.2.5.1.3.
- <name> (C), the name of the circuit breaker. Refer to Chap 3.9.5.2.1.10.
- <internalRef> (O), the cross-reference to the access point introduced in the product management data, element <productionMaintData>
- <accessPointRef> (O), the identifier of the access point allowing to manipulate the circuit breaker. Refer to Para 2.1.3.
- <circuitBreakerLocation> (O), the circuit breaker location in the circuit breaker panel by entering text. Refer to Para 2.2.5.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="42RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>MMR-1 (ILS+GPS)</name>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
```

**Markup example:**

```
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerNumber="800RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
<name>GLIDE ANT2 SWGT RELAY</name>
<circuitBreakerLocation>SSPC</circuitBreakerLocation>
</circuitBreakerDescr>
```

*2.2.5.1.3 Circuit breaker reference*

**Description:** The element <circuitBreakerRef> contains the details about the circuit breaker, eg number, circuit breaker action and circuit breaker type.

**Markup element:** <circuitBreakerRef> (C)

**Attributes:**

- id (O), the identifier of the <circuitBreakerRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- circuitBreakerNumber (C), the circuit breaker identifier (number)
- circuitBreakerType (O), the circuit breaker type. The attribute can have the following values:
  - "eltro" - electronic circuit breakers
  - "elmec" - electro mechanic circuit breakers
  - "clip" - dummy circuit breakers for provisioning use
- circuitBreakerAction (O), the action to perform on the whole set of circuit breaker described in the table. This attribute can have the following values:
  - "open" - the action "to open"
  - "close" - the action "to close"

- "verify-open" - the check of the condition: "is open"
- "verify-closed" - the check of the condition: "is closed"

– checkSum (O), the entered data which allows potential integrity verification
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <name> (O), the name of the zone. Refer to Chap 3.9.5.2.1.10.
– <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<circuitBreakerRef circuitBreakerNumber="42RT"
circuitBreakerType="elmec">
</circuitBreakerRef>
```

*2.2.5.1.4 Circuit breaker location*

**Description:** The element <circuitBreakerLocation> contains the textual description of the circuit breaker location in the circuit breaker panel.

**Markup element:** <circuitBreakerLocation> (O)

**Attributes:**

– id (O), the identifier of the <circuitBreakerLocation> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<circuitBreakerLocation>0867</circuitBreakerLocation>
```

– Required conditions - circuit breaker list - Markup example

Example 1: Access point identifier given by element <accessPointRef>

```
<reqCondCircuitBreaker>
<reqCond>Make sure the circuit breaker is open, safetied/locked
and tagged:</reqCond>
<circuitBreakerDescrGroup circuitBreakerAction="open">
<circuitBreakerDescrSubGroup>
```

```
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="42RT"/>
<name>MMR-1 (ILS+GPS)</name>
<accessPointRef accessPointNumber="2501VU"
accessPointTypeValue="accpnl02"/>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="800RT"/>
<name>GLIDE ANT2 SWGT RELAY</name>
<accessPointRef accessPointNumber="2502VU"
accessPointTypeValue="accpnl02"/>
<circuitBreakerLocation>SSPC</circuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
</circuitBreakerDescrGroup>
</reqCondCircuitBreaker>
<reqCondCircuitBreaker>
<reqCond>Open the circuit breaker:</reqCond>
<circuitBreakerDescrGroup circuitBreakerAction="open">
<circuitBreakerDescrSubGroup>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="44RT"/>
<name>MMR-2 (ILS+GPS)</name>
<accessPointRef accessPointNumber="2514VU"
accessPointTypeValue="accpnl02"/><circuitBreakerLocation>0867</c
ircuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
</circuitBreakerDescrGroup>
</reqCondCircuitBreaker>
```

Example 2: Access point identifier given by element <internalRef> (to element <accessPointRef> within element <productionMaintData>).

```
<reqCondCircuitBreaker>
<reqCond>Make sure the circuit breaker is open, safetied/locked
and tagged:</reqCond>
<circuitBreakerDescrGroup circuitBreakerAction="open">
<circuitBreakerDescrSubGroup>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="42RT"/>
<name>MMR-1 (ILS+GPS)</name>
<internalRef internalRefTargetType="other"
internalRefId="accessPointRef-0041"/>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="800RT"/>
```

```
<name>GLIDE ANT2 SWGT RELAY</name>
<internalRef internalRefTargetType="other"
internalRefId="accpnl-0052"/>
<circuitBreakerLocation>SSPC</circuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
</circuitBreakerDescrGroup>
</reqCondCircuitBreaker>
<reqCondCircuitBreaker>
<reqCond>Open the circuit breaker:</reqCond>
<circuitBreakerDescrGroup circuitBreakerAction="open">
<circuitBreakerDescrSubGroup>
<circuitBreakerDescr>
<circuitBreakerRef circuitBreakerType="elmec"
circuitBreakerNumber="44RT"/>
<name>MMR-2 (ILS+GPS)</name>
<internalRef internalRefTargetType="other"
internalRefId="accpnl-0042"/>
<circuitBreakerLocation>0867</circuitBreakerLocation>
</circuitBreakerDescr>
</circuitBreakerDescrSubGroup>
</circuitBreakerDescrGroup>
</reqCondCircuitBreaker>
```

### 2.2.6 Required conditions - referenced publication module

**Description:** The element <reqCondPm> contains the required action/condition when they are contained in another publication module.

The element <reqCond> is used to describe the required action/condition and the element <pmRef> to contain the publication module identifier.

**Note**

The use of element <reqCondPm> needs a clear reference to the procedure needed to do the action or fulfill the condition. A general reference to eg a component maintenance publication can hinder the mechanic to do the job and also the automated generation of situation adopted maintenance procedures.

**Markup element:** <reqCondPm> (C)

**Attributes:**

– Includes the same set of attributes as the element <circuitBreakerDescr>. Refer to Para 2.2.5.1.2.

**Child elements:**

– <reqCond> (C). Refer to Para 2.2.3.1.1.
– <pmRef> (C). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqCondPm>
<reqCond>Gather the following publication.</reqCond>
```

```
<pmRef>
<pmRefIdent>
<pmCode modelIdentCode="FRIGATE124ALFA" pmIssuer="01233"
pmNumber="01234"
pmVolume="01"/>
</pmRefIdent>
</pmRef>
</reqCondPm>
```

### 2.2.7 Required conditions - referenced non S1000D publication or document

**Description:** The element <reqCondExternalPub> contains the required action/condition when are contained in a non S1000D publication or document.

The element <reqCond> is used to describe the required action/condition and the element <externalPubRef> to contain the publication or document identifier.

**Note**

The use of element <reqCondExternalPub> needs a clear reference to the procedure needed to do the action or fulfill the condition. A general reference to eg a component maintenance publication can hinder the mechanic to do the job and also the automated generation of situation adopted maintenance procedures.

**Markup element:** <reqCondExternalPub> (C)

**Attributes:**

– Includes the same set of attributes as the element <circuitBreakerDescr>. Refer to Para 2.2.5.1.2.

**Child elements:**

– <reqCond> (C). Refer to Para 2.2.3.1.1.
– <externalPubRef> (C). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqCondExternalPub>
<reqCond>Safely discard the horn that you removed</reqCond>
<externalPubRef><externalPubRefIdent><externalPubTitle>Local
Disposal Procedures</externalPubTitle>
</externalPubRefIdent></externalPubRef>
</reqCondExternalPub>
```

## 2.3 Required persons

**Description:** The element <reqPersons> contains the information on the required personnel for the task.

A program can choose to identify the number of a certain skill (category, skill level, trade) that is required. A program choosing this method must use the element <personnel> in conjunction with the attribute numRequired.

If there are requirements for a specific man, then the element <person> must be used. This element has the attribute man, which must be used to indicate the particular person (eg man "B"). This method identifies each person required to do the Procedure together with the

appropriate information as defined by the project: category, skill level, trade/trade code and estimated time spent per person.

If none of the element <reqPersons> is used this will be regarded as "As required".

Required persons can be represented by a mix of populated element <reqPersons> and element <person>.

**Markup element:** <reqPersons> (O)

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*Fig 9 Element <reqPersons>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <circuitBreakerDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <personnel> (O), the required personnel when the number of a certain skill is required. Refer to Para 2.3.1.

– <person> (O), the required personnel when skill per individual is required. Refer to Para 2.3.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of element <reqPersons>

**Markup example:**

```
<reqPersons>
<person man="A"></person>
</reqPersons>
```

### 2.3.1 Personnel

**Description:** The element <personnel> contains the information on the required personnel for the task by grouping the personnel by category, skill level and trade/trade code together with the number of personnel of a certain skill (category, skill level, trade).

If the number of personnel of a specific category, skill level or trade is not defined in the element <person> the absence of a specified quantity indicates as "As required".

**Note**

At page oriented presentation "As required" is given in the Person column of the Required persons table.

If the attribute numRequired is used, then the number required will be presented with the skill level in parentheses.

**Markup element:** <personnel> (O)

**Attributes:**

– id (O), the identifier of the <personnel> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– numRequired (O), the number of personnel for a certain combination of category, skill level and trade
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <personCategory> (O), refer to Para 2.3.1.1.1.
– <personSkill> (O) refer to Para 2.3.1.1.2.
– <trade> (O) refer to Para 2.3.1.1.3.
– <estimatedTime> (O) refer to Para 2.3.1.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<personnel numRequired="2">
<personCategory personCategoryCode="Electrician"/>
<personSkill skillLevelCode="sk01"/>
<trade>AF901</trade>
```

```
<estimatedTime unitOfMeasure="h">1,5</estimatedTime>
</personnel>
```

*2.3.1.1.1 Category*

**Description:** The element <personCategory> contains the required category level of the person.

**Markup element:** <personCategory> (O)

**Attributes:**

- id (O), the identifier of the <personCategory> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- personCategoryCode (C), the typed in category level of the person
- numRequired (O), the number of personnel for a certain combination of category, skill level and trade
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- values for the attribute personCategoryCode

**Markup example:**

```
<personCategory personCategoryCode="Electrician"/>
```

*2.3.1.1.2 Skill level*

**Description:** The element <personSkill> contains the required skill level of the person. This represents the skill level that the person must have attained to be able to perform his or her role in the Procedure and is, eg Basic, Intermediate or Advanced.

**Markup element:** <personSkill> (O)

**Attributes:**

- id (O), the identifier of the <personSkill> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (C), the skill level of the person. The attribute can have the following values:
  - "sk01" thru "sk99". Refer to Chap 3.9.6.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

– None identified

**Markup example:**

```
<personSkill skillLevelCode="sk01"/>
```

2.3.1.1.3 *Trade/trade code*

**Description:** The element <trade> contains the typed in required trade code of the person. Care must be taken when using this element when the product is, for example, multi-national or multi-customer. The trade or trade code or both is typed in.

**Markup element:** <trade> (O)

**Attributes:**

– id (O), the identifier of the <personSkill> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– list of trade codes

**Markup example:**

```
<trade>AF901</trade>
```

2.3.1.1.4 *Estimated time*

**Description:** The element <estimatedTime> contains the estimate of the time that the person will be required on the task. The time must be given in hours with one decimal, eg 2,4 h, or days, eg 1,5 d. The time and unit of measurement must be entered.

**Markup element:** <estimatedTime> (O)

**Attributes:**

– unitOfMeasure (C), the unit of measure
– id (O), the identifier of the <personSkill> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<estimatedTime unitOfMeasure="h">1,5</estimatedTime>
```

## 2.3.2 Person

**Description:** The element <person> contains the skill information on the required personnel for the task when there are requirements to individually specify the personnel.

Each person must be given an identifier in the attribute man. Eg A, B and C to represent "Man A", "Man B" and "Man C" respectively.

**Note**

The use of element <person> generates at presentation the word "Man" before the value of attribute man. At page-oriented presentation "Man A", etc, is given in the Person column of the Required persons table.

**Note**

The Procedure must be written from the point of view of "Man A".

**Markup element:** <person> (O)

**Attributes:**

- id (O), the identifier of the <person> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- man (O), the alphabetic identifier of the person, starting from A
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- Includes the same set of subelements as the element <personnel>. Refer to Para 2.3.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<person man="A">
<personCategory personCategoryCode="Electrician"/>
<personSkill skillLevelCode="sk02"/>
<trade>AF901</trade>
<estimatedTime unitOfMeasure="h">1,5</estimatedTime>
</person>
```

Markup using the element <person>:
In the following example, Man A is required for 1,5 hours and is an electrician (represented in this project by the category Electrician) of basic skill level (represented by the attribute value "sk01"). Electricians have the trade code AF901.

Man B is a propulsion engineer (represented in this project by the category code PE) who is required for 2,5 hours. Man B must be of intermediate skill level (represented by the attribute value "sk02"). The trade code for propulsion engineers is AF903.

Supervisors (as many as required to monitor and check the task) are required. These must be of advanced skill level (represented in this project by attribute value "sk03"). The trade code AF092 represents supervisors.

```
<reqPersons>
<personnel>
<personCategory personCategoryCode="SPRVR"/>
<personSkill skillLevelCode="sk03"/>
<trade>AF092</trade>
</personnel>
<person man="A">
<personCategory personCategoryCode="Electrician"/>
<personSkill skillLevelCode="sk01"/>
<trade>AF901</trade>
<estimatedTime unitOfMeasure="h">1,5</estimatedTime>
</person>
<person man="B">
<personCategory personCategoryCode="PE"/>
<personSkill skillLevelCode="sk02"/>
<trade>AF903</trade>
<estimatedTime unitOfMeasure="h">2,5</estimatedTime>
</person>
<personnel>
<personCategory personCategoryCode="SPRVR"/>
<personSkill skillLevelCode="sk03"/>
<trade>AF902</trade>
</personnel>
</reqPersons>
```

## 2.4 Required technical information

**Description:** The element <reqTechInfoGroup> contains references to any technical documents that are required, in addition to the actual data module, for the maintainer to complete the procedure. The list is not a reference list but can be equated to a special tool that needs to be selected. For example, required technical info can be engineering drawings not included in the data module that the maintainer needs to check out of a drawing library in order to complete the maintenance tasks.

**Markup element:** <reqTechInfoGroup> (O)

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*Fig 10 Element <reqTechInfoGroup>*

**Attributes:**

– None

**Child elements:**

– <reqTechInfo> (M). Refer to Para 2.4.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the element <reqTechInfoGroup>

**Markup example:**

```
<reqTechInfoGroup>
<reqTechInfo>
<externalPubRef>
<externalPubRefIdent>
<externalPubTitle>Power Supply Schematic
(132E470092)</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
</reqTechInfo>
</reqTechInfoGroup>
```

### 2.4.1 Required technical information

**Description:** The element <reqTechInfo> contains the content of <reqTechInfoGroup>.

**Markup element:** <reqTechInfo> (O)

**Attributes:**

– reqTechInfoCategory, (O), the type of information. The attribute can have the following values:
  - "ti01" thru "ti99". Refer to Chap 3.9.6.1.

**Child elements:**

– <dmRef> (O), refer to Chap 3.9.5.2.1.2.
– <pmRef> (O), refer to Chap 3.9.5.2.1.2.
– <externalPubRef>(O), refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqTechInfo>
<externalPubRef>
<externalPubRefIdent>
<externalPubTitle>Power Supply Schematic
(132E470092)</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
</reqTechInfo>
```

## 2.5 Required support equipment

**Description:** The element <reqSupportEquips> must contain information to list any support equipment including special tools, required to accomplish the Procedure contained in the data module. Common types of test equipment such as voltmeters, signal generators and

continuity testers must be listed. Common tools that are part of a standard tool kit must not be listed.

Support equipment must be identified by the name of the support equipment, identification and a quantity. As an identification number, the CSN/ISN identifier given in S2000M is recommended in order to provide a direct link to the IPD at the relevant location.

If there is no support equipment required, then the element <noSupportEquips> must be used.

**Note**

The use of element <noSupportEquips> generates at presentation "None". At page-oriented presentation "None" is given in the Name column of the Support equipment table.

**Markup element:** <reqSupportEquips> (M)

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*Fig 11 Element <reqSupportEquips>*

**Attributes:**

– None

**Child elements:**

– <noSupportEquips> (O), the indicator of no required support equipment as given in the description above
– <supportEquipDecsrGroup> (O), contains one or more of the element <supportEquipDescr> (C). Refer to Para 2.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– listing of common and standard tools

**Markup example:**

```
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0001">
<name>Specialist toolset</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
```

```
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
```

The following example, using a CSN reference, shows two support equipment items that are required:

```
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0001">
<name>Extractor, Left-handed, Puller</name>
<catalogSeqNumberRef catalogSeqNumberValue="11223301 002A"/>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0002">
<name>Extractor, Right-handed, Puller</name>
<catalogSeqNumberRef catalogSeqNumberValue="11223301 001 "
itemSeqNumberValue="00A"/>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
```

The following example, using a NATO stock number identification, shows two support equipment items that are required:

```
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0028">
<name>Extractor, D-Puller, Left-hand</name>
<natoStockNumber>4920991234567</natoStockNumber>
<identNumber> <manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber>
<partNumber>JJ134252</partNumber></partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0312">
<name>Extractor, D-Puller, Right-hand</name>
<natoStockNumber>4290991234561</natoStockNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
```

The following example, using a NATO stock number identification broken into its constituent parts, together with a part number:

```
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0212">
<name>Extractor, D-Puller, Left-hand</name>
<natoStockNumber natoSupplyClass="4920"
natoCodificationBureau="99" natoItemIdentNumberCore="1234567"/>
<identNumber> <manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>JJ134252</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0041">
<name>Extractor, D-Puller, Right-hand</name>
```

```
<natoStockNumber natoSupplyClass="4290"
natoCodificationBureau="99" natoItemIdentNumberCore="1234561"/>
<identNumber> <manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>JJ134259</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
```

The following example, using a part number identification, shows two support equipment items that are required:

```
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0101">
<name>Extractor, Left-handed, Puller</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>JJ123452</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0002">
<name>Extractor, Right-handed, Puller</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>JJ123456</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
```

### 2.5.1 Support equipment description

**Description:** The element <supportEquipDescr> contains the information on each item of support equipment.

**Markup element:** <supportEquipDescr> (C)

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*Fig 12 Element <supportEquipDescr>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`supportEquipDescr`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`name`> (O). Refer to Para 2.5.1.1.1.
- <`shortName`> (O). Refer to Para 2.5.1.1.2.
- The identification by one or more of the elements <`catalogSeqNumberRef`> <`natoStockNumber`>, <`identNumber`> and <`toolRef`>. Refer to Para 2.5.1.1.3.
- <`reqQuantity`> (C). Refer to Para 2.5.1.1.12.
- <`remarks`> (O). Refer to Para 2.5.1.1.13.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute `id`

**Markup example:**

```
<supportEquipDescr id="seq-0001">
<name>Specialist toolset</name>
<identNumber>
```

```
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
```

*2.5.1.1.1 Name of the support equipment element*

The element <name> contains the name of the support equipment. If the technical repository is used in the authoring process, the name of the support equipment is optional as it will be populated during the publication process. Refer to Chap 3.9.5.2.1.10.

*2.5.1.1.2 Shortname*

**Description:** The element <shortName> contains an abbreviated alternate name of the support equipment part designation corresponding to the element <name>. This short form for the name of the part designation is meant to be presented in the narrative of the data module to make the reading easier.

**Markup element:** <shortName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<name>Specialist toolset</name>
```

*2.5.1.1.3 Identification*

One or more of the following elements can be used to identify the support equipment:

– <catalogSeqNumberRef> (O), the CSN. Refer to Para 2.5.1.1.4.
– <natoStockNumber> (O), the North Atlantic Treaty Organisation (NATO) stock number. Refer to Para 2.5.1.1.5.
– <identNumber> (O), the identification number. Refer to Para 2.5.1.1.6.
– <toolRef> (O), the tool reference. Refer to Para 2.5.1.1.9.

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*Fig 13 Identification elements*

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of identification

*2.5.1.1.4 Catalog sequence number - CSN*

**Description:** The element <`catalogSeqNumberRef`> contains the link to the associated parts data module.

The CSN reference using only attribute `catalogSeqNumberValue` is the preferred method. The CSN can also be referenced by the use of both attribute `catalogSeqNumberValue` and attribute `itemSeqNumberValue`.

**Note**

The use of attribute `catalogSeqNumberValue` only, gives a generic reference to an item and no change is needed when a new specific part instance is added to the CSN in the IPD.

The CSN (attribute `catalogSeqNumberValue`) must consist of a 13 thru 16 character string, eg value "`11223301A002A`".

The CSN must be populated with all the 13 thru 16 characters. If there is no character in a position this position must be represented by a space. Eg value "`11223301 002A`".

The Item Sequence Number, ISN, (attribute `itemSeqNumberValue`) must consist of three characters, eg value "`01A`". All three positions must to be filled in.

**Note**

The CSN is 13 thru 16 characters depending on the project data module code rules. Refer to Chap 3.9.5.2.7 for details.

For details on CSN and ISN, refer to Chap 3.9.5.2.7.

**Markup element:** <`catalogSeqNumberRef`> (O)

**Attributes:**

- `id` (O), the identifier of the <`catalogSeqNumberRef`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `catalogSeqNumberValue` (C)
- `itemSeqNumberValue` (O), the Item Sequence Number, ISN, is used to specify a specific part instance of a CSN. For details on ISN, refer to Chap 3.9.5.2.7.
- `initialProvisioningProjectValue` (O), the Initial Provisioning project Number, Initial Provisioning project Number (IPPN) must be populated when the CSN belongs to a non-chapterized IPD. The IPPN must consist of nine characters comprising the five characters for the CAGE code and the four characters for the IPPN. Eg value "`F611799AA`". Used for non-chapterized IPD only.
- `responsiblePartnerCompanyCode` (O), the Responsible Partner Company, Responsible Partner Company (RPC), code can be filled in when the CSN belongs to a non-chapterized IPD. This is used to manage the corresponding IPD data module code from which the CSN belongs to, as this data module code is built with the RPC code, Refer to Chap 5.3.1.3. Used for non-chapterized IPD only.

  **Note**

  The attribute `responsiblePartnerCompanyCode` is optional for non-chapterized CSN reference, as it also can be deduced from the IPPN CAGE code (the first five digits of attribute `initialProvisioningprojectValue`).

- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.
- `xlink:href` (O), XLink attribute used to specify remote resource. Refer to Chap 7.7.4.
- `xlink:title` (O), XLink attribute used to used to describe the meaning of a link or resource in a human-readable fashion. Refer to Chap 7.7.4.
- `xlink:show` (O), XLink attribute used to used to describe how the reference will show. Refer to Chap 7.7.4. This attribute can have the following values:
  - "`new`", opens a new window to display the information
  - "`replace`", replaces the current window with the displayed information
  - "`embed`", embeds the information inline
  - "`other`", defined by user
  - "`none`", does not display the information

– xlink:acutate (O), XLink attribute used to used to describe if the data will be displayed automatically or on click. Refer to Chap 7.7.4. This attribute can have the following values:
  - "onLoad", displays the information when the page loads
  - "onRequest", displays the information on user click

**Child elements:**

– <refs> (O), to establish a reference to a document containing additional parts data related to the equipment concerned, ie a data module or publication module or some non-S1000D publication. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<catalogSeqNumberRef catalogSeqNumberValue="D00000000A010"
itemSeqNumberValue="00A">...</catalogSeqNumberRef>
```

*2.5.1.1.5 NATO stock number - NSN*

**Description:** The element <natoStockNumber> contains the NATO Stock Number (NSN) of the support equipment. Optionally, the complete NSN can be broken into its constituent parts by using its attributes.

The NATO stock number reference is normally followed by an identification number (manufacturer code and part number).

The NSN (contained in <natoStockNumber>) consists of a 13 character string, eg value "4920991234567" with all positions filled in without any spaces.

**Markup element:** <natoStockNumber> (O)

**Attributes:**

– id (O), the identifier of the <natoStockNumber> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– natoSupplyClass (O), the first part of the NSN
– natoCodificationBureau (O), the second part of the NSN
– natoItemIdentNumberCore(O), the third part of NSN
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

The NSN parts (attribute natoSupplyClass, attribute natoCodificationBureau and attribute natoItemIdentNumberCore) is built up of four, two and seven characters respectively. Eg value "4290" value "99" and value "1234567" respectively.

**Child elements:**

– <fullNatoStockNumber> (O), this element contains all three of the individual elements that make up the complete NSN
– <refs> (O), to establish a reference to a document containing additional parts data related to the equipment concerned, ie a data module or publication module or some non-S1000D publication. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– population of the element <natoStockNumber>

**Markup example:**

```
<natoStockNumber natoCodificationBureau="99"
natoItemIdentNumberCore="123456" natoSupplyClass="4920"/>
```

*2.5.1.1.6 Identification number*

**Description:** The element <identNumber> contains the manufacturer's identification information.

**Markup element:** <identNumber> (O)

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*Fig 14 Element <identNumber>*

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– <manufacturerCode> (C). Refer to Para 2.5.1.1.7.
– <partAndSerialNumber> (O). Refer to Para 2.5.1.1.8.
– <refs> (O), to establish a reference to a document containing additional parts data related to the equipment concerned, ie a data module or publication module or some non-S1000D publication. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
```

2.5.1.1.7 *Manufacturer code*

**Description:** The element <manufacturerCode> contains the manufacturer's code.

**Markup element:** <manufacturerCode> (C)

**Attributes:**

- id (O), the identifier of the <manufacturerCode> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<manufacturerCode>KZ666</manufacturerCode>
```

2.5.1.1.8 *Part and serial number*

**Description:** The element <partAndSerialNumber> contains parts and serial numbers.

**Markup element:** <partAndSerialNumber> (O)

**Attributes:**

- None

**Child elements:**

- <partNumber> (M), the part number
- <serialNumber> (O), the listing of a single serial number or a range. Refer to Para 2.5.1.1.9.

**Business rules decisions:**

- None identified

**Markup example:**

```
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
```

2.5.1.1.9 *Part number*

**Description:** The element <partNumber> contains the part number.

**Markup element:** <partNumber> (C)

**Attributes:**

- id (O), the identifier of the <partNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
```

*2.5.1.1.10 Serial number*

**Description:** The element <`serialNumber`> contains the listing of a single serial number or a range.

**Markup element:** <`serialNumber`> (O)

**Attributes:**

– `serialNumberForm` (C), the is used to specify if the serial number is a single value or a range of values. This attribute can have the following values:
  - "`single`", specifies a single value
  - "`range`", specifies a range of values
– `serialNumberValue` (C), the single value or the range of values. A tilde [~] is used to separate the two values. For example, LKJ123~LKJ777.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
<serialNumber serialNumberValue="LKJ123~LKJ777"
serialNumberForm="range"/>
</partAndSerialNumber>
</identNumber>
```

*2.5.1.1.11 Tool reference*

**Description:** The element <`toolRef`> contains the reference to a tool, for those projects which manage a technical information repository.

**Markup element:** <`toolRef`> (O)

**Attributes:**

- id (O), the identifier of the <toolRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- toolNumber (O), the tool identifier in the tool repository, see Chap 3.9.5.2.11.9
- manufacturerCodeValue (O), the supplier code
- specific (O), the indicator if it is a standard or a specific tool. This attribute can have the following values:
  - "1" (D) - indicates it is a standard tool
  - "0" - all tools that are not specific to the Product, and that are not a "common tool" (standard hand tool), ie it comprises mainly test equipments such as voltmeter or signal generators, but also ladders, platforms, torque wrench with particular value range, etc.
- toolAltFlag (O) the indicator if the tool is an alternative of the previously described tool. This attribute can have the following values:
  - "0" (D) - indicates that it is not an alternate tool
  - "1" - indicates that it is an alternate tool
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <refs> (O), to provide a link to the "Tools" technical information repository data module. Refer to Chap 3.9.5.2.11.9.

  **Note**

  Refer to Chap 4.13.1 for more information on paragraph significant data elements and their relations with their associated technical information repository data modules.

**Business rules decisions:**

- None identified

**Markup example:**

```
<supportEquipDescr>
<toolRef toolNumber="T123"></toolRef>
<reqQuantity>2</reqQuantity>
</supportEquipDescr>
```

*2.5.1.1.12 Quantity*

**Description:** The element <reqQuantity> contains the quantity of the support equipment item.

For items of indeterminate quantity, "As required" must be entered as text in the element <reqQuantity> and no attribute unitOfMeasure value must be specified.

**Markup element:** <reqQuantity> (C)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `unitOfMeasure` (C), the unit of measure. When the unit of measure is just the number of pieces, EA (= each) must be used.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqQuantity>2</reqQuantity>
```

*2.5.1.1.13 Remarks*

**Description:** The element <`remarks`> contains any additional information to support the identification or use of the support equipment. Refer to Chap 3.9.5.1.

## 2.6 Required supplies

**Description:** The element <`reqSupplies`> contains information to list any required supplies.

**Markup element:** <`reqSupplies`> (M)

A list of any consumables (such as oils, greases, locking wire), materials (gasket sheet, sheet metal) and expendables (such as O-rings, gaskets, tab washers) required to accomplish the Procedure contained in the data module. Supplies must be identified by a name of the supply, identification and a quantity as applicable. As an identification number, the CSN/ISN identifier given in S2000M is recommended in order to provide a direct link to the IPD at the relevant location.

The element <`reqSupplies`> contains the same elements and attributes as the element <`reqSupportEquips`> (refer to Para 2.5) with the following exception:

– The element <`supplyDescr`> contains the same subelements as the element <`supportEquipDescr`>, as described at Para 2.5.1, except that element <`toolRef`> is substituted with the element <`supplyRqmtRef`> as described in Para 2.6.1.

If there are no supplies required, then the element <`noSupplies`> must be used.

**Note**

The use of element <`noSupplies`> generates at presentation "None". At page-oriented presentation "None" is given in the Name column of the Consumables, materials and expendables table.

If there are supplies required, then the element <`supplyDescr`>, within the element <`supplyDescrGroup`>, must be used for each consumable, material and expendable.

The attribute `id` in element <`supplyDescr`> can be applied so that the supply can be cross-referenced from the Procedure.

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*Fig 15 Element <reqSupplies>*

Refer to Para 2.6.1 for details on element <supplyRqmtRef>.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqSupplies>
<supplyDescrGroup>
<supplyDescr id="suppliedBy-0054">
<name>Oil, Engine, Gas Turbine</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>OIL-HHGA</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="L">2,0</reqQuantity>
</supplyDescr>
<supplyDescr id="suppliedBy-0302">
<name>Grease, Lubricating</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>GRL-6726</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="L">0,5</reqQuantity>
</supplyDescr>
</supplyDescrGroup>
</reqSupplies>
```

## 2.6.1 Supply requirement reference

**Description**: The element <supplyRqmtRef> contains the reference to a consumable, material and expendable for projects which manage a technical information repository.

**Markup element:** <supplyRqmtRef> (C)

**Attributes:**

- id (O), the identifier of the <supplyRqmtRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- supplyRqmtNumber (C) identifies the consumable in the consumable requirement repository, Refer to Chap 3.9.5.2.11.8.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <refs> (O), to provide a link to the "Supplies, requirements" repository data module. Refer to Chap 3.9.5.2.11.8.

**Note**

Refer to Chap 4.13.1 for more information on paragraph significant data elements and their relations with their associated technical information repository data modules.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute id on the element <internalRef>
- use of identification

**Markup example:**

Simple example:

```
<supplyRqmtRef supplyRqmtNumber="sup-0002"></supplyRqmtRef>
```

The following example shows that two liter of oil and 0,5 liter of grease are required for this Procedure. Here a part number and manufacturer identify the supplies to be used:

```
<reqSupplies>
<supplyDescrGroup>
<supplyDescr id="suppliedBy-0054">
<name>Oil, Engine, Gas Turbine</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>OIL-HHGA</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="L">2,0</reqQuantity>
</supplyDescr>
<supplyDescr id="suppliedBy-0302">
<name>Grease, Lubricating</name>
<identNumber><manufacturerCode>K0378</manufacturerCode>
<partAndSerialNumber><partNumber>GRL-6726</partNumber>
</partAndSerialNumber></identNumber>
<reqQuantity unitOfMeasure="L">0,5</reqQuantity>
</supplyDescr>
</supplyDescrGroup>
</reqSupplies>
```

## 2.7 Required spares

**Description:** This element <reqSpares> must contain information to list any required spares.

**Markup element:** <reqSpares> (M)

A list of any spares required to accomplish the Procedure contained in the data module. Spares must be identified by a name of the spare, identification and a quantity as applicable. As an identification number, the CSN/ISN identifier given in S2000M is recommended in order to provide a direct link to the IPD at the relevant location.

The element <reqSpares> contains the same elements and attributes as the element <reqSupportEquips> (refer to Para 2.5) with the following exception:

– The element <sparesDescr> contains the same subelements as the element <supportEquipDescr>, as described at Para 2.5.1, except that element <toolRef> is substituted with the element <functionalItemRef> as described in Para 2.7.1.

If there are no spares requirements, then the element <noSpares> must be used.

**Note**

The use of element <noSpares> generates at presentation "None". At page-oriented presentation "None" is given in the Name column of the Spares table.

If there are spares required, then the element <spareDescr>, within the element <spareDescrGroup>, must be used for each spare.

The attribute id in element <spareDescr> can be applied so that the spares can be cross-referenced from the Procedure.

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*Fig 16 Element <reqSpares>*

Refer to Para 2.7.1 for details on element <functionalItemRef>.

**Business rules decisions:**

– None identified

**Markup example:**

```
<reqSpares>
<spareDescrGroup>
<spareDescr id="spa-0987">
<name>Blade, LP Compressor</name>
<natoStockNumber natoSupplyClass="2840"
natoCodificationBureau="99" natoItemIdentNumberCore="1234524"/>
<catalogSeqNumberRef catalogSeqNumberValue="72321001A010A"
itemSeqNumberValue="00A"/>
<reqQuantity unitOfMeasure="EA">23</reqQuantity>
</spareDescr>
<spareDescr id="spa-0752">
<name>Retainer, Blade, LP Compressor</name>
<natoStockNumber natoSupplyClass="2840"
natoCodificationBureau="99" natoItemIdentNumberCore="1234584"/>
<catalogSeqNumberRef catalogSeqNumberValue="72321001A040A"
itemSeqNumberValue="00A"/>
<reqQuantity unitOfMeasure="EA">23</reqQuantity>
</spareDescr>
</spareDescrGroup>
</reqSpares>
```

### 2.7.1 Functional item reference

The element <functionalItemRef> is used for projects using functional item number, as introduced in Chap 3.9.5.1. Refer to Chap 3.9.5.1 for detail on population of element <functionalItemRef>.

## 2.8 Required safety

**Description:** The element <reqSafety> must contain information to list any safety requirements.

Any warnings, cautions and notes applicable to the Procedure and the Requirements after job completion in the data module must be listed here.

If there are no safety requirements, then the element <noSafety> must be used.

**Note**

The use of element <noSafety> generates at presentation "None". At page-oriented presentation "None" is given as a text paragraph under the caption Safety conditions.

**Markup element:** <reqSafety> (M)

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*Fig 17 Element <reqSafety>*

**Attributes:**

– None

**Child elements:**

- <noSafety> (O), the indicator of no required safety requirements as given in the description above
- <safetyRqmts> (O). Refer to Para 2.8.1.

**Business rules decisions:**

- None identified

**Markup example:**

The following example shows two warnings in the Safety conditions:

```
<reqSafety>
<safetyRqmts>
<warning>
<warningAndCautionPara>Sellinium-X is corrosive. Do not get it
on your skin.
Do not drink it. Use it in a well ventilated
area.</warningAndCautionPara>
</warning>
<warning>
<warningAndCautionPara>Make sure you read the standard reqSafety
conditions
that are given in <dmRef>
<dmRefIdent>
<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="012"
infoCodeVariant="A" itemLocationCode="D" modelIdentCode="AE"
subSubSystemCode="0"
subSystemCode="0" systemCode="00"
systemDiffCode="A"/></dmRefIdent>
</dmRef>.</warningAndCautionPara>
</warning>
</safetyRqmts>
</reqSafety>
```

### 2.8.1 Safety requirements

**Description:** If there are any safety requirements, then the element <safetyRqmts> must be used. This element can be populated with the attribute warningRefs or the attribute cautionRefs, or the element <warning>, the element <caution>, or the element <note>, as described at Chap 3.9.3.

**Markup element:** <safetyRqmts> (O)

**Attributes:**

- id (O), the identifier of the <safetyRqmts> element. Refer to Chap 3.9.5.2.1.2.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.

**Child elements:**

- <warning> (C), repeatable. Refer to Chap 3.9.3.
- <caution> (C), repeatable. Refer to Chap 3.9.3.
- <note> (C), repeatable. Refer to Chap 3.9.3.

**Business rules decisions:**

– None identified

**Markup example:**

```
<safetyRqmts>
<warning>
<warningAndCautionPara>Sellinium-X is corrosive. Do not get it
on your skin.
Do not drink it. Use it in a well ventilated
area.</warningAndCautionPara>
</warning>
<warning>
<warningAndCautionPara>Make sure you read the standard reqSafety
conditions
that are given in <dmRef>
<dmRefIdent>
<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="012"
infoCodeVariant="A" itemLocationCode="D" modelIdentCode="AE"
subSubSystemCode="0"
subSystemCode="0" systemCode="00"
systemDiffCode="A"/></dmRefIdent>
</dmRef>.</warningAndCautionPara>
</warning>
</safetyRqmts>
```

## 2.9 Requirements after job completion

**Description:** The element <closeRqmts> contains any actions that are required after the Procedure is complete.

**Markup element:** <closeRqmts> (M)

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*Fig 18 Element <closeRqmts>*

The element is mandatory in procedural data modules and optional in process data modules.

If there are no actions then the element <noConds> must be used.

If there are actions, then the element <reqCond>, element <reqCondDm>, element <reqCondCircuitBreaker> or element <reqCondTechPub> must be used to give the close-up requirement action in accordance with Para 2.2.

The requirements can reference data modules, publication modules, non-S1000D publications or contain no reference at all. It is recommended that details for close up be given by only referring to complete data modules. The use of element <reqCond> without a reference must be avoided. The requirements after job completion must be in the order that the requirements are satisfied.

**Attributes:**

- id (O), the identifier of the <closeRqmts> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

<recCondGroup> (M). Refer to Para 2.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<closeRqmts>
<reqCondGroup>
<reqCondNoRef>
<reqCond>Replace the tire.</reqCond>
</reqCondNoRef>
<reqCondDm>
<reqCond>Inflate the tire with air.</reqCond>
<dmRef xlink:type="simple" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="URN:S1000D:DMC-S1000(DBIKE)-
AAA-DA0-10-20-00AA-215A-A">
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" sub-subsystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</reqCondDm>
</reqCondGroup>
</closeRqmts>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of production maintenance data**. The project or the organization must decide whether to use the production maintenance data, element <productionMaintData>, or not. Refer to Para 2.1.

**Use of the element <thresholdInterval>.** The project or the organization must decide whether to use element <thresholdInterval>or not. Refer to Para 2.1.1.

**Use of the element <zoneRef>.** The project or the organization must decide whether to use the element <zoneRef> element or not, and how to use it. Consideration for duplication and mismatch of data given in the maintenance planning information has to be taken. Refer to Para 2.1.2.

**Use of the element <accessPointRef>.** The project or the organization must decide whether to use the element <accessPointRef> or not, and how to use it. Consideration for duplication and mismatch of data given in the maintenance planning information has to be taken. Refer to Para 2.1.3.

**Use of the attribute lsarData.** The project or organization must decide whether to use the attribute lsarData or not. Refer to Para 2.1.2 and Para 2.1.3.

**Use of the element <workArea>.** The project or the organization must decide whether to use the element <workArea> element or not, and how to use it. If used, projects will decide which data module types will use it. Refer to Para 2.1.4.

**Use of the element <taskDuration>.** The project or the organization must decide whether to use the <taskDuration> element or not, and how to use them. Consideration for duplication and mismatch of data given in the maintenance planning information has to be taken. Refer to Para 2.1.5.

**Use of list of the element <reqCondCircuitBreaker>.** The projects or the organization must decide if a circuit breaker list is to be considered as part of preliminary conditions and thus the use of the element (refer to Para 2.2.4) or if the circuit breaker settings are part of the steps. In this later case the element <circuitBreakerDescrGroup> in steps content can be used (refer to Chap 3.9.5.2.3).

**Use of element <reqPersons>**. The project or the organization must decide how to use the element. Eg use of either the element <reqPersons> or the element <person> or by use of a mix of the two elements. Refer to Para 2.3.

**Values for the attribute personCategoryValue.** The project or the organization must define a list of categories, eg Electrician, Propulsion engineer, Maintainer. Refer to Para 2.3.1.1.1.

**Trade codes.** The project or the organization must define a list of trades/trade codes. Refer to Para 2.3.1.1.3.

**Use of the element <reqTechInfo>.** The project or the organization must decide whether to use the element <reqTechInfo> or not. Refer to Para 2.4.

**How to use the element <reqTechInfo>.** The project or the organization must decide how to use the element <reqTechInfo>.

- Allowed values of attribute reqTechInfoCategory
- Which categories to be presented in the table Required technical information and which to be presented in Reference table (element <refs> in the element <content>. Refer to Chap 3.9.5.2.1.2 and Para 2.4.

**Listing of common and standard tools.** The project or the organization must decide what types of common and standard tools or toolkits to be identified and listed. Refer to Para 2.5.

**Use of the attribute id on the element <supportEquipDescr>**. The project or the organization must decide to make use of cross-references from the Procedure to the support equipment listed in preliminary requirements. The attribute id on element <supportEquipDescr> respectively, is used to establish the link between the two and

will guarantee consistent use identification throughout the Procedure. The use of cross-references is encouraged. Refer to Para 2.5.1.

**Use of identification**. The project or the organization must decide which elements to use for identification and how to populate these elements. Refer to Para 2.5.1.1.3.

**Population of NSN**. projects must decide on how to populate the element <natoStockNumber>. Refer to Para 2.5.1.1.5.

**Use of the attribute id on element <supplyDescr>.** The project or the organization must decide to make use of the element <supplyDescr>**.** Refer to Para2.6.

**Use of the attribute id on the element <internalRef>**. The project or the organization must decide to make use of cross-references from the Procedure to the support equipment listed in preliminary requirements. The attribute internalRefId of element <internalRef> and the attribute id on element <spareDescr > respectively, are used to establish the link between the two and will guarantee consistent use identification throughout the Procedure. The use of cross-references is encouraged. Refer to Para 2.6.1.

**Use of attribute responsiblePartnerCompanyCode**. The project or the organization must decide on the use of the attribute responsiblePartnerCompanyCode for non-chapterized IPD. Refer to Para 2.7.

# 4 Examples

## 4.1 Preliminary requirements

The following markup example gives the preliminary requirements for S1000DBIKE-AAA-D00-00-00-00AA-258A-A. This data module is presented in full in Chap 6.2.3.3.

```
<preliminaryRqmts>
<reqCondGroup>
<reqCondNoRef>
<reqCond>The bicycle is outdoors</reqCond>
</reqCondNoRef>
</reqCondGroup>
<reqPersons applicRefId="apMK9">
<person man="A">
<personCategory personCategoryCode="Chemical technician"/>
<personSkill skillLevelCode="sk02"/>
<trade>Bike cleaner</trade>
<estimatedTime unitOfMeasure="h">1,0</estimatedTime>
</person>
</reqPersons>
<reqPersons applicRefId="apMK1">
<person man="B">
<personCategory personCategoryCode="Operator"/>
<personSkill skillLevelCode="sk02"/>
<trade>Bike rider</trade>
<estimatedTime unitOfMeasure="h">1,0</estimatedTime>
</person>
</reqPersons>
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0001">
<name>Water hose</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-09</partNumber>
```

```
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0002">
<name>Stiff bristle brush</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-02</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0003">
<name>Sponge</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-11</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
<reqSupplies>
<supplyDescrGroup>
<supplyDescr id="sup-0001">
<name>Degreasing agent</name>
<identNumber>
<manufacturerCode>KZ222</manufacturerCode>
<partAndSerialNumber>
<partNumber>LL-004</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="L">1</reqQuantity>
</supplyDescr>
<supplyDescr id="sup-0002">
<name>Detergent A</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-023-14</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="L">1</reqQuantity>
</supplyDescr>
<supplyDescr applicRefId="apMK9" id="sup-0003">
<name>Detergent B</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-15</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="L">1</reqQuantity>
</supplyDescr>
</supplyDescrGroup>
</reqSupplies>
```

```
<reqSpares>
<noSpares/></reqSpares>
<reqSafety>
<safetyRqmts>
<warning>
<warningAndCautionPara>Do not get <internalRef
internalRefId="sup-0002" internalRefTargetType="supequip"
xlink:actuate="onRequest" xlink:href="sup-0002"
xlink:show="replace"></internalRef> into
your eyes. If it gets into your eyes, wash them immediately in
clean warm
water.</warningAndCautionPara>
</warning>
<warning>
<warningAndCautionPara>Do not get <internalRef
internalRefId="sup-0003" internalRefTargetType="supequip"
xlink:actuate="onRequest" xlink:href="sup-0003"
xlink:show="replace"></internalRef> into
your eyes. If it gets into your eyes, wash them immediately in
clean warm
water.</warningAndCautionPara>
</warning>
<caution>
<warningAndCautionPara>Do not use a <internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip" xlink:actuate="onRequest"
xlink:href="seq-0001"
xlink:show="replace"></internalRef> that has high pressure. A
water hose that
has high pressure can cause some parts to become loose or full
of water.</warningAndCautionPara>
</caution>
<caution>
<warningAndCautionPara>Do not point the hose directly at the hub
or at the
bottom bracket bearings. This can cause damage to the
parts.</warningAndCautionPara>
</caution>
<caution>
<warningAndCautionPara>Apply <internalRef internalRefId="sup-
0003" internalRefTargetType="supply"
xlink:actuate="onRequest" xlink:href="sup-0003"
xlink:show="replace"></internalRef> in
accordance with the instruction on the container. The substance
may cause
damage to the Bike paint if it is not applied
correctly.</warningAndCautionPara>
</caution>
</safetyRqmts>
</reqSafety>
</preliminaryRqmts>
```

As far as changes are concerned, the corresponding status section markup would be:

```
<reasonForUpdate id="chg-0001" updateReasonType="urt01">
<simplePara>Procedure has been changed</simplePara>
</reasonForUpdate>
<reasonForUpdate id="chg-0002" updateReasonType="urt02">
<simplePara>Replaced by supplier</simplePara>
```

```
</reasonForUpdate>
<reasonForUpdate id="chg-0003" updateReasonType="urt01">
<simplePara>Safty hazard reported</simplePara>
</reasonForUpdate>
<reasonForUpdate id="chg-0004" updateReasonType="urt01">
<simplePara>...</simplePara>
</reasonForUpdate>
```

## 4.2 Markup examples closeup

Example 1: This example shows markup if no close-up requirements are needed.

```
<closeRqmts>
<reqCondGroup>
<noConds/>
</reqCondGroup>
</closeRqmts>
```

Example 2: This example shows markup if there are close up requirements needed.

**Note**

The use of the method presented below for element <reqCond> and element <reqCondTechPub> hinders an automated preparation of situation adopted maintenance procedures.

```
<closeRqmts>
<reqCondGroup>
<reqCondDm>
<reqCond>The access panel is closed.</reqCond>
<dmRef>
<dmRefIdent>
<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="740" infoCodeVariant="A" itemLocationCode="D"
modelIdentCode="AE" subSubSystemCode="0" subSystemCode="0"
systemCode="10" systemDiffCode="A"/>
</dmRefIdent>
</dmRef>
</reqCondDm>
<!-- A reference to a non-S1000D publication -->
<reqCondExternalPub>
<reqCond>The access panel is closed.</reqCond>
<externalPubRef>
<externalPubRefIdent>
<externalPubTitle>Component Maintenance
Manual</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
</reqCondExternalPub>
<!-- A required condition that has no reference -->
<reqCondNoRef>
<reqCond>The caps are installed on all orifices</reqCond>
</reqCondNoRef>
</reqCondGroup>
</closeRqmts>
```

# Chapter 3.9.5.2.1.10

## *Common constructs - Text elements*

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# 1 General

The paragraph elements are used to capture text. Several different paragraph models are available depending upon which data module type is being used and where the paragraph is used. The available subelements for each paragraph model are tailored dependent upon its use. For example: including a list within a paragraph is desirable when used in a procedural

step (in element <para>), but is not desirable when used in an applicability statement (in element <simplePara>). The different models are detailed within this paragraph. Usage of individual content elements is detailed in Para 2.

The rules for the presentation of the text, including tables and figures are given in Chap 6.

Care must be taken when authoring text when placing spaces around embedded elements within the element <para> to ensure that spaces are inserted correctly so that the displayed/printed output is spaced correctly. Example:

```
<para>This is<emphasis
emphasisType="em01">bold</emphasis>text.</para>
```

Will yield

"This is**bold**text."

When the following is intended:

```
<para>This is <emphasis emphasisType="em01">bold</emphasis>
text.</para>
```

Will yield

"This is **bold** text."

## 1.1 Paragraph models

The paragraph model holds five types of paragraph elements:

- <para>
- <warningAndCautionPara>. Refer to Chap 3.9.3 for details.
- <attentionListItemPara>. Refer to Chap 3.9.3 for details.
- <notePara>. Refer to Chap 3.9.3.
- <simplePara>. Refer to Para 2.2 for details.

The element <para> consists of two groups of elements:

- textElementGroup which is detailed in this chapter. Refer to Para 1.1.1and Para 2.
- listElementGroup. Refer to Para 1.1.2 and Chap 3.9.5.2.1.3 for details.

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*Fig 1 Element <para>*

### 1.1.1 The textElementGroup

The content of the `textElementGroup` vary depending on data module type but the name of the group is still the same for all data module types. The full (maximum) content of the `textElementGroup` is shown in Fig 2.

**Note**

The `textElementGroup` is used in several other text elements, eg in the element <`action`> in the fault isolation schema. The content of the `textElementGroup` is always the same within the same data module type wherever it appears.

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*Fig 2 The `textElementGroup`*

The content of the five different paragraph types are detailed in Fig 3. The figure provides the element name, which data module types the element is available in and which subelements are available in that context.

**Note**

Even if this chapter is aimed for the element <`para`> or rather the `textElementGroup` and the element <`simplePara`>, the figure includes all five paragraph types to give a complete overview of the where the subelements are used.

**Note**

The `attentionText` group is detailed in Chap 3.9.3.

| Element [group] | Data module type in which the element occurs | Available subelements (grey indicates available) | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | functionalItemRef | circuitBreakerRef | controlIndicatorRef | inlineSignificantData | quantity | zoneRef | accessPointRef | identNumber | internalRef | indexFlag | changeInline | emphasis | symbol | subScript | superScript | dmRef | pmRef | externalPubRef | footnote | footnoteRef | acronym | acronymTerm | captionGroup | caption | verbatimText |
| <para> [textElementGroup] | descript<br>learning<br>scormContent | | | | | | | | | | | | | | | | | | | | | | | | | |
| <para> [textElementGroup] | crew | | | | | | | | | | | | | | | | | | | | | | | | | |
| <para> [textElementGroup] | checkList | | | | | | | | | | | | | | | | | | | | | | | | | |
| <para> [textElementGroup] | fault | | | | | | | | | | | | | | | | | | | | | | | | | |
| <para> [textElementGroup] | proced<br>process | | | | | | | | | | | | | | | | | | | | | | | | | |
| <para> [textElementGroup] | ipd<br>schedul | | | | | | | | | | | | | | | | | | | | | | | | | |
| <warningAndCautionPara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | |
| <warningAndCautionPara> [attentionText] | fault<br>proced<br>process<br>schedul | | | | | | | | | | | | | | | | | | | | | | | | | |
| <attentionListItemPara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | |
| <attentionListItemPara> [attentionText] | fault<br>proced<br>process<br>schedul | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | checkList<br>crew<br>descript<br>learning | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | fault<br>proced<br>process<br>techrep | | | | | | | | | | | | | | | | | | | | | | | | | |
| <notePara> [attentionText] | schedul | | | | | | | | | | | | | | | | | | | | | | | | | |
| <simplePara> | all | | | | | | | | | | | | | | | | | | | | | | | | | |

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*Fig 3 Paragraph models and available subelements*

### 1.1.2 The listElementGroup

The content of the `listElementGroup` is:

- sequential (ordered) lists
- random lists
- definition lists

For details of authoring lists, refer Chap 3.9.5.2.1.3.

# 2 Text elements

## 2.1 Available subelements in the textElementGroup

The complete list of possible subelements in the textElementGroup is:

- paragraph meaningful data, including:
  - elements with dedicated associated technical repository:
    - <functionalItemRef> - functional item number. Refer to Chap 3.9.5.1.
    - <circuitBreakerRef> - circuit breaker. Refer to Para 2.1.1.
    - <controlIndicatorRef> - control or indicator. Refer to Para 2.1.2.
    - <zoneRef> - zone. Refer to Para 2.1.5.
    - <acceassPointRef> - access point. Refer to Para 2.1.6.
  - elements without dedicated technical repository:
    - <inlineSignificantData> - paragraph significant data. Refer to Para 2.1.3.
    - <quantity> - quantity data. Refer to Para 2.1.4.
- <identNumber> - identification number (part/serial number and associated manufacturer code). Refer to Chap 3.9.5.2.1.9.
- <indexFlag> - indexes. Refer to Para 2.1.7.
- <changeInline> - inline change marking. Refer to Chap 3.9.5.2.1.1.
- <emphasis> - emphasis. Refer to Para 2.1.8.
- <symbol> - symbols. Refer to Para 2.1.9.
- <subScript> - subscript. Refer to Para 2.1.10.
- <superScript> superscript. Refer to Para 2.1.11.
- references, refer to Chap 3.9.5.2.1.2, including:
  - <internalRef> - internal references
  - <dmRef> - data module references
  - <pmRef> - publication module references
  - <externalPubRef> - external publication references
- <footnote> - footnotes. Refer to Para 2.1.12.
- <footnoteRef> - footnote references. Refer to Para 2.1.13.
- <acronym> and <acronymTerm> - acronyms, refer to Para 2.1.14.
- <captionGroup> and <caption> - captions. Refer to Chap 3.9.5.2.1.4.
- <verbatim> - verbatim. Refer to Para 2.1.15.

### 2.1.1 Circuit breaker

**Description:** The element <circuitBreakerRef> contains the details about the circuit breaker eg, number, circuit breaker action and circuit breaker type.

**Markup element:** <circuitBreakerRef>

**Attributes:**

- id (O), the identifier of the circuit breaker reference element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- circuitBreakerNumber (M), the circuit breaker identifier (number).
- circuitBreakerType (O), the circuit breaker type. This attribute can have one of the following values:
  - "eltro" - electronic circuit breaker
  - "elmec" - electromechanical circuit breaker
  - "clip" - dummy circuit breaker for provisioning use (clipped circuit breaker)

- circuitBreakerAction (O), indicates the action to perform on the circuit breaker. This attribute can have one of the following values:
  - "open" - the action "to open"
  - "close" - the action "to close"
  - "verify-open" - the check of the condition: "is open"
  - "verify-close" - the check of the condition: "is closed"
- checkSum (O), the entered data which allows potential integrity verification
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <name> (O), the name of the circuit breaker. Refer to Para 2.1.16.
- <refs> (O), references providing a link to the circuit breaker. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute circuitBreakerAction, and if used, how to populate the attribute.
- Use of the attribute checkSum, and if used, how to populate the attribute.

**Markup example:**

```
<circuitBreakerRef circuitBreakerNumber="809-VM"
circuitBreakerAction="open" checkSum="f9f62226"/>
```

### 2.1.2 Controls and indicators

**Description:** The element <controlIndicatorRef> contains the number and name of the controls or indicators and the reference to the control and indicator repository data module.

**Markup element:** <controlIndicatorRef> (O)

**Attributes:**

- id (O), the identifier of the controls and indicators element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- controlIndicatorNumber (O), the control or indicator number identified in the technical repository data module. Refer to Chap 3.9.5.2.11.11 and Chap 4.13.2.
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <name> (O), the name of the control or indicator. Refer to Para 2.1.16.
- <refs> (O), provides a link to the control and indicator repository data module. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the attribute `controlIndicatorNumber`

**Markup example:**

```
<controlIndicatorRef controlIndicatorNumber="ci-0001">
...
</controlIndicatorRef>
```

### 2.1.3 Paragraph significant data

**Description:** The element <`inlineSignificantData`> contains a significant meaning, such as a lubricant or manufacturer code.

**Markup element:** <`inlineSignificantData`> (O)

**Attributes:**

– `significantParaDataType` (M), the meaning of the data. This attribute can have the following values:
  - "`psd01`" - "`psd99`". Refer to Chap 3.9.6.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Types of data to markup.

**Markup example:**

The following markup example illustrates the use of <`inlineSignificantData`>:

```
<para>Use lubricant
(<inlineSignificantData
significantParaDataType="psd03">1X234</inlineSignificantData>)
on threads...
</para>
```

The display of this markup can be as follows:

"Use lubricant (1X234) on threads..."

### 2.1.4 Quantity data

**Description:** The element <`quantity`> provides the capability to identify a portion of a paragraph that corresponds to a numeric value with a special meaning, such as a torque value. The exact meaning of the quantity data can be specified using a set of predefined S1000D values, or extended to support specific project needs.

The quantity data provides the ability to define numerical values to a very precise level. Use of the quantity group structure within quantity data provides the following capabilities:

– Specify a decimal value that does not contain display format information, ie adheres to the W3C XML standard for decimal numbers
– Specify a unit of measure that applies to the value
– Group a value and a tolerance together
– Specify units of measure to the value/tolerance group or to value and tolerance individually
– Group multiple values and tolerances together, units can be apply to the group or individual values

**Markup element:** <quantity> (O)

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*Fig 4 Element <quantity>*

**Attributes:**

– quantityType (O), the type of quantity, eg length, time. This attribute can have the following values:
  - "qty01" - "qty99". Refer to Chap 3.9.6.1.

**Child elements:**

– <quantityGroup> (O). Refer to Para 2.1.4.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the quantity data markup and to what extent
– Determine which types of data to mark up and in what contexts

**Markup example:**

Example 1: Simple quantity with the use of the attribute type:

```
<para>Maximum torque not to exceed
<quantity quantityType="qty05">8 Nm</quantity>.
</para>
```

The display of this markup can be as follows:

"Maximum torque not to exceed 8 Nm."

Example 2: Quantity with the use of the quantity group:

```
<para>Maximum torque not to exceed
<quantity quantityType="qty05">
<quantityGroup quantityGroupType="nominal">
<quantityValue quantityUnitOfMeasure="N.m">8</quantityValue>
</quantityGroup>
</quantity>
.</para>
```

The display of this markup can be as follows:

"Maximum torque not to exceed 8 Nm."

2.1.4.1 Quantity group

**Description:** The element <quantityGroup> contains a group of values and tolerances and/or multiple values in the case where multiple units of measure are used (eg 2 h 30 min).

**Markup element:** <quantityGroup> (O)

**Attributes:**

- quantityGroupType (O). This attribute can have the following values:
  - "nominal" (D) - a single value
  - "minimum" - a "from" (beginning of a range) or "minimum" value
  - "maximum" - a "to" (end of a range) or "maximum" value
- quantityUnitOfMeasure (O), the unit of measure. Refer to Chap 3.9.6.2 for an enumerated list of standard quantity unit of measures. These can be extended using the standard BREX file mechanism. The value within the attribute quantityUnitOfMeasure is a code specifying the exact unit of measure. A quantityUnitOfMeasure at this level indicates that the quantityUnitOfMeasure applies to the entire group, possibly including several values and/or tolerances. The implication is that by default the unit of measure will be displayed once after the value/tolerance; eg "0.250 +0.003 -0.000 in.", but other formats can be applied by stylesheets.

  Refer to Chap 3.9.1 for rules for presentation of unit of measurements and fractions.

About unit of measurements

- attribute quantityUnitOfMeasure on nothing indicates no unit of measure is to be displayed
- attribute quantityUnitOfMeasure on element <quantityValue> and on element <quantityTolerance> within same element <quantityGroup> applies to each value or tolerance independent of the others
- attribute quantityUnitOfMeasure on two elements <quantityValue> within same element <quantityGroup> applies to each value independent of the other or others

  **Note**

  In cases where the attribute quantityUnitOfMeasure is specified at both the element <quantityGroup> level and at the element <quantityValue> or element <quantityTolerance> level, the quantityUnitOfMeasure value from the lower level (element <quantityValue> or element <quantityTolerance>) must take precedence over the attribute quantityUnitOfMeasure value from the element <quantityGroup>.

**Child elements:**

- <quantityValue> (M), the value and an optional unit of measure. Refer to Para 2.1.4.1.1
- <quantityTolerance> (O), the tolerance value. Refer to Para 2.1.4.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of value and tolerance decomposition and to what level of the markup that the unit of measure is to be applied
- Which unit of measure types to allow

**Markup example:**

Example 1: Quantity group and is a simple quantity with value and unit of measure:

```
<para>The windshield assembly weighs approximately
<quantity>
<quantityGroup quantityGroupType="nominal">
<quantityValue quantityUnitOfMeasure="kg">40</quantityValue>
</quantityGroup>
</quantity>
and requires two persons ...
</para>
```

The display of this markup can be as follows:

"The windshield assembly weighs approximately 40 kg and requires two persons ..."

Example 2: Quantity where value and tolerance have the same unit of measure:

```
<para>If hole tolerance of
<quantity>
<quantityGroup quantityGroupType="nominal"
quantityUnitOfMeasure="mm">
<quantityValue>0.700</quantityValue>
<quantityTolerance
quantityToleranceType="plus">0.010</quantityTolerance>
<quantityTolerance
quantityToleranceType="minus">0.000</quantityTolerance>
</quantityGroup>
</quantity>
has been exceeded ...
</para>
```

The display of this markup can be as follows:

"If hole tolerance of 0,700 +0,010 -0,000 mm has been exceeded ..."

Example 3: Quantity with minimum/maximum values:

```
<para>Tighten fasteners
<quantity quantityType="qty05">
<quantityGroup quantityGroupType="minimum">
<quantityValue quantityUnitOfMeasure="N.m">18.0</quantityValue>
</quantityGroup>
<quantityGroup quantityGroupType="maximum">
<quantityValue quantityUnitOfMeasure="N.m">22.0</quantityValue>
</quantityGroup>
</quantity>
using torque wrench ...
</para>
```

The display of this markup can be as follows:

"Tighten fasteners from 18,0 Nm to 22,0 Nm using torque wrench ..."

*2.1.4.1.1 Value*

**Description:** The element <`quantityValue`> contains a decimal value and an optional unit of measure. The value must conform to the W3C XML standard for decimal values which

requires use a period [.] for the separator between the integral part and the fractional part, and no thousands separator. The display format is not specified in the XML code but, must conform to program or country requirements at presentation (Refer to Chap 3.9.1 for rules on presentation).

**Markup element:** <quantityValue> (M)

**Attributes:**

– quantityUnitOfMeasure (O), specifies the unit of measure. Refer to Para 2.1.4.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of value and tolerance decomposition and to what level of the markup that the unit of measure is to be applied
– Which unit of measure types to allow

**Markup example:**

The following markup example illustrates the use of quantity group and is a simple quantity with value and unit of measure:

```
<quantityValue quantityUnitOfMeasure="kg">40</quantityValue>
```

*2.1.4.1.2 Tolerance*

**Description:** The element <quantityTolerance> contains a decimal tolerance value, the type of tolerance, and an optional unit of measure. The tolerance value must conform to the W3C XML standard for decimal values which reuires use a period [.] for the separator between the integralpart and the fractionalpart, and no thousands separator. The display format is not specified in the XML code, but must conform to program or country requirements at presentation (refer to Chap 3.9.1 for rules on presentation).

**Markup element:** <quantityTolerance> (O)

**Attributes:**

– quantityToleranceType (O), the type of tolerance with allowable values. This attribute can have the following values:
  - "plus" - the tolerance must be within the range of the value specified
  - "minus" - the tolerance must be within the range of the value specified
  - "plusorminus" - the tolerance must be within range of the value specified
– quantityUnitOfMeasure (O), specifies the unit of measure. Refer to Para 2.1.4.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of value and tolerance decomposition and to what level of the markup that the unit of measure is to be applied
– Which unit of measure types to allow

**Markup example:**

Example 1: Quantity with type, value, tolerance, and unit of measure:

```
<para>Holding nut, torque bolt to
<quantity quantityType="qty05">
<quantityGroup quantityGroupType="nominal" unitOfMeasure="N.m">
<quantityValue>20</quantityValue>
<quantityTolerance
quantityToleranceType="plusorminus">2</quantityTolerance>
</quantityGroup>
</quantity>
.
</para>
```

The display of this markup can be as follows:

"Holding nut, torque bolt to 20 ±2 Nm."

Example 2: Quantity with multiple value groups and value and tolerance with different units:

```
<para>Chamfer both sides of rib
<quantity>
<quantityGroup quantityGroupType="nominal">
<quantityValue>0.153</quantityValue>
<quantityTolerance
quantityToleranceType="plusorminus">0.005</quantityTolerance>
</quantityGroup>
x
<quantityGroup quantityGroupType="nominal">
<quantityValue quantityUnitOfMeasure="dega">45</quantityValue>
<quantityTolerance quantityToleranceType="plusorminus"
quantityUnitOfMeasure="mina">30
</quantityTolerance>
</quantityGroup>
</quantity>
.
</para>
```

The display of this markup formatted for Système International d'Unites (SI) can be as follows:

"Chamfer both sides of rib 0,153 ±0,005 × 45° ±30´."

The display of this markup formatted for imperial can be as follows:

"Chamfer both sides of rib 0.153 ±0.005 × 45° ±30´."

Example 3: Quantity with tolerance only:

```
<para>Make sure that spacing is within
<quantity>
<quantityGroup quantityGroupType="nominal">
<quantityTolerance
quantityToleranceType="plusorminus">0.030</quantityTolerance>
</quantityGroup>
</quantity>
on each side ...
</para>
```

The display of this markup formatted for SI can be as follows (comma separator):

"Make sure that spacing is within ±0,030 on each side ..."

The display of this markup formatted for imperial can be as follows (period separator):

"Make sure that spacing is within ±0.030 on each side ..."

### 2.1.5 Zone

**Description:** The element <zoneRef> contains the zoning information (one or more), as described in Chap 3.4. For the use of element <zoneRef> in connection with technical information repositories, refer to Chap 4.13.2.

This element is available in the product management data within the element <productionMaintData> of preliminary requirements (refer to Chap 3.9.5.2.1.9) and within the element <para> of descriptive data modules.

**Markup element:** <zoneRef> (O), repeatable

**Attributes:**

- id (O), the identifier of the zone element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- zoneNumber (O), the zone identifier
- lsarData (C), a mark to identify if the reference is derived from a Logistics Support Analysis Record (LSAR) or not. This attribute can have the following values:
  - "0" (D) - No, when not derived from an LSAR
  - "1" - Yes, when derived from an LSAR
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <name> (O), the name of the zone. Refer to Para 2.1.16.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the element <zoneRef>

**Markup example:**

Example 1: A zone with a name, zone number and indicating the use of LSAR data:

```
<zoneRef lsarData="1" zoneNumber="500">
<name>Left wing</name>
</zoneRef>
```

Example 2: A zone with a zone identifier and a zone number:

```
<zoneRef id="zoneRef-210" zoneNumber="210"/>
```

### 2.1.6 Access point

**Description:** The element <accessPointRef> describe/identify any (one or more) access points like panels, doors, hatches. The identifier of the access point is given either through the attribute accessPointNumber or the element <name> element <refs>. For the use of

element <accessPointRef> in connection with technical information repositories, refer to Chap 4.13.2.

This element is available in the product management data within the element <productionMaintData> of preliminary requirements (refer to Chap 3.9.5.2.1.9) and within the element <para> of descriptive data modules.

**Markup element:** <accessPointRef> (O), repeatable

**Attributes:**

- id (O), the identifier of the access point element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- attribute accessPointNumber (O), the identifier of the access point
- attribute accessPointTypeValue (O), the access point type. This attribute can have the following values:
  - "accpnl01" - "accpnl99". Refer to Chap 3.9.6.1.
- lsarData (C), a mark to identify if the reference is derived from an LSAR or not. This attribute can have the following values:
  - "0" (D) - No, when not derived from an LSAR
  - "1" - Yes, when derived from an LSAR
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <name> (O), the name of the zone. Refer to Para 2.1.16.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the element <accessPointRef>

**Markup example:**

Example 1: An access point with a name, access point number, and indicating the use of LSAR data:

```
<accessPointRef accessPointNumber="2514VU" lsarData="1">
<name>Panel A</name>
</accessPointRef>
```

**Markup example:**

Example 2: A n access point with an identifier and an access point number:

```
<accessPointRef id="accessRef-210" accessPointNumber="210"/>
```

### 2.1.7 Index

**Description:** The element <indexFlag> is used to contain the text of an item that is required to be included in an automatically generated index.

**Markup element:** <indexFlag> (O)

**Attributes:**

– indexLevelOne (O), indexLevelTwo (O), indexLevelThree (O), and indexLevelFour (O), which are used to indicate the four permissible levels of indexing

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Whether an index is required and to what level indexing is made

**Markup example:**

```
<indexFlag indexLevelOne="1">Bike tire</indexFlag>
```

### 2.1.8 Emphasis

**Description:** The element <emphasis> contains eg a word, an expressions or a sentence to be highlighted.

To highlight a word, an expression or a sentence, bold text is the preferred method. Alternatively, the use of color is permitted. Capital (uppercase) letters, italics or underlining are not permitted to highlight text, except for legacy data. Refer to Chap 3.9.1.

**Markup element:** <emphasis> (O)

**Attributes:**

– emphasisType (O), the type of emphasis such as bold and is set to one of the values given in Chap 3.9.6

**Child elements:**

– Includes the same set of child elements as the textElementGroup applicable for the actual data module type. Refer to Para 1.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of attribute emphasisType values

**Markup example:**

Example 1: A paragraph with a highlighted word which is intended by the author to be emphasized by making it appear in bold:

```
<para>This is some text which has the word <emphasis
emphasisType="em01">emphasis</emphasis> emphasized in
bold.</para>
```

Example 2: Use of the over-line function for the signal name CONTROL:

```
<para>Pin 12 carries the negatively going signal <emphasis
emphasisType="em04">CONTROL</emphasis> which goes more negative
when active.</para>
```

### 2.1.9 Symbol

**Description:** The element <symbol> contains illustrations and graphics that are intended to be presented inline within the normal text. Symbols must be controlled using the ICN, as described in Chap 4.4. However, the ICN must not be presented.

**Markup element:** <symbol> (O)

**Attributes:**

- applicRefId (O), the applicability information by referencing the element <applic> as described in Chap 3.9.5.3
- id (O), the identifier of the symbol element. Refer to Chap 3.9.5.2.1.2.
- infoEntityIdent (M), the ID/IDREF mechanism. Refer to Chap 3.9.5.2.1.7.
- reproductionHeight (O), reproductionWidth (O), and reproductionScale (O), the presentation sizes and scaling for the presentation system
- xlink:type (O), the attribute used to specify link type. This attribute can have the following values:
  - "simple" - the reference to a single target object, the normal case
  - "extended" - the reference to multiple target objects
- xlink:href (O), the attribute used to specify remote resource
- xlink:title (O), the attribute used to used to describe the meaning of a link or resource in a human-readable fashion
- xlink:show (O), the attribute used to used to describe how the reference will show. This attribute can have the following values:
  - "new" - opens a new window to display the information
  - "replace" - replaces the current window with the displayed information
  - "embed" - embeds the information inline
  - "other" - defined by user
  - "none" - does not display the information
- xlink:acutate (O), the attribute used to used to describe if the data will be displayed automatically or on click. This attribute can have the following values:
  - "onLoad" - displays the information when the page loads
  - "onRequest" - displays the information on user click
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Sizes and scaling of symbols

**Markup example:**

The following example shows a paragraph with a symbol which is intended to be displayed inline.

```
<para>When this condition occurs the symbol
<symbol infoEntityIdent="ICN-S1000DBIKE-AAA-DA10000-0-U8025-
09999-A-01-1"></symbol> will show on the display.</para>
```

### 2.1.10 Subscript

**Description:** The element <subScript> contains the text that is intended to be presented subscripted.

**Markup element:** <subScript> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <subScript>

**Markup example:**

The following example shows a paragraph with text that is subscripted:

```
<para>The chemical symbol for water is H
<subScript>2</subScript>O.</para>
```

### 2.1.11 Superscript

**Description:** The element <superScript> contains the text that is intended to be presented superscripted.

**Note**

Superscript is the default value for inline and table footnotes.

**Markup element:** <superScript> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <superScript>

**Markup example:**

The following example shows a paragraph with text that is superscripted:

```
<para>The symbol for a square meter is m
<superScript>2</superScript>.</para>
```

### 2.1.12 Footnote

**Description:** The element <footnote> contains can eg bibliographic references or explanations which would take too much space or in any other way would be annoying for the reader.

The element <footnote> is a wrapper around the contents of a footnote. The element <footnote> typically generates a marker (eg a superscripted number) at the place in the flow of the document where it occurs. The footnote itself is then generally presented at the bottom of the page or the end of the table.

Footnotes are used in tables (table footnotes) or in regular text and titles (inline footnotes)

Footnotes must not

- be used for references and cross-references
- include footnotes

It is recommended to use only one type of footnote marker for each of the table footnotes and inline footnotes throughout a project. It is recommended that the superscripted numbers are used for both.

**Note**

Additional information that can be useful to the user to understand descriptive information, to carry out an action etc, can be presented in notes. Refer to Chap 3.9.3.

**Note**

The use of footnotes puts demands on the presentation of the footnote markers and the footnotes themselves. Project decisions on the presentation have to be made dependant on the publishing as page-oriented or IETP or both. Refer to Chap 6.2 and Chap 6.3.

**Markup element:** <footnote> (O)

**Attributes:**

- applicRefId (O), the applicability information by referencing the element <applic> as described in Chap 3.9.5.3
- id (O), the identifier of the footnote element. Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- footnoteMark (O), the type of footnote marker to be used to identify the footnote. Only one type of footnote marker must be used for each of the table footnotes and inline footnotes throughout a data module. This attribute can have the following values:
  - "num" (D) - superscripted numbers will be used
  - "sym" - symbols such as asterisk (*) and dagger (†) will be used
  - "alpha" - alpha characters will be used
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <para> (M), repeatable, is used to include the footnote text. Refer to Para 1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of footnotes
- Determine footnote marker type

**Markup example:**

Example 1: An inline page footnote:

```
<para>This paragraph includes a footnote. I would like to
further define a footnote<footnote id="ftn-1234"
footnoteMark="num"><para>A footnote is used to further define
information and it is printed at the bottom of the
page</para></footnote> and where the footnote is printed.</para>
```

Example 2: Table footnotes:

```
<table frame="topbot">
<title>Example table with footnotes</title>
<tgroup cols="3">
<colspec colnum="1" colname="col1"/>
<colspec colnum="2" colname="col2"/>
<colspec colnum="3" colname="col3"/>
<thead>
<row rowsep="1">
<entry><para>Col 1 Heading</para></entry>
<entry><para>Col 2 Heading</para></entry>
<entry><para>Col 3 Heading</para></entry>
</row>
</thead>
<tfoot>
<row>
<entry namest="col1" nameend="col3"><para>This is footer
information and spans the bottom of the table. The footer could
be table information such as "All units are measured in inches".
</para></entry>
</row>
</tfoot>
<tbody>
<row>
<entry><para>Row 1 entry 1 has a footnote<footnote id="ftn-
0001"><para>This is a footnote for entry
1</para></footnote></para></entry>
<entry><para>Row 1 entry 2</para></entry>
<entry><para>Row 1 entry 3</para></entry>
</row>
<row>
<entry><para>Row 2 entry 1 continues on a second
line</para></entry>
<entry><para>Row 2 entry 2</para></entry>
<entry><para>Row 2 entry 3 uses the first footnote for the
second time<footnoteRef internalRefId="ftn-
0001"/></para></entry>
</row>
<row rowsep="1">
<entry><para>Row 3 entry 1 also has a footnote<footnote id="ftn-
0002"><para>Second footnote</para></footnote></para></entry>
<entry><para>Row 3 entry 2</para></entry>
<entry><para>Row 3 entry 3</para></entry>
</row>
</tbody>
</tgroup>
</table>
```

### 2.1.13 Footnote reference

**Description:** The element <`footnoteRef`> contains the link to a previously defined footnote. The same link is used to reference the same footnote many times.

**Markup element:** <footnoteRef> (O)

**Attributes:**

– internalRefId (O), the target id of the footnote. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

The following markup example illustrates a footnote reference:

```
<para>This paragraph includes the same footnote<footnoteRef
internalRefId="ftn-1234"/>given in the previous paragraph</para>
```

### 2.1.14 Acronym

**Description:** The element <acronymTerm> contains the acronym itself and the definition of the acronym when that acronym is first used.

Separately, the element <acronymTerm> can be used to indicate the acronym and refer to its definition by using the attribute internalRefId. Refer to Para 2.1.14.1.

**Markup element:** <acronym> (O)

ICN-S3627-S1000D0540-001-01

*Fig 5 Element <acronym>*

**Attributes:**

– id (O), the identifier of the acronym element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
– acronymType (O), the type of acronym. This attribute can have the following values:
  - "at01" - "at99". Refer to Chap 3.9.6.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
– securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

– <acronymTerm> (M), the acronym. Refer to Para 2.1.14.1.
– <acronymDefinition> (M), the definition of the acronym when that acronym is first used. Refer to Para 2.1.14.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <acronym>

**Markup example:**

```
<acronym id="acr-0001">
<acronymTerm>ASD</acronymTerm>
<acronymDefinition>AeroSpace and Defence Industries Association
of Europe</acronymDefinition>
</acronym>
```

2.1.14.1 Acronym term

**Description:** The element <acronymTerm> contains the acronym itself and a reference to its definition.

**Markup element:** <acronymTerm> (M)

**Attributes:**

– internalRefId (O), the target id of the acronym definition to be reused. Refer to Chap 3.9.5.2.1.2

**Child elements:**

– <subScript> (O),the items to be subscripted. Refer to Para 2.1.10
– <superScript> (O), the items to be superscripted. Refer to Para 2.1.11

**Business rules decisions:**

– None identified

**Markup example:**

The following example shows the coding of an acronym and its reuse by the attribute internalRefId:

```
<acronym id="acr-0001">
<acronymTerm>ASD</acronymTerm>
<acronymDefinition>AeroSpace and Defence Industries Association
of Europe</acronymDefinition>
</acronym>
…
<acronymTerm internalRefId="acr-0001">ASD</acronymTerm>
```

2.1.14.2 Acronym definition

**Description:** The element <acronymDefinition> contains the definition of the acronym when that acronym is first used.

**Markup element:** <acronymDefinition> (O)

**Attributes:**

– id (O), the identifier of the element acronym definition. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <`subScript`> (O), the items to be subscripted. Refer to Para 2.1.10.
- <`superScript`> (O), the items to be superscripted. Refer to Para 2.1.11.

**Business rules decisions:**

- None identified

**Markup example:**

The following example shows the coding of an acronym definition:

```
<acronymDefinition>AeroSpace and Defence Industries Association
of Europe</acronymDefinition>
```

### 2.1.15 Verbatim text

**Description:** The element <`verbatimText`> contains text that is supposed to be presented with as little content distorting formatting applied. Typically, using the element <`verbatimText`>, the verbatim text is included to represent and show information like computer program text, non-proportional screen display text.

When the element is applied to contain markup information, that content must be entered in such a way that the contained marked up information does not interfere with the data module markup itself. One way to contain markup type of information in element <`verbatimText`> is to apply a CDATA marked section to represent the information. This will also retain line feeds, etc.

**Markup element:** <`verbatimText`> (O)

**Attributes:**

- `id` (O), the identifier of the element verbatim. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `verbatimStyle` (O), the style of verbatim text in the cases where there are more than one type of verbatim information and the types should be recognized and/or presented differently. This attribute can have the following values:
  - "`vs01`" - "`vs99`", refer to Chap 3.9.6.1
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of values for attribute `verbatimStyle`

**Markup example:**

Example 1: A paragraph containing a PC command line sequence (used this way, line feeds will normally be dropped):

```
<para>
<verbatimText>
C:\>cd C:\BikeDS\the_text_xml

C:\BikeDS\the_text_xml>dir data module code-S1000DBIKE-AAA-DA0-
20*.* /b
data module code-S1000DBIKE-AAA-DA0-20-00-0000-412A-A_000-02.XML
data module code-S1000DBIKE-AAA-DA0-20-00-0000-520A-A_000-02.XML

C:\BikeDS\the_text_xml>
</verbatimText>
</para>
```

Example 2: The markup for the same paragraph as in Example 1 containing a PC command line sequence using a CDATA marked section (this way, line feeds will be retained.):

```
<para>
<verbatimText>
<![CDATA[
C:\>cd C:\BikeDS\the_text_xml

C:\BikeDS\the_text_xml>dir DMC-S1000DBIKE-AAA-DA0-20*.* /b
DMC-S1000DBIKE-AAA-DA0-20-00-0000-412A-A_000-02.XML
DMC-S1000DBIKE-AAA-DA0-20-00-0000-520A-A_000-02.XML

C:\BikeDS\the_text_xml>
]]>
</verbatimText>
</para>
```

Example 3: A paragraph of tagged text (such as XML) using a CDATA marked section:

```
<para>
<verbatimText>
<![CDATA[
<para>For a full description of the headset,
refer to <dmRef xlink:type="simple"
xlink:actuate="onRequest" xlink:show="replace"
xlink:href=
"URN:S1000D:DMC-S1000DBIKE-AAA-DA2-30-00-00AA-041A-A">
<dmRefIdent><dmCode modelIdentCode="S1000DBIKE"
systemDiffCode="AAA" systemCode="DA2" subSystemCode="3"
subSubSystemCode="0" assyCode="00" disassyCode="00"
disassyCodeVariant="AA" infoCode="041" infoCodeVariant="A"
itemLocationCode="A"/></dmRefIdent>
</dmRef>.</para>
]]>
</verbatimText>
</para>
```

Example 4: A paragraph of tagged text (such as XML) using parameter entities to avoid tag character conflicts (in this case line feeds will normally be dropped):

```
<para>
<verbatimText>
&lt;para&gt;For a full description of the headset,
```

```
refer to &lt;refdm xlink:type="simple"
xlink:actuate="onRequest" xlink:show="replace"
xlink:href=
"URN:S1000D:DMC-S1000DBIKE-AAA-DA2-30-00-00AA-041A-A"&gt;
&lt;modelic&gt;S1000DBIKE&lt;/modelic&gt;
&lt;sdc&gt;AAA&lt;/sdc&gt;
&lt;chapnum&gt;DA2&lt;/chapnum&gt;
&lt;section&gt;3&lt;/section&gt;
&lt;subsect&gt;0&lt;/subsect&gt;
&lt;subject&gt;00&lt;/subject&gt;
&lt;discode&gt;00&lt;/discode&gt;
&lt;discodev&gt;>AA&lt;/discodev&gt;
&lt;incode&gt;041&lt;/incode&gt;
&lt;incodev&gt;A&lt;/incodev&gt;
&lt;itemloc&gt;A&lt;/itemloc&gt;
&lt;/refdm&gt;.&lt;/para&gt;
</verbatimText>
</para>
```

Example 5: A paragraph of text containing an example of inline xml text that has to be recognized in its context:

```
<para>This is a running text demonstrating how the attribute
<verbatimText verbatimStyle="vs01">verbatimStyle</verbatimText>
itself could be marked up in some context.</para>
```

This text would typically be presented as:

"This is a running text demonstrating how the attribute `verbatimStyle` itself could be marked up in some context."

### 2.1.16 Name

**Description:** The element <`name`> contains the name of the function, circuit breaker, controls and indicators, zone or access point. If technical repositories are used in the authoring process, the name is optional as it will be populated during the publication process.

**Markup element:** <`name`> (O)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

– None

**Business rules decisions:**

– None identified

## 2.2 Simple paragraph

**Description:** The element <`simplePara`> contains a minimum set of text subelements. It is used where the full set of elements that are available in a full paragraph (element <`para`>) are not required. Simple paragraphs are used in eg the element <`reasonForUpdate`> and the element <`remarks`>.

**Markup element:** <`simplePara`>

**Attributes:**

- `id` (O), the identifier of the element simple paragraph. Refere to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6

**Child elements:**

- <`subScript`> (O), the items to be subscripted. Refer to Para 2.1.10.
- <`superScript`> (O), the items to be superscripted. Refer to Para 2.1.11.

**Business rules decisions:**

- None identified

**Markup example:**

```
<reasonForUpdate>
<simplePara>Updated to include requirements of modification JS-
P-ORT-1ON</simplePara><simplePara>Updated to include
requirements of scheme ME-BAB1EE</simplePara>
</reasonForUpdate >
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the attribute `circuitBreakerAction`.** The project or the organization must decide whether to use the attribute `circuitBreakerAction` or not, and, if used establish writing rules to ensure that authors will be consistent in the paragraph text and the value of the attribute itself. Refer to Para 2.1.1.

**Use of the attribute `checkSum`.** The project or the organization must decide whether to use the attribute `circuitBreakerAction` or not, and, if used how to populate the attribute. Refer to Para 2.1.1.

**Use of the attribute `controlIndicatorNumber`.** The project or the organization must decide whether to use the attribute `controlIndicatorNumber` or not. Refer to Para 2.1.2.

**Types of inline significant data to markup.** If using paragraph significant data markup, the project or the organization must decide which types of data to mark up and in what contexts. The project or the organization must also consider that data modules can be less portable if the paragraph significant data types are extended in the BREX file past the standard types. Refer to Para 2.1.3.

**Types of quantity data to markup.** If using quantity data markup, the project or the organization must decide which types of data to mark up and in what contexts. The project or the organization must also consider that data modules can be less portable if the quantity data types are extended in the BREX file past the standard types. Refer to Para 2.1.4.

**Level of implementation.** The project or the organization must decide whether to use quantity data markup and to what extent it is used. The quantity data markup can be used with or without using the value and tolerance decomposition. Refer to Para 2.1.4.

**Use of unit of measure.** If using the value and tolerance decomposition, the project or the organization must decide at which level of the markup that the unit of measure is to be applied. A consistent usage of unit of measure is required to produce a consistent display or printout to the user. Refer to Para 2.1.4.1.

**Types of unit of measure.** If using the value and tolerance decomposition, the project or the organization must decide which unit of measure types to allow. Due to the large number of units of measure, it is expected that a project will only use a small subset of the available units of measure. The project or the organization must also consider that data modules can be less portable if the units of measure types are extended in the BREX file past the standard types. Refer to Para 2.1.4.1.

**Use of the element <`zoneRef`>.** The project or the organization must decide whether to use the element <`zoneRef`> element or not, and how to use it. Consideration for duplication and mismatch of data given in the maintenance planning information has to be taken. Refer to Para 2.1.5.

**Use of the element <`accessPointRef`>.** The project or the organization must decide whether to use the element <`accessPointRef`> or not, and how to use it. Consideration for duplication and mismatch of data given in the maintenance planning information has to be taken. Refer to Para 2.1.5.

**Definitions of attribute values for `accessPointTypeValue`.** The project or the organization must decide the use of values and allocate suitable definitions to them in the project or organization business rules. Refer to Chap 3.9.6.1 and Para 2.1.5.

**Use of indexing.** The project or the organization must decide whether an index is required and to what level indexing should be made. Refer to Para 2.1.7.

**Definitions of attribute values.** The project or the organization must decide the use of attribute `emphasisType` values and allocate suitable definitions to them in the project business rules. Refer to Chap 3.9.6 and Para 2.1.8.

**Size and scaling of symbols.** The project or the organization must decide the sizes and scaling of symbols. Refer to Para 2.1.9.

**Use of the element <`subScript`>.** The project or the organization must decide on the use of this element. Refer to Para 2.1.10.

**Use of the element <`superScript`>.** The project or the organization must decide on the use of this element. Refer to Para 2.1.11.

**Use of the element <`footnotes`>.** The project or the organization must decide if footnotes are used or not, or be limited to regular text and titles (inline) or tables (table footnotes). Refer to Para 2.1.12.

**Note**

The use of footnotes puts demands on the presentation of the footnote markers and the footnotes themselves. Project decisions on the presentation have to be made dependant on the publishing as page-oriented or IETP or both. Refer to Chap 6.2 and Chap 6.3.

**Determine footnote mark type.** It is recommended to use only one type of footnote marker for each of the table footnotes and inline footnotes throughout a project. It is recommended that the superscripted numbers are used for both. Refer to Para 2.1.12.

**Use of the element <`acronyms`>.** The project or the organization must decide whether acronyms will be indicated with markup. Refer to Para 2.1.14.

**Use of attribute `verbatimStyle`**. The project or the organization must decide the use of values and allocate suitable definitions to them in the project or organization business rules. Refer to Chap 3.9.6.1 and Para 2.1.15.

# Chapter 3.9.5.2.1.11

## *Common constructs - Controlled content*

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## 1 General

This chapter gives rules and guidance for marking controlled content within the content section of data modules.

There are cases where data receivers are offered the opportunity to augment or modify technical content prior to its publication. This content is referred to as controlled content.

## 2 Controlled content

The attributes indicating that an element contains controlled content are present on many of the elements in the data module structures.

### 2.1 Controlled content requirements

The requirements for controlled content can be summarized as:

- Controlled content that is not originator content must be identified
- Controlled content must identify the entity that controls the content, and, optionally, related authority documentation
- The identification of controlled content must remain persistent across revisions
- The data receiver must be able to clearly identify controlled content

## 2.2 Marking an element as controlled content

When applying controls over elements, the effect of the control propagates downward through the hierarchy. Controlled content is indicated by setting the values of the attributes. When there is the need to mark controlled content, the attribute `authorityName` must be used.

**Attributes:**

– `authorityName` (M) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Presentation**. The project or the organization must decide the method of presentation for controlled content. Refer to Para 2.

# 4 Examples

The following markup example shows that the second element of type <`proceduralStep`> is originated by the data receiver identified by the 3-letter attribute `authorityName` value of "`xyz`".

```
<proceduralStep>
<para>This is normal procedural step content</para>
<proceduralStep>
<para>This is normal originator owned content</para>
</proceduralStep>
<proceduralStep authorityName="xyz" authorityDocument="xyz-prod-
1">
<para>This content is controlled by data receiver xyz</para>
</proceduralStep>
</proceduralStep>
```

# Chapter 3.9.5.2.1.12

## *Common constructs - Common information*

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| Chap 3.9.5.2.1.7 | Common constructs - Figures and foldouts |
| Chap 3.9.5.2.1.10 | Common constructs - Text elements |
| Chap 3.9.5.2.1.11 | Common constructs - Controlled content |
| Chap 3.9.5.3 | Data modules - Applicability |

# 1 General

This chapter contains the definition and handling of the element <commonInfo> from an author's point of view. It gives details about the available elements and attributes and how to use them to populate <commonInfo>.

Common information is used to provide data to the user that applies to the entire data module. The information can contain a general description or introduction of the task or subtask contained in the data module. The element <commonInfo> must not contain procedural steps.

The element <commonInfo> is contained in the procedural, fault, checklist, and maintenance planning data modules.

# 2 Common information

ICN-XXXXX-S1000D-00001-001-01

*Fig 1 Element <commonInfo>*

## 2.1 Definition

**Description:** The element <commonInfo> contains descriptive information that applies to an entire data module.

**Markup element:** <commonInfo> (M)

**Attributes:**

– None

**Child elements:**

– <title> (O). Refer to Chap 3.9.5.2.1.5.
– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <note> (C). Refer to Chap 3.9.3.
– <para> (C). Refer to Chap 3.9.5.2.1.10.

– <commonInfoDescrPara> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of common information (element <commonInfo>)

**Markup example:**

Refer to Para 4 for a complete markup example.

```
<commonInfo>
<commonInfoDescrPara>
...
</commonInfoDescrPara>
</commonInfo>
```

### 2.1.1 Paragraph text

2.1.1.1 Definition

The common information text can be marked up using one of two methods. One method makes use of an optional element <note>, one or more element <para>, and optional and repeatable element <commonInfoDescrPara>. The other method makes use of one or more element <commonInfoDescrPara>.

2.1.1.2 Descriptive Paragraph Definition

**Description:** The element <commonInfoDescrPara> is used to contain text information.

**Markup element:** <commonInfoDescrPara> (C)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3
– id (O), the identifier of the <commonInfoDescrPara> element. Refer to Chap 3.9.5.2.1.2
– changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
– securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

– <warning> (O). Refer to Chap 3.9.3.
– <caution> (O). Refer to Chap 3.9.3.
– <note> (O). Refer to Chap 3.9.3.
– <circuitBreakerDescrGroup> (O). Refer to Chap 3.9.5.2.1.10.
– <para> (O). Refer to Chap 3.9.5.2.1.10.
– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <multimedia> (O). Refer to Chap 3.9.2.4.
– <foldout> (O). Refer to Chap 3.9.5.2.1.7.
– <table> (O). Refer to Chap 3.9.5.2.1.6.
– <commonInfoDescrPara> (O).

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Markup method for common information text.

**Markup example:**

Refer to Para 4 for a complete markup example.

```
<commonInfoDescrPara>
<para>
...
</para>
</commonInfoDescrPara>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of common information**. The project or the organization must decide whether to use the element <commonInfo> in procedural, maintenance planning, and/or fault data modules or not. Refer to Para 2.

**Markup method for common information text**. The project or the organization must decide whether to use the markup method containing <note>, <para> and <commonInfoDescrPara> or the method containing only <commonInfoDescrPara>. Refer to Para 2.1.1.

# 4 Examples

The following markup examples demonstrate the use of the <commonInfo> element.

```
<commonInfo>
<title>General Information</title>
<commonInfoDescrPara>
<title>Components Involved in an Accident</title>
<para>Any component removed for reason of accident shall be
preserved and shall be shipped in the same condition it was in
after the accident</para>
</commonInfoDescrPara>
</commonInfo>
```

```
<commonInfo>
<title>Special Instructions</title>
<commonInfoDescrPara>
<para>The columns headed I and P are used to indicate the
requirements for Intermediate and Periodic inspections
respectively. When item is required with a frequency other than
that indicated by these column headings, the proper frequency is
indicated in the appropriate column.</para>
</commonInfoDescrPara>
<commonInfoDescrPara>
<para>Work time requirements for individual items are stated in
the W/T column.</para>
</commonInfoDescrPara>
</commonInfo>
```

```
<commonInfo>
<title>Condition Inspection</title>
<para>Operators have periodically experienced fram vibration and
```

```
have had difficulty identifying the cause of vibration.
Troubleshooting frame vibration can consume a number of man-
hours and cause considerable amount of concern. This procedure
proivdes a compliation of known causes of frame vibration and
the required corrective action.</para>
</commonInfo>
```

# Chapter 3.9.5.2.2

## *Content section - Descriptive information*

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## 1 General

This Schema is used to capture and represent descriptive information.

The granularity of descriptive data modules must follow the breakdown reflected by the SNS providing descriptions at:

- system
- subsystem
- sub-subsystem levels

as required by the:

- maintenance philosophy
- scope of information required

For details on the scope of information, refer to Chap 5.2.1.2.

The granularity must be determined by the project or the organization.

# 2 Descriptive information

## 2.1 Description

**Description:** The element <description> is used to contain the descriptive information. Descriptive paragraphs can be broken down into subparagraphs, which can be broken down further into sub-subparagraphs and so on. The depth of this breakdown is unlimited, however, it is recommended to not exceed five levels of depth. It is further recommended that additional levels only be used in a conversion effort, where existing data is authored to such a depth and restructuring of data is not feasible. In these cases, the subparagraph breakdown must never exceed eight levels of depth. The project or the organization must decide on the depth of breakdown.

**Note**

The descriptive data module uses common constructs. For the detailed explanations and rules for common constructs, refer to Chap 3.9.5.2.1.

**Markup element:** <description> (M)

ICN-83007-0000000054-001-01

*Fig 1 Element <description>*

**Attributes:**

- `warningRefs` (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- `cautionRefs` (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.

**Child elements:**

- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <warning> (O). The use of warnings in descriptive information is a project or an organization decision. Refer to Chap 3.9.3.
- <caution> (O). The use of cautions in descriptive information is a project or an organization decision. Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <levelledPara> (O). Refer to Chap 3.9.5.2.1.10.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7 and Chap 3.9.5.2.1.6.
- <table> (O). Refer to Chap 3.9.5.2.1.6.
- <caption> (O). Refer to Chap 3.9.5.2.1.4.

**Business rules decisions:**

- paragraph depth
- occurrences of subparagraphs

– use of warnings and cautions

**Markup example:**

Refer to Para 4.

## 2.2 Levelled paragraphs

**Description:** The element <`levelledPara`> is the equivalent of a headed paragraph and subparagraphs. It can have one or more <`levelledPara`> elements nested within it. The depth of this structure is unlimited, however, it is recommended to not exceed five levels of depth. It is further recommended that additional levels only be used in a conversion effort, where existing data is authored to such a depth and restructuring of data is not feasible. In these cases, the structure must never exceed eight levels of depth. The project or the organization must decide on the depth of breakdown.
The Schema allows for a single occurrence of <`levelledPara`> under a parent <`levelledPara`>. The project or organization must decide whether to allow this structure in their descriptive data modules or to insist on a minimum occurrence of two <`levelledPara`> elements.

**Markup element:** <`levelledPara`> (O)

ICN-83007-0000000061-001-01

*Fig 2 Element* <`levelledPara`>

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the [*insert description*] element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O) and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `warningRefs` (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- `cautionRefs` (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.

- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`title`> (O). Refer to Chap 3.9.5.2.1.5.
- <`captionGroup`> (O). Refer to Chap 3.9.5.2.1.4.
- <`warning`> (O). The use of warnings in descriptive information is a project or an organization decision. Refer to Chap 3.9.3.
- <`caution`> (O). The use of cautions in descriptive information is a project or an organization decision. Refer to Chap 3.9.3.
- <`note`> (O). Refer to Chap 3.9.3.
- <`circuitBreakerDescrGroup`> (O). Refer to Chap 3.9.5.2.11.2.
- <`para`> (O). Refer to Chap 3.9.5.2.1.10.
- <`figure`> (O). Refer to Chap 3.9.5.2.1.7.
- <`multimedia`> (O). Refer to Chap 3.9.2.
- <`foldout`> (O). Refer to Chap 3.9.5.2.1.7 and Chap 3.9.5.2.1.6.
- <`table`> (O). Refer to Chap 3.9.5.2.1.6.
- <`caption`> (O). Refer to Chap 3.9.5.2.1.4.
- <`levelledPara`> (O)

**Business rules decisions:**

- paragraph depth
- occurrences of subparagraphs
- use of warnings and cautions

**Markup example:**

Refer to Para 4.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Granularity of data modules**. The project or the organization must define the granularity of data modules. Refer to Para 1.

**Paragraph depth.** The project or the organization must decide on the depth of breakdown for paragraphs. Refer to Para 2.2.

**Occurrences of subparagraphs.** The project or the organization must decide whether to allow this breakdown in their descriptive data modules or to insist on a minimum of two subparagraphs or not. Refer to Para 2.2.

**Use of warnings and cautions.** The project or the organization must decide whether to use warnings and cautions in descriptive information. Refer to Para 2.1 and Para 2.2.

# 4 Examples

```
<levelledPara>
<title>The bicycle wheel</title>
<para>The wheel (refer to <internalRef internalRefId="fig-0001"
internalRefTargetType="figure"></internalRef>) of a bicycle is a
complex structure. The wheel assembly has these parts:
```

```
<randomList listItemPrefix="pf01">
<listItem>the tire</listItem>
<listItem>the tube</listItem>
<listItem>the spokes</listItem>
<listItem>the spoke nipples</listItem>
<listItem>the valve</listItem>
<listItem>the hub</listItem>
</randomList>
On their own, the individual components are not very strong.
But, when they are installed together, the components make the
complete wheel (refer to <internalRef internalRefId="fig-0001"
internalRefTargetType="figure"></internalRef>). The complete
wheel is resistant to almost any type of heavy loads and
operation.</para>
<figure id="fig-0001">
<title>Parts of the wheel</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-DA00000-0-U8025-
00504-A-03-1" reproductionWidth="510"></graphic>
</figure>
<levelledPara id="par-0001">
<title>Spokes</title>
<para>The spokes go out from the hub and go across and below
each other. The spoke nipples attach the spokes to the rim
with the threads on the end of the spokes. You can use the
spoke nipples to adjust the tension of the spokes.
The tension on each of the spokes must be equal.</para>
</levelledPara>
<levelledPara id="par-0002">
<title>Wheel rim</title>
<para>The rim (refer to <internalRef internalRefId="fig-0002"
internalRefTargetType="figure"></internalRef>) of the wheel has
a lining of rim tape. This tape protects the tube from damage
that the rough edges on the spoke nipples can cause.</para>
<figure id="fig-0002">
<title>The tire and rim</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-DA00000-0-U8025-
00504-B-03-1" reproductionWidth="510"></graphic>
</figure>
</levelledPara>
<levelledPara id="par-0003">
<title>Tube and tire</title>
<para>The tube and the tire install on the rim. The sidewalls of
the tire have markings on them. These which are used to indicate
the correct direction of rotation. The markings also make sure
the tire installs on the rim and that the directional arrows
points in the correct direction. You install the tube into the
tire before you inflate it. The tube has a valve (refer to
<internalRef internalRefId="fig-0003"
internalRefTargetType="figure"></internalRef>) which you put
through the hole in the rim. This valve (refer to <internalRef
internalRefId="fig-0003"
internalRefTargetType="figure"></internalRef>)is used to inflate
the tube and the tire to the correct pressure. A dust cap
installs on the valve (refer to <internalRef internalRefId="fig-
0003" internalRefTargetType="figure"></internalRef>)to prevent
damage that dust and debris can cause.</para>
<figure id="fig-0003">
<title>Valve</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-DA00000-0-U8025-
00505-A-03-1" reproductionWidth="510"></graphic>
```

```
</figure>
</levelledPara>
</levelledPara>
```

# Chapter 3.9.5.2.3

## *Content section - Procedural information*

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# 1 General

The procedural Schema is used to capture and represent procedural information. The granularity of maintenance procedural data modules is to follow the breakdown reflected by the SNS, the information codes and should reflect the tasks identified in the maintenance plan. The granularity of crew/operator procedural data modules is to follow the breakdown reflected by the SNS, information codes and should reflect the operation identified. The use of the common entities, elements and attributes is to be as detailed in Chap 3.9.5.2.1.

# 2 Procedural information

## 2.1 Schema basic rules

The procedural Schema has structural elements that are used to provide a hierarchy of steps and substeps. Note that if a condition applies to a step or substep, then that condition also applies to all its substeps.

## 2.2 Content

This procedural Schema can be used for all types of information of procedural or instructional type. Eg for the technical content in maintenance procedures, refer to Chap 5.2.1.3.1.

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*Fig 1 Major elements in procedural content*

**Attributes:**

– id (O), the identifier of the <content> element. Refer to Chap 3.9.5.2.1.2.

## 2.3 References

References, element <refs> must be populated in accordance with Chap 3.9.5.2.1.2.

## 2.4 Warnings and cautions collection

The collection of warnings and cautions, element <warningAndCautions> must be populated in accordance with Chap 3.9.3.

## 2.5 Procedure

**Description:** The element <procedure> contains all information necessary to carry out the task or the main objective of the procedural information.

**Markup element:** <procedure> (M)

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*Fig 2 Element <procedure>*

**Attributes:**

– None

**Child elements:**

– <commonInfo> (O). Refer to Chap 3.9.5.2.1.12.
– <preliminaryRqmts> (M). Refer to Chap 3.9.5.2.1.9.
– <mainProcedure> (M). Refer to Para 2.6.
– <closeRqmts> (M). Refer to Chap 3.9.5.2.1.9.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional element <commonInfo>

**Markup example:**

– Refer to Para 4.

## 2.6 Main procedure

**Description:** The element <mainProcedure> contains the detailed procedural steps to be done, properly supported by figures, multimedia, foldouts and tables.

**Markup element:** <mainProcedure> (M)

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*Fig 3 Element <mainProcedure>*

**Attributes:**

- id (O), the identifier of the <mainProcedure> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (O), the skill level required for the complete procedure. Refer to Chap 3.9.5.1. This attribute can have the following values:
  - "sk01" thru "sk99". Refer to Chap 3.9.6.1.
- independentCheck (O), the complete procedure must be checked by a supervisor with a given qualification
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

One or more of the following:

- <proceduralStep> (O). Refer to Para 2.6.1.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the optional attribute skillLevelCode
- use of the optional attribute independentCheck

**Markup example:**

- Refer to Para 4.

### 2.6.1 Procedural step

**Description:** The element <proceduralStep > contains a step in the procedure. A step can be broken down into substeps by including another element <proceduralStep>, which can itself be broken down further into substeps by including another element <proceduralStep>, and so on following the lower branch in Fig 1. In this way, any depth

of substep breakdown can be achieved. However, it is highly discouraged not to exceed five levels of depth. The substep breakdown must never exceed eight levels of depth (for details, refer to Business rules decisions below).

**Markup element:** <`proceduralStep`> (M)

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*Fig 4 Element <`proceduralStep`>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`proceduralStep`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `warningRefs` (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- `cautionRefs` (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- `independentCheck` (O), the step must be checked by eg a supervisor with a given qualification.
- `skillLevelCode` (O), the skill level required for complete procedure. Refer to Chap 3.9.5.1. This attribute can have the following values:
  - "`sk01`" thru "`sk99`". Refer to Chap 3.9.6.1.
- `keepWithNext` (O), the indication whether a step is presented together with the next step, if possible. This attribute is intended for use only when absolutely necessary in a situation where eg scrolling is not practical for the user or the viewing device does not allow scrolling. This attribute can have the following values:
  - "`0`" (D), No
  - "`1`", Yes - the step is kept with the next sibling step (if one exists) and therefore, all children of the element for which the attribute is set should be kept together as well (if possible). This attribute has no meaning when placed on a final step.
- `itemCharacteristic` (O), used to indicate characteristics of the item that is the subject of a given procedural step. This attribute can have the following values:
  - "`ic00`" thru "`ic99`". Refer to Chap 3.9.6.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`title`> (O). Refer to Para 2.6.2 for the use of titles. Refer to Chap 3.9.5.2.1.5 for general rules on titles.
- <`warning`> (O). Refer to Para 2.6.3 for the validity of warnings. Refer to Chap 3.9.3 for general rules on warnings.
- <`caution`> (O). Refer to Para 2.6.3 for the validity of cautions. Refer to Chap 3.9.3 for general rules on cautions.
- <`note`> (O). Refer to Chap 3.9.3.
- <`circuitBreakerDescrGroup`> (O). Refer to Chap 3.9.5.2.1.10.
- <`para`> (O). Refer to Chap 3.9.5.2.1.10.
- <`figure`> (O). Refer to Chap 3.9.5.2.1.7.
- <`multimedia`> (O). Refer to Chap 3.9.2.4.
- <`foldout`> (O). Refer to Chap 3.9.5.2.1.7.
- <`table`> (O). Refer to Chap 3.9.5.2.1.6.
- <`caption`> (O). Refer to Chap 3.9.5.2.1.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- maximum number of step levels allowed

- minimum number of substeps under a parent
- use of the optional attribute `skillLevelCode`
- use of the optional attribute `independentCheck`
- use of the optional attribute `keepWithNext`
- use of the optional attribute `itemCharacteristic`

**Markup example:**

- Refer to Para 4.

### 2.6.2 Title

**Description:** The element <`title`>is used give the title of the step or a sequence of substeps. The element <`title`>must not be used on a substep when the preceding step or substep does not have a title.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of titles in procedural steps

### 2.6.3 Warnings, cautions and notes

A warning, caution or note or a warning or caution reference that is placed in a step (element <`proceduralStep`>) applies to all substeps (element <`proceduralStep`>) within. The converse of this does not hold true.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the optional element <`commonInfo`>**. The project or the organization must decide whether to use the element <`commonInfo`> or not, when to use the element, and give guidance and rules that will make sure that it is consistently used. Refer to Para 2.5.

**Use of the optional attribute `skillLevelCode`**. The element <`mainProcedure`> and the element <`proceduralStep`> can contain an indication of the skill level required for the whole procedure and/or for individual steps/substeps using the attribute. The project or the organization must decide whether to use the attribute `skillLevelCode` or not and how to use it. Refer to Para 2.6.

**Use of the optional attribute `independentCheck`**. The element <`mainProcedure`> and the element <`proceduralStep`> can contain a check using the attribute `independentCheck` to indicate that the whole procedure and/or individual steps/substeps must be checked by a supervisor with a given qualification. The project or the organization must decide whether to use the attribute `independentCheck` or not and how to use it. Refer to Para 2.6.

**Maximum number of step levels**. Exceeding a substep breakdown of five levels of depth is highly discouraged in development of new data. It is recommended that additional levels only be used in a conversion effort where the existing data is authored to this depth (maximum eight levels) and restructuring of data is not feasible. The project or the organization must decide on the maximum step levels allowed. Refer to Para 2.6.

**Minimum number of substeps under a parent**. The Schema allows for a single substep under a parent. The project or the organization must decide whether to allow this breakdown in their procedural data modules or to insist on a minimum of two substeps. Refer to Para 2.6.1.

**Use of the optional attribute `keepWithNext`**. The project or the organization must decide whether to use the attribute `keepWithNext` or not. Refer to Para 2.6.1.

**Use of the optional attribute `itemCharacteristic`**. The project or the organization must decide whether to use the attribute `itemCharacteristic` or not and how to use it.

**Use of titles in procedural steps**. The project or the organization must decide whether to use the element <`title`> or not and how to use it. Refer to Para 2.6.1.

# 4 Examples

The following is a markup example of a procedure.

```
<procedure>
<preliminaryRqmts>
<reqCondGroup>
<reqCondNoRef>
<reqCond>The bicycle chain is clean and dry</reqCond>
</reqCondNoRef>
</reqCondGroup>
<reqPersons>
<person man="A">
<personCategory personCategoryCode="Operator"/>
<personSkill skillLevelCode="sk02"/>
<trade>Bike rider</trade>
<estimatedTime unitOfMeasure="h">0,5</estimatedTime>
</person>
</reqPersons>
<reqSupportEquips>
<supportEquipDescrGroup>
<supportEquipDescr id="seq-0001">
<name>Clean dry cloth</name>
<identNumber>
<manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-12</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
</supportEquipDescr>
<supportEquipDescr id="seq-0002">
<name>Floor covering</name>
<identNumber>
<manufacturerCode>KK999</manufacturerCode>
<partAndSerialNumber>
<partNumber>PPP-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="pack">1</reqQuantity>
</supportEquipDescr>
</supportEquipDescrGroup>
</reqSupportEquips>
<reqSupplies>
<supplyDescrGroup>
<supplyDescr id="sup-0001">
<name>Wet lube</name>
<identNumber>
<manufacturerCode>KZ222</manufacturerCode>
<partAndSerialNumber>
```

```
<partNumber>LL-007</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="dl">1</reqQuantity>
</supplyDescr>
<supplyDescr id="sup-0002">
<name>Dry lube</name>
<identNumber>
<manufacturerCode>KZ222</manufacturerCode>
<partAndSerialNumber>
<partNumber>LL-006</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity unitOfMeasure="dl">1</reqQuantity>
</supplyDescr>
</supplyDescrGroup>
</reqSupplies>
<reqSpares>
<noSpares/>
</reqSpares>
<reqSafety>
<safetyRqmts>
<warning>
<warningAndCautionPara>Dry lube is a very dangerous substance.
Do not get it onto your skin. Use it in a well ventilated area.
If you swallow it seek immediate medical advice. If it gets into
your eyes wash your eyes in clean water and seek medical
advice.</warningAndCautionPara>
</warning>
<warning>
<warningAndCautionPara>Wet lube is a very dangerous substance.
Do not get it onto your skin. Use it in a well ventilated area.
If you swallow it seek immediate medical advice. If it gets into
your eyes wash your eyes in clean water and seek medical
advice.</warningAndCautionPara>
</warning>
</safetyRqmts>
</reqSafety>
</preliminaryRqmts>
<mainProcedure>
<proceduralStep>
<para>Apply the penetrating lubricant into all the parts of the
bike that move. This includes: <randomList
listItemPrefix="pf02">
<listItem>
<para>derailleur pivots (refer to <internalRef
internalRefId="fig-0001" internalRefTargetType="figure"
xlink:actuate="onRequest" xlink:show="replace" xlink:href="#fig-
0001"/>)</para>
</listItem>
<listItem>
<para>derailleur tension (refer to <internalRef
internalRefId="fig-0002" internalRefTargetType="figure"
xlink:actuate="onRequest" xlink:show="replace" xlink:href="#fig-
0002"/>)</para>
</listItem>
<listItem>
<para>brake lever pivots (refer to <internalRef
internalRefId="fig-0003" internalRefTargetType="figure"
```

```
xlink:actuate="onRequest" xlink:show="replace" xlink:href="#fig-
0003"/>)</para>
</listItem>
</randomList> These brake lever pivots include: <randomList
listItemPrefix="pf02">
<listItem>
<para>derailleur pivots</para>
</listItem>
<listItem>
<para>derailleur tension</para>
</listItem>
<listItem>
<para>guide wheels</para>
</listItem>
<listItem>
<para>brake lever pivots</para>
</listItem>
<listItem>
<para>control cables and where they go into their casings</para>
</listItem>
</randomList>
</para>
<figure id="fig-0001">
<title>Derailleur pivots</title>
<graphic xlink:type="simple" xlink:href="URN:S1000D:ICN-
S1000DBIKE-AAA-DA51000-0-U8025-00521-A-04-1"
xlink:title="Derailleur pivots" infoEntityIdent="ICN-S1000DBIKE-
AAA-DA51000-0-U8025-00521-A-04-1"/>
</figure>
<figure id="fig-0002">
<title>Derailleur tension</title>
<graphic xlink:type="simple" xlink:href="URN:S1000D:ICN-
S1000DBIKE-AAA-DA51000-0-U8025-00522-A-04-1"
xlink:title="Derailleur tension" infoEntityIdent="ICN-
S1000DBIKE-AAA-DA51000-0-U8025-00522-A-04-1"/>
</figure>
<figure id="fig-0003">
<title>Brake lever pivots</title>
<graphic xlink:type="simple" xlink:href="URN:S1000D:ICN-
S1000DBIKE-AAA-DA10000-0-U8025-00516-A-04-1" xlink:title="Brake
lever pivots" infoEntityIdent="ICN-S1000DBIKE-AAA-DA10000-0-
U8025-00516-A-04-1"/>
</figure>
</proceduralStep>
<proceduralStep id="stp-0001">
<para>Lubricate the chain.</para>
<proceduralStep>
<para>Make sure the chain is clean and dry.</para>
</proceduralStep>
<proceduralStep>
<para>Put the <internalRef internalRefId="seq-0002"
internalRefTargetType="supply" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="seq-0002"/> on the floor below
the chain.</para>
</proceduralStep>
<proceduralStep>
<para>Use a <internalRef internalRefId="sup-0002"
internalRefTargetType="supply" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="sup-0002"/> for dry
```

```
conditions.</para>
</proceduralStep>
<proceduralStep>
<para>Use a <internalRef internalRefId="sup-0001"
internalRefTargetType="supply" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="sup-0001"/> for wet
conditions</para>
</proceduralStep>
<proceduralStep itemCharacteristic="ic03">
<para>Apply the lubricant to each roller of the chain (refer to
<internalRef internalRefId="fig-0004"
internalRefTargetType="figure" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="#fig-0004"/>) but only apply a
small quantity.</para>
<figure id="fig-0004">
<title>Lubricate the chain</title>
<graphic xlink:type="simple" xlink:href="URN:S1000D:ICN-
S1000DBIKE-AAA-DA41000-0-U8025-00528-A-04-1"
xlink:title="Lubricate the chain" infoEntityIdent="ICN-
S1000DBIKE-AAA-DA41000-0-U8025-00528-A-04-1"/>
</figure>
</proceduralStep>
<proceduralStep>
<para>Hold the nozzle of the container above the front of the
chain ring and slowly turn the cranks rearwards.</para>
</proceduralStep>
<proceduralStep itemCharacteristic="ic03">
<caution>
<warningAndCautionPara>Do not get lubrication oil into the brake
system. Oil in the break system can affect the efficiency of the
brake system. Do not get oil onto the floor where it can easily
get transferred onto the brake system.</warningAndCautionPara>
</caution>
<para>Let the lubricant soak into chain before you clean the
unwanted lubricant from the chain.</para>
</proceduralStep>
</proceduralStep>
<proceduralStep>
<para>Do a check of the rear wheel rim and clean the unwanted
lubricant if necessary.</para>
</proceduralStep>
<proceduralStep>
<para>Do a check of the chain to make sure that each link is
lubricated. If there are links that do not move easily or have
become frozen, lubricate the chain again (refer to <internalRef
internalRefId="stp-0001" internalRefTargetType="step"
xlink:actuate="onRequest" xlink:show="replace" xlink:href="stp-
0001"/>).</para>
</proceduralStep>
<proceduralStep>
<para>Do a check of the remaining lubricated parts and clean the
unwanted lubricant with a <internalRef internalRefId="seq-0001"
internalRefTargetType="supequip" xlink:actuate="onRequest"
xlink:show="replace" xlink:href="seq-0001"/>.</para>
</proceduralStep>
</mainProcedure>
<closeRqmts>
<reqCondGroup>
<noConds/>
```

```
</reqCondGroup>
</closeRqmts>
</procedure>
```

# Chapter 3.9.5.2.4

## *Content section - Fault information*

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# 1 General

The fault Schema is used to capture and represent fault reporting, fault isolation and fault correlation information. The granularity of these data modules is to follow the breakdown reflected by the SNS.

The use of the common entities, elements and attributes is detailed in Chap 3.9.5.2.1.

# 2 Fault information

## 2.1 Content

**Description:** The fault isolation Schema allows for five types of fault information to be produced as individual data modules. These are fault reporting (in terms of isolated, detected, observed or correlated faults) or fault isolation. Refer to Chap 5.2.1.3.2.

**Markup element:** <content> (M)

**Attributes:**

– `id` (O), the identifier of the <`content`> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <`refs`> (O). Refer to Chap 3.9.5.2.1.2.
– <`warningsAndCautions`> (O). Refer to Chap 3.9.3.

and one of

– <`faultReporting`> (O). Refer to Para 2.4.
– <`faultIsolation`> (O). Refer to Para 2.5.

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*Fig 1 Major elements in fault isolation content*

**Business rules decisions:**

– None identified

**Markup example:**

```
<content>
<faultReporting>
<isolatedFault id="flt-0003" faultCode="NYCJD03">
<faultDescr>
</faultDescr>
<locateAndRepair>
<locateAndRepairLruItem>
<lru>
</lru>
</locateAndRepair>
</locateAndRepairLruItem>
</isolatedFault>
</faultReporting>
</content>
```

## 2.2 References

References (element <refs>) must be populated in accordance with Chap 3.9.5.2.1.2.

## 2.3 Warnings and cautions

Warnings and cautions (element <warningsAndCautions>) must be populated in accordance with Chap 3.9.3.

## 2.4 Fault reporting

**Description:** The element <faultReporting > contains information to enable technician or computerized maintenance systems to indicate faults through data modules.

**Markup element:** <faultReporting > (O)

**Attributes:**

– None

**Child elements:**

– <commonInfo> (O). Refer to Chap 3.9.5.2.1.12.
– <preliminaryRqmts> (O). Refer to Chap 3.9.5.2.1.9.

and one of

– <isolatedFault>(O). Refer to Para 2.4.1.
– <detectedFault>(O). Refer to Para 2.4.2.
– <observedFault>(O). Refer to Para 2.4.3.
– <correlatedFault>(O). Refer to Para 2.4.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<faultReporting>
<isolatedFault id="flt-0003" faultCode="NYCJD03">
<faultDescr>
<detailedFaultDescr>
<systemName>Engine</systemName>
<faultMessageBody>Engine will not start.</faultMessageBody>
</detailedFaultDescr>
</faultDescr>
```

```
<locateAndRepair>
<locateAndRepairLruItem>
<lru>
</lru>
</locateAndRepairLruItem>
</locateAndRepair>
</isolatedFault>
</faultReporting>
```

### 2.4.1 Isolated faults

**Description:** The element <isolatedFault> is used to capture isolated faults information.

**Markup element:** <isolatedFault> (O)

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*Fig 2 Element <isolatedFault>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <isolatedFault> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultCode (M), the fault code that is allocated as part of a logistic analysis process
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <faultDescr> (C). Refer to Para 2.4.1.1.
- <detectionInfo> (O). Refer to Para 2.4.1.3.
- <locateAndRepair> (C). Refer to Para 2.4.1.4.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<isolatedFault id="flt-0003" faultCode="NYCJD03">
<faultDescr>
<detailedFaultDescr>
<systemName>Engine</systemName>
<faultMessageBody>Engine will not start.</faultMessageBody>
</detailedFaultDescr>
</faultDescr>
```

```
<locateAndRepair>
<locateAndRepairLruItem>
<lru>
</lru>
</locateAndRepairLruItem>
</locateAndRepair>
</isolatedFault>
```

2.4.1.1 Description of the isolated fault

**Description:** The element <faultDescr> contains the description of the isolated fault.

**Markup element:** <faultDescr> (C)

ICN-3627-S1000D0504-001-01

*Fig 3 Element <faultDescr>*

**Attributes:**

- id (O), the identifier of the <faultDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <descr> (O), the textual fault description by the message identification as it is displayed to the maintenance crew.
- <detailedFaultDescr> (O). Refer to Para 2.4.1.2.
- <refs> (O), the references to, if required, other data modules, publication modules or non S1000D publications to complete the description. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<faultDescr>
<descr>Horn failed</descr>
</faultDescr>
```

2.4.1.2 Detailed description of the isolated fault

**Description:** The element <detailedFaultDescr> contains the detailed description of the isolated fault.

**Markup element:** <detailedFaultDescr> (O)

**Attributes:**

- id (O), the identifier of the <faultDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

All child elements can have a textual content and all have the same set of attributes as the element <faultDescr >.

- <viewLocation> (O), the physical location on display system
- <systemLocation> (O), the location or panel where the malfunction is shown
- <systemName> (C) , the faulty system
- <faultySubSystem> (O), the faulty subsystem
- <systemIdent> (O), the discriminating identification information to identify the faulty system, eg "yellow" for a hydraulic flag system
- <systemPosition> (O), the discriminating identification information, position-oriented, eg "left"
- <faultEquip>) (O), the equipment involved in the malfunction
- <faultMessageIndication> (O), the indication part of the fault message, eg "temperature"
- <faultMessageBody> (C), the main part of the fault message
- <faultCond> (O), the potential fault condition

**Business rules decisions:**

- None identified

**Markup example:**

```
<detailedFaultDescr>
<systemName>Engine</systemName>
<faultMessageBody>Engine will not start.</faultMessageBody>
</detailedFaultDescr>
```

2.4.1.3 Fault detecting information

**Description:** The element <detectionInfo> contains the information for detecting the fault.

**Markup element:** <detectionInfo> (O)

ICN-3627-S1000D0505-001-01

*Fig 4 Element <detectionInfo>*

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- detectionType (O), the type of fault

**Child elements:**

- <detectedLruItem>. Refer to Para 2.4.1.3.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<detectionInfo detectionType="Major">
<detectedLruItem>
<lru>
<name>Tire</name>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</detectedLruItem>
</detectionInfo>
```

*2.4.1.3.1 Detected Line Replaceable Unit (LRU) item*

**Description:** The element <detectedLruItem> contains the identification, name and abbreviation of the detected LRU.

**Markup element:** <detectedLruItem> (C)

**Attributes:**

- id (O), the identifier of the <detectedLruItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultProbability (O), the probability factor to indicate the likelihood that this particular LRU is faulty
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <lru> (C). Refer to Para 2.4.1.3.2.
- <remarks> (O). Refer to Chap 3.9.5.1.
- <detectSruItem> (O). Refer to Para 2.4.1.3.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<detectedLruItem>
<lru>
<name>Tire</name>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</detectedLruItem>
```

*2.4.1.3.2 LRU identification*

**Description:** The element <lru> contains name, a shortname and identification of the LRU.

**Markup element:** <lru> (C)

ICN-3627-S1000D0506-001-01

*Fig 5 Element <lru>*

**Attributes:**

- id (O), the identifier of the <faultDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <name> (O). Refer to Chap 3.9.5.2.1.9.
- <shortName> (O). Refer to Chap 3.9.5.2.1.9.
- The identification by one or more of the elements <catalogSeqNumberRef> <natoStockNumber>, <identNumber> and <toolRef>. Refer to Chap 3.9.5.2.1.9.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lru>
<name>Tire</name>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
```

*2.4.1.3.3 Detected Shop Replaceable Unit (SRU) item*

**Description:** The element <detectedSruItem> contains the identification, name and abbreviation of the detected SRU.

**Markup element:** <detectedSruItem> (C)

**Attributes:**

- id (O), the identifier of the <detectedLruItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultProbability (O), the probability factor to indicate the likelihood that this particular LRU is faulty
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <sru> (C). Refer to Para 2.4.1.3.4.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<detectedSruItem>
<sru>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</sru>
</detectedSruItem>
```

*2.4.1.3.4 SRU identification*

**Description:** The element <sru> contains name, a shortname and identification of the SRU.

**Markup element:** <sru> (C)

**Attributes:**

- id (O), the identifier of the <faultDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <name> (O). Refer to Chap 3.9.5.2.1.9.
- <shortName> (O). Refer to Chap 3.9.5.2.1.9.
- The identification by one or more of the elements <catalogSeqNumberRef> <natoStockNumber>, <identNumber> and <toolRef>. Refer to Chap 3.9.5.2.1.9.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<sru>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</sru>
```

2.4.1.4 Locate and repair/Locate and repair LRU

**Description:** The element <`locateAndRepair`>/<`locateAndRepairLruItem`> contains any locating and repairing tasks and information on the faulty LRU.

**Markup element:** <`locateAndRepair`> (M)

ICN-3627-S1000D0507-001-01

*Fig 6 Element <`locateAndRepair`>/<`locateAndRepairLruItem`>*

**Attributes:**

- `id` (O), the identifier of the <`detectedLruItem`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `faultProbability` (O), the probability factor to indicate the likelihood that this particular LRU is faulty
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`lru`> (C). Refer to Para 2.4.1.3.2.
- <`repair`> (O). Refer to Para 2.4.1.4.1.
- <`remark`> (O). Refer to Chap 3.9.5.1.
- <`locateAndRepairSruItem`> (O). Refer to Para 2.4.1.4.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<locateAndRepair>
<locateAndRepairLruItem>
<lru>
</lru>
</locateAndRepairLruItem>
</locateAndRepair>
```

*2.4.1.4.1 Repair*

**Description:** The element <repair> contains any repair procedure.

**Markup element:** <repair> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<repair>
<refs>
<externalPubRef>
<externalPubRefIdent>
<externalPubTitle>External repair publication</externalPubTitle>
</externalPubRefIdent>
</externalPubRef>
</refs>
</repair>
```

*2.4.1.4.2 Locate and repair SRU*

**Description:** The element <locateAndRepairSruItem> contains any locating and repairing tasks and information on the faulty SRU.

**Markup element:** <locateAndRepairSruItem> (C)

**Attributes:**

– id (O), the identifier of the <detectedLruItem> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– faultProbability (O), the probability factor to indicate the likelihood that this particular LRU is faulty
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <sru> (C). Refer to Para 2.4.1.3.4.

– <repair> (O). Refer to Para 2.4.1.4.1.
– <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<faultReporting>
<isolatedFault id="flt-0003" faultCode="NYCJD03">
<faultDescr>
<descr>Horn failed</descr>
</faultDescr>
<locateAndRepair>
<locateAndRepairLruItem>
<lru>
<name>Horn</name>
<identNumber>
<manufacturerCode>KZ444</manufacturerCode>
<partAndSerialNumber>
<partNumber>Horn-001</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
<repair>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA3" subSystemCode="1" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</repair>
</locateAndRepairLruItem>
</locateAndRepair>
</isolatedFault>
</faultReporting>
```

### 2.4.2 Detected faults

**Description:** The element <detectedFault> contains information on detected faults.

**Markup element:** <detectedFault> (O)

ICN-3627-S1000D0508-001-01

*Fig 7 Element <detectedFault>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <isolatedFault> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultCode (M), the fault code that is allocated as part of a logistic analysis process
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <faultDescr> (C). Refer to Para 2.4.1.1.
- <detectInfo> (O). Refer to Para 2.4.1.3.
- <isolateDetectedFault> (O). Refer to Para 2.4.2.1.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<detectedFault id="flt-0002" faultCode="NYCJD00">
<faultDescr>
<descr>The rear wheel does not operate correctly</descr>
</faultDescr>
<detectionInfo detectionType="Major">
<detectedLruItem>
<lru>
<name>Tire</name>
<identNumber>
<manufacturerCode>KT666</manufacturerCode>
<partAndSerialNumber>
<partNumber>TIRES-010101</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</detectedLruItem>
</detectionInfo>
<isolateDetectedFault>
<lruItem>
<lru>
<name>Rear wheel</name>
```

```
<identNumber>
<manufacturerCode>KZ333</manufacturerCode>
<partAndSerialNumber>
<partNumber>WH-001</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</lruItem>
</isolateDetectedFault>
<remarks><simplePara>Prepare the rear wheel for the removal of
the tire</simplePara></remarks>
</detectedFault>
```

2.4.2.1 Isolate detected fault

**Description:** The element <isolateDetectedFault > contains the information needed to isolate the detected fault to an LRU from amongst a list of suspected LRU. This is done by referring out to another data module through the element <faultIsolationRef> or by describing a test on these LRU using the element <lruItem>.

**Markup element:** <isolateDetectedFault > (O)

ICN-3627-S1000D0509-001-01

*Fig 8 Element <isolateDetectedFault>*

**Attributes:**

– None

**Child elements:**

– <faultIsolationRef> (O), the reference to information needed to isolate the detected fault
– <lruItem> (M). Refer to Para 2.4.2.1.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<isolateDetectedFault>
<lruItem>
<lru>
<name>Rear wheel</name>
<identNumber>
<manufacturerCode>KZ333</manufacturerCode>
<partAndSerialNumber>
<partNumber>WH-001</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</lruItem>
</isolateDetectedFault>
```

*2.4.2.1.1 Fault isolation test - LRU*

**Description:** The element <`lruItem` > contains the information needed to perform the test on the faulty LRU.

**Markup element:** <`lruItem` > (O)

**Attributes:**

– `id` (O), the identifier of the <`detectedLruItem`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `faultProbability` (O), the probability factor to indicate the likelihood that this particular LRU is faulty
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`lru`> (O). Refer to Para 2.4.1.3.2.
– <`faultIsolationTest` > (M). Refer to Para 2.4.2.1.2.
– <`repair`> (M). Refer to Para 2.4.1.4.1.
– <`remarks`> (M). Refer to Chap 3.9.5.1.
– <`sruItem`> (C). Refer to Para 2.4.2.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lruItem>
<lru>
<name>Rear wheel</name>
<identNumber>
<manufacturerCode>KZ333</manufacturerCode>
<partAndSerialNumber>
<partNumber>WH-001</partNumber>
</partAndSerialNumber>
</identNumber>
```

```
</lru>
</lruItem>
```

2.4.2.1.2 *Fault isolation test performance*

**Description:** The element <faultIsolationTest > contains the test description, test parameters and the test procedure.

**Markup element:** <faultIsolationTest > (O)

ICN-3627-S1000D0510-001-01

*Fig 9 Element <faultIsolationTest>*

**Attributes:**

- id (O), the identifier of the <faultIsolationTest> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- testType (M), the name of the type of test
- testCode (M), the code for test
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <testDescr> (O), the name of the test and any reference to a test description
- <testParameters> (O). Refer to Para 2.4.2.1.3.
- <testProcedure> (O), the reference to test procedures or any relevant information

**Business rules decisions:**

- None identified

**Markup example:**

```
<faultIsolationTest testCode="O-001" testType="Operation">
<testDescr>
<testName>Test the bulbs</testName>
</testDescr>
```

```
<testParameters from="1" to="1" unitOfMeasure="Days"/>
<testProcedure>
<refs>
<dmRef xlink:actuate="onRequest" xlink:href="URN:S1000D:DMC-
S1000DLIGHTING-AAA-D00-00-00-00AA-341A-A" xlink:show="replace"
xlink:type="simple">
<dmRefIdent>
<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="341" infoCodeVariant="A" itemLocationCode="A"
modelIdentCode="S1000DLIGHTING" subSubSystemCode="0"
subSystemCode="0" systemCode="D00" systemDiffCode="AAA"/>
</dmRefIdent>
</dmRef>
</refs>
</testProcedure>
</faultIsolationTest>
```

*2.4.2.1.3 Test parameters*

**Description:** The element <`testParameters`> contains a set of attributes to capture parameters for the test.

**Markup element:** <`testParameters`> (O)

**Attributes:**

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `from` (O), the start value for a range of values
- `to` (O), the end value for a range of values
- `unitOfMeasure` (O), the unite of measurement for the range

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<testParameters from="1" to="1" unitOfMeasure="Days"/>
```

*2.4.2.1.4 Fault isolation test - SRU*

**Description:** The element <`sruItem`> contains the information needed to perform the test on the faulty SRU.

**Markup element:** <`sruItem` > (O)

ICN-3627-S1000D0511-001-01

*Fig 10 Element <sruItem>*

**Attributes:**

- id (O), the identifier of the <detectedLruItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultProbability (O), the probability factor to indicate the likelihood that this particular LRU is faulty
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <sru> (C). Refer to Para 2.4.1.3.4.
- <faultIsolationTest > (O). Refer to Para 2.4.2.1.2.
- <repair> (O). Refer to Para 2.4.1.4.1.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<sruItem>
<sru><name>Shop unit</name></sru>
</sruItem>
```

### 2.4.3 Observed faults

**Description:**The element <observedFault> contains information on observed faults but not detected by the computerized maintenance system.

The element has an attribute faultCode, which can be used to contain the fault code that is allocated as part of a logistic analysis process and an attribute faultType which can capture the type of fault.

**Markup element:** <observedFault> (O)

ICN-3627-S1000D0512-001-01

*Fig 11 Element <observedFault>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <observedFault> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultCode (O), the fault code that is allocated as part of a logistic analysis process.
- faultType (O), the fault type that is allocated as part of a logistic analysis process.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <faultDescr> (C), the description of the isolated fault. Refer to Para 2.4.1.1.
- <contextAndIsolationInfo> (C). Refer to Para 2.4.3.1.
- <remarks>. Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<observedFault faultCode="NYCJD02" id="flt-0001">
<faultDescr>
<descr>The lights are set to the dim position.</descr>
</faultDescr>
<contextAndIsolationInfo>
<isolationInfo>
<lruItem>
<lru></lru>
</lruItem>
</isolationInfo>
</contextAndIsolationInfo>
</observedFault>
```

2.4.3.1 Context and isolation information

**Description:** The element <contextAndIsolationInfo> contains the description of the context in which the fault is observed and information needed to isolate the faulty item.

**Markup element:** <contextAndIsolationInfo> (C)

ICN-3627-S1000D0513-001-01

*Fig 12 Element <contextAndIsolationInfo>*

**Attributes:**

– None

**Child elements:**

– <faultContext> (O), the textual description of the context in which the fault is observed
– <isolationInfo> (C). Refer to Para 2.4.3.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<observedFault faultCode="NYCJD02" id="flt-0001">
<faultDescr>
<descr>The lights are set to the dim position.</descr>
</faultDescr>
<contextAndIsolationInfo>
<isolationInfo>
<lruItem>
<lru></lru>
</lruItem>
</isolationInfo>
</contextAndIsolationInfo>
</observedFault>
```

2.4.3.2 Fault isolation information

**Description:** The element <isolationInfo> contains the diagnostic information for the observed fault. This is done by referring out using the element <faultIsolationRef> or by describing a diagnostic process using the element <diagnosticProcess> or simply testing the LRU using the element <lruItem>.

**Markup element:** <isolationInfo> (O)

**Attributes:**

– None

**Child elements:**

- <faultIsolationRef> (O), the references to diagnostic information for the observed fault by using the element <refs>. Refer to Chap 3.9.5.2.1.2.
- <diagnosticProcess> (O). Refer to Para 2.4.3.3.
- <lruItem> (O). Refer to Para 2.4.2.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<isolationInfo>
<lruItem>
<lru></lru>
</lruItem>
</isolationInfo>
```

2.4.3.3 Diagnostics

**Description:** The element <diagnosticProcess> contains a textual description of the reason and a reference to a repair procedure or any locating and repairing tasks and information on the faulty LRU.

**Markup element:** <diagnosticProcess> (O)

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*Fig 13 Element <diagnosticProcess>*

**Attributes:**

- None

**Child elements:**

- <diagnosticsReason> (O), the textual description of the of the cause of the failure.
- <repair> (O). Refer to Para 2.4.1.4.1.
- <locateAndRepairLruItem> (O). Refer to Para 2.4.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<diagnosticProcess>
<locateAndRepairLruItem>
<lru></lru>
</locateAndRepairLruItem>
</diagnosticProcess>
```

### 2.4.4 Correlated faults

**Description:** The element <correlatedFault> contains the information on correlated faults.

**Markup element:** <correlatedFault> (O)

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*Fig 14 Element <correlatedFault>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <correlatedFault> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <basicCorrelatedFault> (C), the correlated messages and warnings/malfunctions descriptions. Refer to Para 2.4.4.1.1.
- <isolateDetectedFault> (C), the fault information for the correlated fault isolation. Refer to Para 2.4.2.1.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<correlatedFault id="CFS0001">
<basicCorrelatedFaults>
<bitMessage><fault faultCode="100FC01"/>
<faultDescr>
<descr>The pedal mechanism is jammed</descr>
</faultDescr>
</bitMessage>
<bitMessage><fault faultCode="200FC01"/>
<faultDescr>
<descr>The derailleur is jammed</descr>
</faultDescr>
</bitMessage>
</basicCorrelatedFaults>
<isolateDetectedFault>
```

```
<lruItem>
<lru>
<name>Bicycle chain</name>
<identNumber>
<manufacturerCode>KZ120</manufacturerCode>
<partAndSerialNumber>
<partNumber>Tchain-120</partNumber>
</partAndSerialNumber>
</identNumber>
</lru>
</lruItem>
</isolateDetectedFault>
<remarks><simplePara>Prepare the derailleur to put transmission
chain back on pedal mechanism.</simplePara></remarks>
</correlatedFault>
```

*2.4.4.1.1 Messages and warnings*

**Description:** The element <basicCorrelatedFaults> contains the list of basic faults (messages and/or warnings) that have been correlated.

**Markup element:** <basicCorrelatedFaults> (C)

ICN-3627-S1000D0516-001-01

*Fig 15 Element <basicCorrelatedFault>*

**Attributes:**

- `id` (O), the identifier of the <`basicCorrelatedFault`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`warningMalfunction`> (O). Refer to Para 2.4.4.1.2.
- <`assocWarningMalfunction`> (O). Refer to Para 2.4.4.1.3.
- <`bitMessage`> (O). Refer to Para 2.4.4.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<basicCorrelatedFaults>
<bitMessage><fault faultCode="100FC01"/>
<faultDescr>
<descr>The pedal mechanism is jammed</descr>
</faultDescr>
</bitMessage>
<bitMessage><fault faultCode="200FC01"/>
<faultDescr>
<descr>The derailleur is jammed</descr>
</faultDescr>
</bitMessage>
</basicCorrelatedFaults>
```

*2.4.4.1.2 Warning or malfunction*

**Description:** The basic fault (warning or malfunction) which is part of the current correlated fault.

**Markup element:** <`warningMalfunction`> (O)

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*Fig 16 Element <`warningMalfunction`>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <warningMalfunction> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultPartCategory (O), the category of the fault part of the correlation
- subCategory (O), the subcategory of the fault part of the correlation
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <fault> (C), the basic fault presented through the attribute faultCode
- <dmRef> (O), an optional reference to the data module where the unitary fault has been introduced, eg: a reference to a "detected fault list" data module. Refer to Chap 3.9.5.2.1.2.
- <faultDescr> (O). Refer to Para 2.4.1.1.
- <detectInfo> (O). Refer to Para 2.4.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<warningMalfunction>
<fault faultCode="100FC01"/>
</warningMalfunction>
```

2.4.4.1.3 *Associated warning or malfunction*

**Description:** The associated fault (warning or malfunction) which is part of the current correlated fault.

**Markup element:** <assocWarningMalfunction> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <warningMalfunction> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultPartCategory (O), the category of the fault part of the correlation
- subCategory (O), the subcategory of the fault part of the correlation
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <fault> (C), the basic fault presented through the attribute faultCode

- <dmRef> (O), an optional reference to the data module where the unitary fault has been introduced, eg: a reference to a "detected fault list" data module. Refer to Chap 3.9.5.2.1.2.
- <faultDescr> (O). Refer to Para 2.4.1.1.
- <detectInfo> (O). Refer to Para 2.4.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<assocWarningMalfunction>
<fault faultCode="100FC01"/>
</assocWarningMalfunction>
```

*2.4.4.1.4 Computerized message from built-in test equipment*

**Description:** The basic fault (computerized message or warning/malfunction) which is part of the current correlated fault.

**Markup element:** <bitMessage> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <warningMalfunction> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- faultPartCategory (O), the category of the fault part of the correlation
- subCategory (O), the subcategory of the fault part of the correlation
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <fault> (C), the basic fault presented through the attribute faultCode
- <dmRef> (O), an optional reference to the data module where the unitary fault has been introduced, eg: a reference to a "detected fault list" data module. Refer to Chap 3.9.5.2.1.2.
- <faultDescr> (O). Refer to Para 2.4.1.1.
- <detectInfo> (O). Refer to Para 2.4.1.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of correlation
- correlated fault messages and warnings
- population of detection and description information elements

**Markup example:**

```
<bitMessage><fault faultCode="100FC01"/>
<faultDescr>
<descr>The pedal mechanism is jammed</descr>
</faultDescr>
</bitMessage>
```

## 2.5 Fault isolation

**Description:** The fault isolation branch of the Schema identifies and describes the fault and gives the diagnostic path to isolate a faulty item.

**Markup element:** <faultIsolation> (O)

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*Fig 17 Element <faultIsolation>*

**Attributes:**

- id (O), the identifier of the <faultIsolation> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <commonInfo> (O). Refer to Chap 3.9.5.2.1.12.
- <preliminaryRqmts> (O). Refer to Chap 3.9.5.2.1.9.
- <faultIsolationProcedure> (C), repeatable. Refer to Para 2.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<faultIsolation>
<faultIsolationProcedure>
<fault faultCode="NYCJD04"/>
<faultDescr><descr>Tire does not function correctly</descr>
</faultDescr>
<isolationProcedure>
<preliminaryRqmts><reqCondGroup><noConds/></reqCondGroup>
<reqSupportEquips><supportEquipDescrGroup>
<supportEquipDescr id="seq-0001"><name>Tire pressure gage</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-01</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
```

```
<supportEquipDescr><name>Specialist toolset</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
</supportEquipDescrGroup></reqSupportEquips>
<reqSupplies><noSupplies/></reqSupplies>
<reqSpares><noSpares/></reqSpares>
<reqSafety><noSafety/></reqSafety></preliminaryRqmts>
<isolationMainProcedure>
<isolationStep id="stp-0001">
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0003">
<action>Inflate the tire as given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></action>
</isolationProcedureEnd>
<isolationStep id="stp-0004"><action>To do a check of the tire
for damage</action>
<isolationStepQuestion>Is there damage to the
tire?</isolationStepQuestion>
<isolationStepAnswer>
<yesNoAnswer>
<yesAnswer nextActionRefId="stp-0005"/>
<noAnswer nextActionRefId="stp-0006"/>
</yesNoAnswer>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0005">
<action>Replace the tire (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
```

```
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode ="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0006">
<action>Replace the inner-tube (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="10" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
</isolationMainProcedure>
<closeRqmts>
<reqCondGroup>
<noConds></noConds>
</reqCondGroup>
</closeRqmts>
</isolationProcedure>
</faultIsolationProcedure>
</faultIsolation>
```

### 2.5.1 Fault isolation procedure

**Description:** The element <faultIsolationProcedure> contains the detailed fault isolation procedure including fault code, fault description.

**Markup element:** <faultIsolationProcedure> (C)

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*Fig 18 Element <faultIsolationProcedure>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <faultIsolationProcedure> element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`fault`>(O), the basic fault presented through the attribute `faultCode`.
- <`faultDescr`> (O). Refer to Para 2.4.1.1.
- <`isolationProcedure`> (C). Refer to Para 2.5.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<faultIsolationProcedure>
<fault faultCode="NYCJD04"/>
<faultDescr><descr>Tire does not function correctly</descr>
</faultDescr>
<isolationProcedure>
<preliminaryRqmts><reqCondGroup><noConds/></reqCondGroup>
<reqSupportEquips><supportEquipDescrGroup>
<supportEquipDescr id="seq-0001"><name>Tire pressure gage</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-01</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
<supportEquipDescr><name>Specialist toolset</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
</supportEquipDescrGroup></reqSupportEquips>
<reqSupplies><noSupplies/></reqSupplies>
<reqSpares><noSpares/></reqSpares>
<reqSafety><noSafety/></reqSafety></preliminaryRqmts>
<isolationMainProcedure>
<isolationStep id="stp-0001">
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
```

```
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0003">
<action>Inflate the tire as given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></action>
</isolationProcedureEnd>
<isolationStep id="stp-0004"><action>To do a check of the tire
for damage</action>
<isolationStepQuestion>Is there damage to the
tire?</isolationStepQuestion>
<isolationStepAnswer>
<yesNoAnswer>
<yesAnswer nextActionRefId="stp-0005"/>
<noAnswer nextActionRefId="stp-0006"/>
</yesNoAnswer>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0005">
<action>Replace the tire (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode ="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0006">
<action>Replace the inner-tube (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="10" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
</isolationMainProcedure>
<closeRqmts>
<reqCondGroup>
<noConds></noConds>
</reqCondGroup>
</closeRqmts>
</isolationProcedure>
</faultIsolationProcedure>
```

2.5.1.1 Isolation procedure

**Description:** The element <isolationProcedure> contains the isolation procedure including preliminary requirements and closeup requirements.

**Markup element:** <isolationProcedure> (C)

**Attributes:**

- id (O), the identifier of the <isolationProcedure> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- independentCheck (O), the complete core procedure must be checked by a supervisor with a given qualification
- skillLevelCode (O), the skill level to which the procedure has been written. Refer to Chap 3.9.5.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <preliminaryRqmts>(C). Refer to Chap 3.9.5.2.1.9.
- <isolationMainProcedure> (C). Refer to Para 2.5.1.2.
- <closeRqmts> (C). Refer to Para 2.5.1.5. Refer to Chap 3.9.5.2.1.9 for details.

**Business rules decisions:**

- None identified

**Markup example:**

```
<isolationProcedure>
<preliminaryRqmts><reqCondGroup><noConds/></reqCondGroup>
<reqSupportEquips><supportEquipDescrGroup>
<supportEquipDescr id="seq-0001"><name>Tire pressure gage</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-01</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
<supportEquipDescr><name>Specialist toolset</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
</supportEquipDescrGroup></reqSupportEquips>
<reqSupplies><noSupplies/></reqSupplies>
<reqSpares><noSpares/></reqSpares>
<reqSafety><noSafety/></reqSafety></preliminaryRqmts>
<isolationMainProcedure>
<isolationStep id="stp-0001">
```

```
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0003">
<action>Inflate the tire as given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></action>
</isolationProcedureEnd>
<isolationStep id="stp-0004"><action>To do a check of the tire
for damage</action>
<isolationStepQuestion>Is there damage to the
tire?</isolationStepQuestion>
<isolationStepAnswer>
<yesNoAnswer>
<yesAnswer nextActionRefId="stp-0005"/>
<noAnswer nextActionRefId="stp-0006"/>
</yesNoAnswer>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0005">
<action>Replace the tire (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode ="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0006">
<action>Replace the inner-tube (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="10" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
```

```
</dmRef>).</action>
</isolationProcedureEnd>
</isolationMainProcedure>
<closeRqmts>
<reqCondGroup>
<noConds></noConds>
</reqCondGroup>
</closeRqmts>
</isolationProcedure>
```

2.5.1.2 Main isolation procedure

**Description:** The element <isolationMainProcedure> contains the individual isolation steps.

**Markup element:** <isolationMainProcedure> (C)

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*Fig 19 Element <isolationMainProcedure>*

**Attributes:**

– None

**Child elements:**

– <isolationStep> (C). Refer to Para 2.5.1.3.
– <isolationProcedureEnd> (C). Refer to Para 2.5.1.4.
– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <multimedia> (O). Refer to Chap 3.9.2.4.
– <foldout> (O). Refer to Chap 3.9.5.2.1.7.
– <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<isolationMainProcedure>
<isolationStep id="stp-0001">
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
```

```
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0003">
<action>Inflate the tire as given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></action>
</isolationProcedureEnd>
<isolationStep id="stp-0004"><action>To do a check of the tire
for damage</action>
<isolationStepQuestion>Is there damage to the
tire?</isolationStepQuestion>
<isolationStepAnswer>
<yesNoAnswer>
<yesAnswer nextActionRefId="stp-0005"/>
<noAnswer nextActionRefId="stp-0006"/>
</yesNoAnswer>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0005">
<action>Replace the tire (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode ="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0006">
<action>Replace the inner-tube (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="10" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
</isolationMainProcedure>
```

2.5.1.3 Fault isolation step

**Description:** The element <isolationStep> contains the textual description of the action, the question and answer alternatives. It can also include eg a title, warnings, cautions and note.

**Markup element:** <isolationStep> (O)

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*Fig 20 Element <isolationStep>*

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <isolationStep> element. Refer to Chap 3.9.5.2.1.2.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- independentCheck (O), the isolation step must be checked by a supervisor with a given qualification
- keepWithNext (O), the indication whether a step should be presented together with the next step, if possible. This attribute is intended for use only when absolutely necessary in a situation where eg scrolling is not practical for the user or the viewing device does not allow scrolling. This attribute can have the following values:
  - "0" (D), (no)
  - "1", (yes) the step should be kept with the next sibling step (if one exists) and therefore, all children of the element for which the attribute is set should be kept together as well (if possible). This attribute has no meaning when placed on a final step.
- skillLevelCode (O), the skill level to which the procedure has been written. Refer to Chap 3.9.5.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <title> (O). Refer to Para 2.5.1.3.1 for the use of titles. Refer to Chap 3.9.5.2.1.5 for general rules.
- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <action> (O). Refer to Para 2.5.1.3.2.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.
- <isolationStepQuestion> (C), the textual question based on the corresponding action.
- <isolationStepAnswer> (C), the answers to the question. Refer to Para 2.5.1.3.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<isolationStep id="stp-0001">
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
```

*2.5.1.3.1 Title*

**Description:** The element <title> contains the title of the step.

**Markup element:** <title> (O)

**Attributes:**

- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

The text elements used for the fault isolation element <action> can be used, refer to Para 2.5.1.3.2. Refer to Chap 3.9.5.2.1.10 for details.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of titles in fault isolation steps.

**Markup example:**

```
<title>Tire Pressure</title>
```

*2.5.1.3.2 Action*

**Description:** The element <action> contains an action in the isolation procedure.

**Markup element:** <action> (O)

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*Fig 21 Element <action>*

**Attributes:**

- `id` (O), the identifier of the <`action`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

The text elements given in Fig 21 can be used. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
```

*2.5.1.3.3 Answer*

**Description:** The element <`isolationStepAnswer`> contains the answers to the corresponding question (element <`isolationStepQuestion`>). The answers are given in the form of a reference to another action, to one or more final actions (in element <`isolationProcedureEnd`>) or to close-up requirements <`closeRqmts`>.

**Markup element:** <`isolationStepAnswer`> (C)

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*Fig 22 Element <`isolationStepAnswer`>*

**Attributes:**

- `id` (O), the identifier of the <`isolationStepAnswer`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`yesNoAnswer`> (O). Refer to Para 2.5.1.3.4.
– <`listOfChoices`> (O). Refer to Para 2.5.1.3.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
```

*2.5.1.3.4 Answers - Yes and no*

**Description:** The element <`yesNoAnswer`> contains the selection of the two answers: Yes (element <`yesAnswer`>) or No (element <`noAnswer`>). Each of these is giving a reference to another action, to the final action (in element <`isolationProcedureEnd`>) or to the close-up requirements (element <`closeRqmts`>).

**Markup element:** <`yesNoAnswer`> (C)

**Child elements:**

– <`yesAnswer`> (M). Action for a positive answer.
– <`noAnswer`> (M). Action for a negative answer.

**Attributes:**

The element <`yesAnswer`> (C) and the element <`noAnswer`> (C) have the attribute `nextActionRefId` containing the identifier for the next action.

**Business rules decisions:**

– None identified

**Markup example:**

```
<yesNoAnswer>
<yesAnswer nextActionRefId="istp-0005"/>
<noAnswer nextActionRefId="istp-0006"/>
</yesNoAnswer>
```

*2.5.1.3.5 Answers - Selection of choice*

**Description:** The element <`listOfChoices`> contains a selection of multiple (one or more) choices. Each of these is giving a reference to another action, to the final action (in element <`isolationProcedureEnd`>) or to close-up requirements (element <`closeRqmts`>).

**Markup element:** <`listOfChoices`> (C)

**Attributes:**

- `nextActionRefId` (M), contains the identifier of the next action for each of the element choices above.

**Child elements:**

- <`choice`> (M). List of possible choices.

**Business rules decisions:**

- None identified

**Markup example:**

```
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
```

2.5.1.4 Isolation procedure end

**Description:** The element <`isolationProcedureEnd`> contains further isolation actions (these are either within the data module or referenced out to another data module) or to the element <`closeRqmts`> containing a closeup procedure.

**Markup element:** <`isolationProcedureEnd`> (C)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`isolationProcedureEnd`> element. Refer to Chap 3.9.5.2.1.2.
- `independentCheck` (O), the isolation step must be checked by a supervisor with a given qualification
- `skillLevelCode` (O), the skill level to which the procedure has been written. Refer to Chap 3.9.5.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

The child elements are the same as in the element <`isolationStep`> except for <`isolationStepQuestion`> and the element <`isolationStepAnswer`>.

- <`title`> (O). Refer to Para 2.5.1.3.1 for the use of titles. Refer to Chap 3.9.5.2.1.5 for general rules.
- <`warning`> (O). Refer to Chap 3.9.3.
- <`caution`> (O). Refer to Chap 3.9.3.
- <`note`> (O). Refer to Chap 3.9.3.
- <`action`> (O). Refer to Para 2.5.1.3.2.
- <`figure`> (O). Refer to Chap 3.9.5.2.1.7.
- <`multimedia`> (O). Refer to Chap 3.9.2.4.
- <`foldout`> (O). Refer to Chap 3.9.5.2.1.7.
- <`table`> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
```

2.5.1.5 Close-up requirements

**Description:** The element <closeRqmts> contains any actions/conditions that must be in place before the equipment, which was the object of the procedure, is returned to operation. Refer to Chap 3.9.5.2.1.9.

**Markup element:** <closeRqmts> (C)

**Attributes:**

– id (O), the identifier of the <isolatedFault> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <reqCondGroup> (M). Refer to Chap 3.9.5.2.1.9.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– inclusion of logistic data
– use of attribute skillLevelCode
– use of attribute independentCheck

**Markup example:**

```
<reqCondGroup><noConds/></reqCondGroup>
```

**2.5.2 Markup example**

```
<faultIsolation>
<faultIsolationProcedure>
<fault faultCode="NYCJD04"/>
<faultDescr><descr>Tire does not function correctly</descr>
</faultDescr>
<isolationProcedure>
<preliminaryRqmts><reqCondGroup><noConds/></reqCondGroup>
<reqSupportEquips><supportEquipDescrGroup>
<supportEquipDescr id="seq-0001"><name>Tire pressure gage</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
<partAndSerialNumber>
<partNumber>BSK-TLST-001-01</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
<supportEquipDescr><name>Specialist toolset</name>
<identNumber><manufacturerCode>KZ666</manufacturerCode>
```

```
<partAndSerialNumber>
<partNumber>BSK-TLST-001</partNumber>
</partAndSerialNumber>
</identNumber>
<reqQuantity
unitOfMeasure="EA">1</reqQuantity></supportEquipDescr>
</supportEquipDescrGroup></reqSupportEquips>
<reqSupplies><noSupplies/></reqSupplies>
<reqSpares><noSpares/></reqSpares>
<reqSafety><noSafety/></reqSafety></preliminaryRqmts>
<isolationMainProcedure>
<isolationStep id="stp-0001">
<action>Use the tire pressure gage (<internalRef
internalRefId="seq-0001"
internalRefTargetType="supequip"></internalRef> to do a check of
the pressure</action>
<isolationStepQuestion>What is the tire pressure
reading?</isolationStepQuestion>
<isolationStepAnswer>
<listOfChoices>
<choice nextActionRefId="stp-0002">More than 2700 hPa</choice>
<choice nextActionRefId="stp-0003">Between 100 hPA and 2700
hPa</choice>
<choice nextActionRefId="stp-0004">Less than 100 hPA</choice>
</listOfChoices>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0002">
<action>Deflate the tire until the pressureis 2700 hPa</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0003">
<action>Inflate the tire as given in
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="215" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></action>
</isolationProcedureEnd>
<isolationStep id="stp-0004"><action>To do a check of the tire
for damage</action>
<isolationStepQuestion>Is there damage to the
tire?</isolationStepQuestion>
<isolationStepAnswer>
<yesNoAnswer>
<yesAnswer nextActionRefId="stp-0005"/>
<noAnswer nextActionRefId="stp-0006"/>
</yesNoAnswer>
</isolationStepAnswer>
</isolationStep>
<isolationProcedureEnd id="stp-0005">
<action>Replace the tire (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="20" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode ="A"/>
```

```
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
<isolationProcedureEnd id="stp-0006">
<action>Replace the inner-tube (refer to
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="1" subSubSystemCode="0"
assyCode="10" disassyCode="00" disassyCodeVariant="AA"
infoCode="921" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>).</action>
</isolationProcedureEnd>
</isolationMainProcedure>
<closeRqmts>
<reqCondGroup>
<noConds></noConds>
</reqCondGroup>
</closeRqmts>
</isolationProcedure>
</faultIsolationProcedure>
</faultIsolation>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of correlation**. The project or organization must decide whether to use the correlated fault concept or not. Refer to Para 2.4.4

**Correlated fault messages and warnings**. The project or organization must decide how to populate element <warningMalfunction>, element <assocWarningMalfunction> and element <bitMessage> when using the correlated fault concept. Refer to Para 2.4.4.1.4.

**Population of detection and description information elements**. The project or organization must decide whether the repetition of the detection and description information for the basic fault which has been correlated (element <faultDescr> and element <detectionInfo>) is used or not. Projects can consider that the detection and description information can eg be populated during IETP generation by picking up the information in the detected fault list data module describing the basic faults. Refer to Para 2.4.2.

**Use of titles in fault isolation steps**. The project or the organization must decide whether to use the element <title> or not and how to use it. Refer to Para 2.5.1.3.1.

**Inclusion of logistic data**. The project or organization must decide whether all isolation procedures should be kept in a single data module for an item or fault or whether to refer out to other data modules. Refer to Para 2.5.1.5.

**Use of attribute skillLevelCode**. The project or organization must decide whether to use the attribute skillLevelCode in the element <isolationProcedure>, the element <isolationStep> and the element <isolationProcedureEnd> or not. Refer to Para 2.5.1.5.

**Use of attribute `independentCheck`**. The project or organization must decide whether to use the attribute `independentCheck` in the element <`isolationProcedure`>, the element <`isolationStep`> and the element <`isolationProcedureEnd`> or not. Refer to Para 2.5.1.5.

# Chapter 3.9.5.2.5

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# 1 General

The maintenance planning Schema must be used to contain maintenance planning information. The granularity of these data modules is determined by the application of the SNS in accordance with Chap 8.2.1 and the data module coding guidance given in Chap 5.2.1.6.

# 2 Maintenance planning information

## 2.1 Common Information

**Description:** The common information structure is in the content of the schema for maintenance planning data as a sibling to the maintenance planning information. Refer to Chap 3.9.5.2.1.12.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <`commonInfo`>

## 2.2 Maintenance planning

**Description:** Maintenance planning information is captured using the Content section of the four types of maintenance schedule data modules. These four types are time limits, which captures information about periodicities and life details for a system; task definitions, which captures the information about individual tasks to be carried out on a system, inspection definitions, which captures groups of maintenance tasks or inspection types, and maintenance allocation, which captures maintenance functions along with maintenance levels and time associated for each task.

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*Fig 1 Element <maintPlanning>*

**Markup element:** <maintPlanning> (M)

**Attributes:**

– maintPlanningType (O), a text string used to classify the maintenance planning data

**Business rules decisions:**

– None identified

**Child elements:**

– <inspectionDefinition> (O). Refer to Para 2.3.
– <taskDefinition> (O). Refer to Para 2.4.
– <timeLimitInfo> (O). Refer to Para 2.5.
– <maintAllocation> (O). Refer to Para 2.6.
– <toolsList> (O). Refer to Para 2.6.10.
– <remarksList> (O). Refer to Para 2.6.12.

**Markup example:**

```
<maintPlanning maintPlanningType="mpt01">
<timeLimitInfo timeLimitIdent="TL35">
...
</timeLimitInfo>
</maintPlanning>
```

## 2.3 Inspection definition

**Description:** This element contains information about inspections. Inspections are a way to group tasks that are related to the topic or intent of the inspection. This element groups a set of tasks with the limit information associated to perform the set of tasks.

**Markup element:** <inspectionDefinition> (O)

**Attributes:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional element <inspectionDefinition>

**Child elements:**

– <inspection> (M), inspection information, refer to Para 2.3.1
– <taskGroup> (O), a list of tasks associated with the inspection, refer to Para 2.3.12

**Markup example:**

```
<inspectionDefinition>
<inspection>
...
</inspection>
<taskGroup>
...
</taskGroup>
</inspectionDefinition>
```

### 2.3.1 Inspection information

**Description:** The element <inspection> groups the inspection limit information with the associated remark information.

**Markup element:** <inspection> (M)

**Attributes:**

– id (O), the identifier of the <inspection> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

– None identified

**Child elements:**

– <limit> (O), this element provides a structure that is designed to specify the interval between inspections, or the threshold before which an inspection must be performed. The limits can be associated with units of calendar time, number of events or with the occurrence of specific events. Refer to Para 2.3.2.
– <remarks> (O),this element contains text which gives further information about the inspection. Refer to Para 2.3.11

**Markup example:**

```
<inspection id="Preflight">
<limit>
...
</limit>
<remarks>
...
</remarks>
</inspection>
```

### 2.3.2 Limit information

**Description:** The element <`limit`> gives the information required to determine when a task must be performed.

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*Fig 2 Element <`limit`>*

**Markup element:** <`limit`> (O)

**Attributes:**

- `id` (O), the identifier of the <`limit`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `limitTypeValue` (O), this attribute is used to indicate the limit classification (it contains one of the following values. If no value is specified, the default value "`PE`" is implied.
  - "`PO`" = perform once
  - "`PE`" = perform periodically
  - "`OC`" = On condition

- `limitCond` (O), this attribute is used when attribute `limitTypeValue` contains the value "`OC`" to indicate the condition type of the limit when (ie maritime flight, dirty conditions)
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

- None identified

**Child elements:**

- <`sampling`> (O). Refer to Para 2.3.3.
- <`threshold`> (O). Refer to Para 2.3.4.
- <`inspectionType`> (O). Refer to Para 2.3.6.
- <`trigger`> (O). Refer to Para 2.3.7.
- <`limitRange`> (O). Refer to Para 2.3.8.
- <`remarks`> (O). This element is used for text that gives further information about the limit. This element provides the means to convey comments on the limit information or descriptions of limits that cannot be represented with the available elements. For general use of the remarks element, refer to Para 2.3.11.

**Markup example:**

```
<limit limitTypeValue="po">
<sampling>10 Percent</sampling>
<limitRange>
...
</limitRange>
</limit>
```

### 2.3.3 Sampling

**Description:** This element <`sampling`> contains a description of a subset of the total number of Product instances on which the inspection must be performed. The sampling can be given as a percentage, a fraction or as a textual description. This element has only text content. This element must be omitted if the inspection must be performed on the full set of Products.

**Markup element:** <`sampling`> (O)

**Attributes:**

- None

**Business rules decisions:**

- None identified

**Child elements:**

- None

### 2.3.4 Threshold information

**Description:** The element <`threshold`> provides the ability to describe limit information in terms of a value before which the inspection must be performed. The value can be given in calendar time or in other terms such as the number of hours a Product has been operating.

**Markup element:** <`threshold`> (O)

**Attributes:**

- `thresholdUnitOfMeasure` (M). This attribute gives the dimensional units in which to interpret the threshold values. The unit values are given as codes patterned as "`th`" plus two digits, and the meaning of these values are given in Chap 3.9.6.
- `thresholdType` (O). This attribute contains the value "`threshold`" or "`interval`", and it specifies the starting point of the threshold. It can be "from the beginning" of the maintenance program or from "the last time the inspection was performed."

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- units of measure for threshold information
- values for the attribute `thresholdType`

**Child elements:**

- <`thresholdValue`> (M). This element gives a value before which the inspection must be performed. This element has only text content. Refer to Para 2.3.4
- <`tolerance`> (O). This element gives values that can be used to expand the threshold value into a range of acceptable values. Refer to Para 2.3.5.

**Markup example:**

```
<threshold thresholdUnitOfMeasure="th01">
<thresholdValue>10</thresholdValue>
</threshold>
```

### 2.3.5 Tolerance information

**Description:** The element <`tolerance`> allows the threshold to be given as minimum and maximum value between which the inspection must be performed. The minimum value is determined by subtracting the value of `toleranceLow` from the value of the threshold. The maximum value is determined by adding the value of `toleranceHigh` to the value of the threshold.

**Markup element:** <`tolerance`> (M)

**Attributes:**

- `toleranceLow` (O), this attribute gives the negative threshold value tolerance (- n)
- `toleranceHigh` (O), this attribute gives the positive threshold value tolerance (+ n)

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<tolerance toleranceLow="2" toleranceHigh="3"/>
```

### 2.3.6 Inspection type

**Description:** The element <`inspectionType`> provides a classification of maintenance into various types such as "systems", "structural" and "zonal".

**Markup element:** <`inspectionType`> (M)

**Attributes:**

- `id` (O), the identifier of the <`inspectionType`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `inspectionTypeCategory` (M), this attribute contains a text string that is used to classify the inspection, when limit is used at the task level, this attribute would allow the author to refer to the inspection `id`
- `toleranceHigh` (O), the positive threshold value tolerance (+ n)
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- values for the inspection types

**Child elements:**

- None

**Markup example:**

```
<inspectionType inspectionTypeCategory="Preflight" />
```

### 2.3.7 Trigger

**Description:** The element <`trigger`> provides the means to establish that the inspection must be performed after a certain event.

**Markup element:** <`trigger`> (M)

**Attributes:**

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `releaseEvent` (O), a description of the release event causing the triggering of an inspection

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- values of the attribute `releaseEvent`

**Child elements:**

- <`refs`> (O). This element is used to indicate any tasks that must be performed before the inspection. Refer to Chap 3.9.5.2.1.2
- <`threshold`> (O), this element indicates that the Inspection must be performed after some threshold value has been reached. Refer to Para 2.3.4.

**Markup example:**

```
<trigger releaseEvent="after" >
<threshold thresholdUnitOfMeasure="th01">
...
</threshold>
</trigger>
```

### 2.3.8 Limit range

**Description:** The element <limitRange> provides the means to establish that the inspection must be performed between two values.

**Markup element:** <limitRange> (M)

**Attributes:**

– None

**Business rules decisions:**

– None identified

**Child elements:**

– <limitRangeFrom> (M), the inspection must be performed after this range has been reached. Refer to Para 2.3.9.
– <limitRangeTo> (O), the Inspection must be performed before this range has been reached. Refer to Para 2.3.10.

**Markup example:**

```
<limitRange>
<limitRangeFrom>
...
</limitRangeFrom>
<limitRangeTo>
...
</limitRangeTo>
</limitRange>
```

### 2.3.9 Limit range start

**Description:** The element <limitRangeFrom> provides the means to establish the starting limit for a limit range between which the inspection must be performed.

**Markup element:** <limitRangeFrom> (M)

**Attributes:**

– None

**Business rules decisions:**

– None identified

**Child elements:**

– <threshold> (M). The inspection must be performed after some threshold value has been reached. Refer to Para 2.3.4.

**Markup example:**

```
<limitRangeFrom>
<threshold thresholdUnitOfMeasure="th01">
...
</threshold>
</limitRangeFrom>
```

### 2.3.10 Limit range end

**Description:** The element <limitRangeTo> provides the means to establish the ending limit for a limit range between which the inspection must be performed.

**Markup element:** <limitRangeTo> (O)

**Attributes:**

– None

**Business rules decisions:**

– None identified

**Child elements:**

– <threshold> (M). The inspection must be performed after some threshold value has been reached. Refer to Para 2.3.4.

**Markup example:**

```
<limitRangeTo>
<threshold thresholdUnitOfMeasure="th01">
...
</threshold>
</limitRangeTo>
```

### 2.3.11 Remarks

**Description:** The element <remarks> represents textual comments related to the containing element.

**Markup element:** <remarks> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Business rules decisions:**

– None identified

**Child elements:**

– <simplePara> (M). This element provides a restricted form paragraph which can only contain the elements <subScript> and <superScript>. Refer to Chap 3.9.5.2.1.10.

**Markup example:**

```
<remarks>
<simplePara>Here is some text</simplePara>
</remarks>
```

### 2.3.12 Task group

**Description:** The element <taskGroup> represents a list of tasks that belong to the inspection. This element facilitates production of a table of tasks in an inspection.

**Markup element:** <taskGroup> (O)

**Attributes:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– which tasks belong to which groups

**Child elements:**

– <taskItem> (M), an individual task in an inspection. Refer to Para 2.3.13.

**Markup example:**

```
<taskGroup>
<taskItem taskSeqNumber="001" taskName="Nose Landing Gear
Inspection">
...
</taskItem>
</taskGroup>
```

### 2.3.13 Task item

**Description:** The element <taskItem> represents an individual task that belongs to an inspection.

**Markup element:** <taskItem> (M)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <taskItem> element. Refer to Chap 3.9.5.2.1.2.
– taskSeqNumber (M), this attribute contains the ordinal position of the task within the inspection tasks group
– taskName (M), this attribute contains the textual identifier of the task
– skillLevelCode (O), this attribute contains the competency level required of the person who will perform the task. The values that can be specified for this attribute are defined in Chap 3.9.6.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– how to sequence the tasks
– values and definitions of the skill level code

**Child elements:**

– <refs> (O), this element is used to make reference to data modules for the task. The intent is to refer to a task instance in the element <taskDefinition>. For a

description of the task definition structure, refer to Para 2.3.14. For a description of the reference structure, refer to Chap 3.9.5.2.1.2.

– <task> (O), this element contains a set of information that describes the task. Refer to Para 2.3.14.

**Markup example:**

```
<taskItem taskSeqNumber="001" taskName="Nose Landing Gear
Inspection">
<refs>
...
</refs>
<task>
...
</task>
</taskItem>
```

### 2.3.14 Task

**Description:** The element <task> has general data for a task that belongs to an inspection.

**Markup element:** <task> (O)

**Attributes:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– values for the attribute, markerType, of the <taskMarker> element

**Child elements:**

– <taskTitle> (O), this element contains a short textual description of the task.
– <taskDescr> (M), this element contains a fuller textual description of the task.
– <taskMarker> (O), this element contains no content and a single attribute, markerType, that indicates the nature of the data in the <taskDescr> element. This element can be used to separate an aggregation of text that came from regulatory sources into discretely classified textual items. The value of the attribute markerType can be used to indicate whether the task is performed internal or external to the product.

**Markup example:**

```
<taskItem taskSeqNumber="001" taskName="Nose Landing Gear
Inspection">
<task>
<taskTitle>
General Visual Inspection of the Landing Gear
</taskTitle>
<taskDescr>
This inspection of the landing gear covers all aspects including
wiring...
</taskDescr>
<taskMarker markerType="location"/>
</task>
</taskItem>
```

## 2.4 Task definition

**Description:** The element <taskDefinition> contains the task information necessary to schedule maintenance.

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*Fig 3 Element <taskDefinition>*

**Markup element:** <taskDefinition> (M) Mandatory for the task definition branch of the maintenance planning element.

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <taskDefinition> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- taskIdent (M), this attribute contains a unique identifier for the list of tasks.
- taskCode (O), this attribute provides a mechanism to categorize the task. For example, a general visual inspection is a common category. The valid pattern for this attribute is "taskcd" plus two digits. Several task code values are defined in Chap 3.9.6.1. The project or the organization must decide additional definitions.
- worthinessLimit (O), this attribute signifies whether the task is subject to worthiness limitations. It indicates whether the performance of the tasks is mandatory or recommended.

- `reducedMaint` (O), this attribute indicates that values in the task represent a reduction in the maintenance requirements as compared to the original task.
- `skillLevelCode` (O), a code that indicated the competency level required of the person performing the task. The values that can be specified for this attribute are defined in Chap 3.9.6.
- `skillType` (O), this attribute provides a classification of the main technical ability required of the person performing the task (eg "Airframe", "Electrical", "Avionic", "Engine") and must be populated as described in Chap 3.9.6.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`task`> (M), this element groups information used to describe the task, refer to Para 2.3.14.
- <`rqmtSource`>(O), this element identifies the authority that established the requirement to do the task. Refer to Para 2.4.1.
- <`preliminaryRqmts`>(O). This element provides a grouping of information about resources that are required before the task can be performed. Refer to Chap 3.9.5.2.1.9.
- <`refs`>(O), this element is used to refer to data modules or other publications that represent the accomplishment instructions for the task. For a description of the reference structure, refer to Chap 3.9.5.2.1.2.
- <`equipGroup`> (O), this element provides a grouping of information used to describe equipment that is the subject of, used in or associated to the task. Refer to Para 2.4.4.
- <`name`> (O), this element can be used instead of element <`equipGroup`> for structural and other items that do not have part numbers. Refer to Para 2.4.6.
- <`supervisorLevel`> (O), this element is used to indicate the level of supervision that is appropriate for the task. It has a single attribute `supervisorLevelCode` (O). Refer to Para 2.4.7.
- <`limit`> (O), this element gives the information required to determine when a task must be performed. Refer to Para 2.3.2.
- <`remarks`> (O), this element contains text giving further information about the inspection. Refer to Para 2.3.11.
- <`relatedTask`> (O), this element is used to provide a relationship between two tasks. It has an attribute `taskIdent` that is used to refer to the `taskIdent` of the related task. It has another attribute `relatedTaskDescr` that is used to describe the relationship. Refer to Para 2.4.8.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- definitions for the `taskCode` attribute values
- use of the attribute `worthinessLimit`
- use of the attribute `reducedMaint`
- use of the attribute `skillLevelCode` and definitions for the skill levels
- use of and values for the attribute `skillType`

**Markup example:**

```
<taskDefinition taskIdent="31-010-01" taskCode="taskcd01">
<task>
```

```
...
</task>
<relatedTask taskIdent="23-050-02" relatedTaskDescr="A" />
</taskDefinition>
```

### 2.4.1 Requirement source

**Description:** The element <rqmtSource> gives information to enable identification of the authority that is the source of the maintenance requirement.

**Markup element:** <rqmtSource> (O)

**Attributes:**

- sourceOfRqmt (M), this attribute contains a code that indicates the origination of the requirement (eg "MSG3", "CMR" and "AD")
- sourceIdent (O), this attribute contains the document number of the source of requirement or the title of the source if no document number is available.
- approval (O), this attribute gives the level of approval of the source.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- values for the attribute sourceOfRqmt
- values for the attribute approval

**Child elements:**

- <issueInfo> (O). Refer to Chap 3.9.5.1.
- <issueDate> (O). Refer to Chap 3.9.5.1.
- <sourceType> (O), this attribute has information that classifies the source of the requirement. This gives the ability to include requirements such as failure effect category, failure effect code, Enhanced Zonal Analysis Program (EZAP), Lightning or High Intensity Radiated Field (L/HIRF), CMR 1 star, CMR 2 star, and future regulatory sources. Refer to Para 2.4.2.

**Markup example:**

```
<rqmtSource sourceOfRqmt="MRB" />
```

### 2.4.2 Source type

**Description:** This element <sourceType> provides a means to classify the source of the requirement.

**Markup element:** <sourceType> (O)

**Attributes:**

- sourceCriticality (M), this attribute is a four character value with the pattern of "sc" plus two digits that indicates the impact of not complying with the requirement (refer to Chap 3.9.6.1 for the list of values). It is also called the failure effect category. As an example, the values for civil air given by: "sc5" = "Evident, safety", "sc6" = "Evident, Operational", "sc7" = "Evident, Economic", "sc8" = "Hidden, Safety", "sc9" = "Hidden, Non-Safety" and an empty string indicates "not coming from MSG3.
- sourceTypeCode (M), a five character value with the pattern of "stc" plus two digits that indicates the type of source

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- values for the attribute `sourceCriticality`
- values for the attribute `sourceTypeCode`

**Child elements:**

- None

**Markup example:**

```
<sourceType sourceCriticality="sc01" sourceTypeCode="stc01"/>
```

### 2.4.3 Preliminary requirements

**Description:** The element <`preliminaryRqmts`> groups together all information about resources that can be required before the accomplishment of the task. The structure of this element is described in Chap 3.9.5.2.1.9.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <`preliminaryRqmts`>

### 2.4.4 Equipment group

**Description:** The element <`equipGroup`> provides a means to identify the equipments associated with the task.

**Markup element:** <`equipGroup`> (O)

**Attributes:**

- `id` (O), the identifier of the <`equipGroup`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`equip`> (M), this element provides a means to identify an individual piece of equipment associated with the task. Refer to Para 2.4.5.

**Business rules decisions:**

- None identified

**Markup example:**

```
<equipGroup>
<equip>
...
</equip>
</equipGroup>
```

### 2.4.5 Equipment

**Description:** The element <equip> provides a means to identify an individual piece of equipment associated with the task.

**Markup element:** <equip> (M)

**Attributes:**

- id (O), the identifier of the <equip> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <name> (M), this element contains a short textual identifier of the equipment. Refer to Para 2.4.6.
- <natoStockNumber> (O). Refer to Chap 3.9.5.2.7.
- <identNumber> (O). Refer to Chap 3.9.5.2.1.9.
- <catalogSeqNumberRef> (O). Refer to Chap 3.9.5.2.7.

**Business rules decisions:**

- None identified

**Markup example:**

```
<equip>
<name>Flight Data Recorder</name>
...
</equip>
```

### 2.4.6 Equipment name

**Description:** The element <name> contains the textual name of the equipment.

**Markup element:** <name> (M)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- whether a terminology database is to be used

**Child elements:**

- None

**Markup example:**

```
<name>Flight Data Recorder</name>
```

### 2.4.7 Supervisor level

**Description:** The element <supervisorLevel> contains the hierarchical level in the supervisory structure that explain if the supervisor must observe the task or inspect the results of the task.

**Markup element:** <supervisorLevel> (M)

**Attributes:**

- id (O), the identifier of the <supervisorLevel> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- supervisorLevelCode (O), identifies if either the supervisor must observe the task or inspect the results of the task.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- codes for the attribute supervisorLevelCode

**Child elements:**

- None

**Markup example:**

```
<supervisorLevel supervisorLevelCode="sl01"/>
```

### 2.4.8 Related task

**Description:** The attributes of this element identify another task that has an association to the current task and provide a code that indicates the nature of the association.

**Markup element:** <relatedTask> (O)

**Attributes:**

- taskIdent (M), identifies the task that has an association to the current task
- relatedTaskDescr (M), indicates the nature of the association
  - "after" the current task must be performed after the related task
  - "before" the current task must be performed before the related task
  - "complied" performing the current task complies with the requirements of the related task
  - "finished" the current task must be finished before the related task can be finished.
  - "precludes" the current task satisfies the intent of the related task
  - "started" the current task must be started before the related task
  - "with" the current task and the related task must be performed together

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<relatedTask taskIdent="31-010-01" relatedTaskDescr="before" />
```

### 2.4.9 NATO stock number

**Description:** The element <natoStockNumber> contains an identifier for the equipment that follows the coding system determined by NATO, and Ministries or Departments of Defense. Refer to Chap 3.9.5.2.7.

### 2.4.10 Identification number

**Description:** This element <identNumber> contains an identifier for the equipment associated with the task. Refer to Chap 3.9.5.2.1.9.

### 2.4.11 Manufacturer code

**Description:** The element <manufacturerCode> contains an identifier for the manufacturer of the equipment. Refer to Chap 3.9.5.2.1.9.

### 2.4.12 Part and serial number

**Description:** The element <partAndSerialNumber> groups the serial number of an item of equipment with its part number. The structure allows multiple serial numbers to be associated to a part number. Refer to Chap 3.9.5.2.1.9.

### 2.4.13 Part number

**Description:** The element <partNumber> has the part number of the equipment associated with the task. Refer to Chap 3.9.5.2.1.9.

### 2.4.14 Serial number

**Description:** The element <serialNumber> has the serial number of the equipment associated with the task. A serial number uniquely identifies a physical part in the set of parts with a given part number. Refer to Chap 3.9.5.2.1.9.

### 2.4.15 Catalog sequence number reference

**Description:** The element <catalogSeqNumberRef> provides a reference to the IPD CSN that corresponds to the equipment. Refer to Chap 3.9.5.2.7.

## 2.5 Time limit information

**Description:** The element <timeLimitInfo> is used to contain time limit, periodicities and life details information relating to equipments or systems.

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*Fig 4 Element <timeLimitInfo>*

**Markup element:** <timeLimitInfo> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- timeLimitIdent (M), this attribute gives the identifier of the <timeLimit> element.
- skillLevelCode (O), this attribute gives the competency level required of the person who will perform the task

**Business Rules Decisions:**

Business rules decisions include, but are not limited to, the following:

- values of the competency level codes

**Child elements:**

- <equipGroup> (M), this element provides a grouping of information used to describe equipment that is subject to the time limit. Refer to Para 2.4.4.
- <reqQuantity> (O), this element contains details about the quantity of items of equipment subject to the time limit. Refer to Para 2.5.1.
- <timeLimitCategory> (O), this element provides a means to classify the time limits. Refer to Para 2.5.2.
- <timeLimit> (M), this element contains information describing when a piece of equipment must be removed from service or storage. Refer to Para 2.5.3.

**Markup example:**

```
<timeLimitInfo timeLimitIdent="TL35">
<equipGroup>
...
</equipGroup>
<timeLimit>
...
</timeLimit>
</timeLimitInfo>
```

### 2.5.1 Required quantity

**Description:** The element <reqQuantity> contains the number of equipment items that are subject to the time limit in the scope of the Product.

**Markup element:** <reqQuantity> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- unitOfMeasure (M), a text string giving the fundamental subdivision along the dimension to which the quantity applies. It can also give a name for a container of items (eg "cases" as in "five cases").

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<reqQuantity unitOfMeasure="boxes">6</reqQuantity>
```

### 2.5.2 Time limit category

**Description:** The element <timeLimitCategory> is used to classify the time limit.

**Markup element:** <timeLimitCategory> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- timeLimitCategoryValue (M), an enumeration representing the categories of time limits. Valid values are "1" and "2". These values can represent categories such as "safety related" or "non-safety related".

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element <timeLimitCategory>

**Child elements:**

- None

**Markup example:**

```
<timeLimitCategory timeLimitCategoryValue="1"/>
```

### 2.5.3 Time limit

**Description:** The element <timeLimit> is used to express the time limits.

**Markup element:** <timeLimit> (M)

**Attributes:**

- None

**Child elements:**

- <limitType> (M), this element contains information expressing the time limit. Refer to Para 2.5.4.
- <remarks> (O), this element contains textual comments to supplement the structured limit information. Refer to Para 2.3.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<timeLimit>
<limitType>
...
</limitType>
</timeLimit>
```

### 2.5.4 Limit type

**Description:** The element <limitType> is used to express the threshold values and units of the time limit.

**Markup element:** <limitType> (M)

**Attributes:**

- id (O), the identifier of the <limitType> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- limitUnitType (M), this element contains an enumeration representing the dimensional unit for the given time limit values. Valid values have the pattern "lt" plus two digits, and these are given in Chap 3.9.6.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Values for the attribute limitUnitType.

**Child elements:**

- <threshold> (M), this element contains information expressing the time limit. Refer to Para 2.3.4
- <remarks> (M), textual comments to supplement the structured limit information. Refer to Para 2.3.11.

**Markup example:**

```
<limitType limitUnitType="lt01">
<threshold thresholdUnitOfMeasure="th01">
...
</threshold>
</limitType>
```

## 2.6 Maintenance allocation

**Description:** The element <maintAllocation> contains information about maintenance allocations. Maintenance allocations capture maintenance functions along with maintenance levels and time associated for each task. It is contained in the element <maintPlanning> (refer to Para 2.2).

The maintenance allocation designates the overall authority and the responsibility for the performance of maintenance functions on the identified end item or component. The data lists maintenance functions along with maintenance levels, and the time associated for each task. These maintenance functions can also be grouped together. All the information required to build the maintenance allocation is included in the Logistics Support Analysis Record (LSAR). The element <toolsList> and the element <remarksList> are used to provide a list of tools and remarks for referencing purposes.

**Markup element:** <maintAllocation> (O)

**Attributes:**

– None

**Business rules decisions:**

– None identified

**Child elements:**

– <title> (M), this element contains the title which describes the maintenance allocation. Refer to Chap 3.9.5.2.1.5.
– <maintAllocationGroup> (M), this element is used to group functional items together. Refer to Para 2.6.1.

Sibling elements:

– <toolsList> (O), this element contains a list of tools for referencing purposes. Refer to Para 2.6.10.
– <remarksList> (O), this element contains a list of remarks. Refer to Para 2.6.12.

**Markup example:**

```
<maintPlanning>
<maintAllocation>
...
</maintAllocation>
<toolsList>
...
</toolsList>
</maintPlanning>
```

### 2.6.1 Maintenance allocation group

**Description:** The element <maintAllocationGroup> is used to group maintenance functional items together.

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*Fig 5 Element <maintAllocationGroup>*

**Markup element:** <maintAllocationGroup> (M)

**Attributes:**

- id (O), the identifier of the <maintAllocationGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (O), the competency level required of the person who will perform the task.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <groupNumber> (M), this element is used to capture the functional item group of the end item. The functional group applies to repairable assemblies and subassemblies, ie spares (any repairable component required for the maintenance or repair of an end item), but not to repair parts (any consumable, non-repairable component required for the maintenance or repair of an end item). Refer to Para 2.6.2.
- <componentAssy> (M), this element is used to identify the item name or nomenclature (a basic name and a noun word or phrase modifier, eg transformer) and must be marked up using the element <name>. Parts that are not subject to maintenance must not be listed. Refer to Para 2.6.3.
- <maintQualifier> (M), this element is used to capture maintenance action qualification such as maintenance function, maintenance level estimated work time, any tools and/or test equipment and any remarks. Refer to Para 2.6.4.
- <componentAssyGroup> (M), this element is used when there is a requirement to subdivide the list into subassemblies. Refer to Para 2.6.9.

**Business rules decisions:**

- None identified

**Markup example:**

```
<maintAllocationGroup>
<groupNumber>
```

```
...
</groupNumber>
<componentAssy>
...
</componentAssy>
<maintQualifier>
...
</maintQualifier>
</maintAllocationGroup>
```

### 2.6.2 Maintenance allocation group number

**Description:** The element <groupNumber> is used to capture the functional item group of the end item. The functional group applies to repairable assemblies and subassemblies, ie spares (any repairable component required for the maintenance or repair of an end item), but not to repair parts (any consumable, non-repairable component required for the maintenance or repair of an end item).

**Markup element:** <groupNumber> (M)

**Attributes:**

- id (O), the identifier of the <groupNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (O), this attribute contains the competency level required of the person who will perform the task. The values that can be specified for this attribute are defined in Chap 3.9.6.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<groupNumber>0401</groupNumber>
```

### 2.6.3 Component assembly

**Description:** The element <componentAssy> is used to identify the item name or nomenclature (a basic name and a noun word or phrase modifier, eg transformer) and must be marked up using the element <name>. Parts that are not subject to maintenance must not be listed.

**Markup element:** <componentAssy> (M)

**Attributes:**

- None

**Child elements:**

- <name> (M), this element contains the name or nomenclature of the item, refer to Para 2.4.6.
- <typeDesignation> (O), this element contains a text string used to give further information about the component assembly. The element has no attributes.

**Business rules decisions:**

- None identified

**Markup example:**

```
<componentAssy>
<name>Flight Data Recorder</name>
<typeDesignation>
Here is some text.
</typeDesignation>
</componentAssy>
```

### 2.6.4 Maintenance qualifier

**Description:** The element <maintQualifier> is used to capture maintenance action qualification such as maintenance function, maintenance level estimated work time, any tools and/or test equipment and any remarks.

**Markup element:** <maintQualifier> (M)

**Attributes:**

- None

**Child elements:**

- <maintFunction> (M), this element includes the maintenance function to be performed on the item listed (eg inspect, test, service,..). The maintenance function is entered by specifying an enumerated value using the attribute function. Specific values are given in Chap 3.9.6.1.
- <maintLevelGroup> (M), this element is used to gather the information about the lowest authorized maintenance level and the associated estimated work time to perform the maintenance. The maintenance level is specified by selecting an enumerated value for the attribute maintLevelCode (refer to Chap 3.9.6.1). The enumerated values can be specified by project decision and can be defined for maintenance levels such as crew, operator, organization, direct, general support, or depot. The estimated work time should be entered as a data string within the element <maintLevel>. Refer to Para 2.6.5.
- <toolsRefs> (O), this element is used to contain a reference to a required tool or test equipment that is contained in the tools list within the maintenance allocation data. The element <internalRef> is allowed inside <toolsRefs> and is repeatable to allow for referencing multiple tools (refer to Chap 3.9.5.2.1.2). Refer to Para 2.6.7.
- <remarksRefs> (O), this element is used to contain a reference to remarks contained in the remarks list within the maintenance allocation data. The element <internalRef> is allowed inside element <remarksRefs> and is repeatable to allow for referencing multiple remarks (refer to Chap 3.9.5.2.1.2). Refer to Para 2.6.8.

**Business rules decisions:**

- None identified

**Markup example:**

```
<maintQualifier>
<maintFunction function="ft00"/>
<maintLevelGroup>
...
</maintLevelGroup>
</maintQualifier>
```

### 2.6.5 Maintenance level group

**Description:** This element is used to gather the information about the lowest authorized maintenance level and the associated estimated work time to perform the maintenance. <`maintLevel`>.

**Markup element:** <`maintLevelGroup`> (M)

**Attributes:**

– None

**Child elements:**

– <`maintLevel`> (M), The maintenance level is specified by selecting an enumerated value for the attribute `maintLevelCode`. The enumerated values can be specified by project decision and can be defined for maintenance levels such as crew, operator, organization, direct, general support, or depot. The estimated work time can be entered as a data string within the element. Refer to Para 2.6.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<maintLevelGroup>
<maintLevel maintLevelCode="ml01">
...
</maintLevel>
</maintLevelGroup>
```

### 2.6.6 Maintenance level

**Description:** The maintenance level is specified by selecting an enumerated value for the attribute `maintLevelCode`. The estimated work time can be entered as a data string within the element.

**Markup element:** <`maintLevel`> (M)

**Attributes:**

– `maintLevelCode` (O), Contains enumerated values specified by project decision and can be defined for maintenance levels such as crew, operator, organization, direct, general support, or depot. Refer to Chap 3.9.6.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– values for the attribute `maintLevelCode`

**Child elements:**

– None

**Markup example:**

```
<maintLevel maintLevelCode="ml01"/>
```

### 2.6.7 Tools References

**Description:** The element <toolsRefs> is used to contain a reference to a required tool or test equipment that is contained in the tools list within the maintenance allocation data.

**Markup element:** <toolsRefs> (O)

**Attributes:**

– None

**Child elements:**

– <internalRef> (M), This element provides the mechanism to reference multiple tools. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<toolsRefs>
<internalRef internalRefId="tool-001"
internalRefTargetType="other">
...
</internalRef>
</toolsRefs>
```

### 2.6.8 Remarks References

**Description:** The element <remarksRefs> is used to contain a reference to remarks contained in the remarks list within the maintenance allocation data.

**Markup element:** <remarksRefs> (O)

**Attributes:**

– None

**Child elements:**

– <internalRef> (M), This element provides the mechanism to reference multiple remarks. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<remarksRefs>
<internalRef internalRefId="rem-001"
internalRefTargetType="other">
...
```

```
</internalRef>
</remarksRefs>
```

### 2.6.9 Component Assembly Group

**Description:** The element <`componentAssyGroup`> is used when there is a requirement to subdivide the list into subassemblies.

**Markup element:** <`componentAssyGroup`> (O)

**Attributes:**

– None

**Child elements:**

– <`componentAssy`> (M). Refer to Para 2.6.3.
– <`maintQualifier`> (M). Refer to Para 2.6.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<componentAssyGroup>
<componentAssy>
...
</componentAssy>
<maintQualifier>
...
</maintQualifier>
</componentAssyGroup>
```

### 2.6.10 Tools list

**Description:** The element <`toolsList`> is used to list both special and common tools and test equipment required to maintain the equipment as indicated in the maintenance allocation. When tools and test equipment are indicated in the maintenance allocation, the tools list must be included. The tools list includes a required element <`title`> and a required and repeatable element <`toolsListGroup`>.

**Markup element:** <`toolsList`> (O)

**Attributes:**

– `id` (O), the identifier of the <`toolsList`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `skillLevelCode` (O), the competency level required of the person who will perform the task.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`title`> (M), this element is used to capture the tools and test equipment list title. It is populated in accordance with Chap 3.9.5.2.1.5.

– <toolsListGroup> (M), this element is used to capture data about the tool or test equipment. It includes elements for tools list code, maintenance, nomenclature, NSN, and tool number. Refer to Para 2.6.11.

**Business rules decisions:**

– None identified

**Markup example:**

```
<toolsList>
<title>List of tools</title>
<toolsListGroup>
...
</toolsListGroup>
</toolsList>
```

### 2.6.11 Tools list group

**Description:** The element <toolsListGroup> is used to capture data about the tool or test equipment. It includes elements for tools list code, maintenance, nomenclature, NSN, and tool number.

**Markup element:** <toolsListGroup> (M)

**Attributes:**

– None

**Child elements:**

– <toolsListCode> (M), this element is used to provide an id for the purposes of cross referencing. The element also allows for string data in the event that a particular code such as "A", "B", or "C" is used to identify the tool in the maintenance allocation data.
– <maintLevel> (M), this element is used to capture the lowest authorized maintenance level. The enumerated attribute maintLevelCode is used to identify the level. Refer to Para 2.6.6
– <name> (M), this element is used to identify the tool or test equipment. A basic name or noun should be used. Refer to Para 2.4.6.
– <natoStockNumber> (M), this element provides an identifier for the equipment that follows the coding system determined by NATO, and Ministries or Departments of Defense. Refer to Para 2.4.9.
– <toolRef> (M), this element is used to indicate the tool number. The tool number is entered via the attribute toolNumber. Refer to Chap 3.9.5.2.1.9.

**Business rules decisions:**

– None identified

**Markup example:**

```
<toolsListGroup>
<toolsListCode>
...
</toolsListCode>
<maintLevel maintLevelCode="ml01">
...
</maintLevel>
<name>
```

```
...
</name>
<natoStockNumber>
...
</natoStockNumber>
<toolRef toolNumber="782345"/>
</toolsListGroup>
```

### 2.6.12 Remarks list

**Description:** The element <remarksList> is used to list remarks pertinent to the maintenance functions listed in maintenance allocation data. The purpose is to provide a list for referencing from maintenance allocation. When remarks are indicated in the maintenance allocation, the remarks list must be included.

**Markup element:** <remarksList> (O)

**Attributes:**

- id (O), the identifier of the <remarksList> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (O), the competency level required of the person who will perform the task.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (M), this element is used to capture the remarks list title. It is populated in accordance with Chap 3.9.5.2.1.5.
- <remarksGroup> (M), this element is used to capture remarks pertinent to the maintenance of the assemblies and subassemblies. It includes elements for remarks list code and remarks. Refer to Para 2.6.13.

**Business rules decisions:**

- None identified

**Markup example:**

```
<remarksList>
<title>Remarks</title>
<remarksGroup>
...
</remarksGroup>
</remarksList>
```

### 2.6.13 Remarks group

**Description:** The element <remarksGroup> is used to capture data about the tool or test equipment. It includes elements for tools list code, maintenance, nomenclature, NSN, and tool number.

**Markup element:** <remarksGroup> (M)

**Attributes:**

– None

**Child elements:**

– <remarkCode> (M), this element is used to provide an id for the purposes of cross referencing. The element also allows for string data in the event that a particular code such as "A", "B", or "C" is used to identify the remark in the maintenance allocation data.
– <remarks> (M), this element is used to capture the remarks about the data and is populated in accordance with Chap 3.9.5.1. Refer to Para 2.3.11.

**Business rules decisions:**

– None identified

**Markup example:**

```
<remarksGroup>
<remarkCode id="A1">
...
</remarkCode>
<remarks>
...
</remarks>
</remarksGroup>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the element <commonInfo>**. The project or the organization must decide if and how the optional element <commonInfo> will be used. Refer to Para 2.1.

**Use of the optional element <inspectionDefinition>**. The project or the organization must decide if and how the optional element <inspectionDefinition> will be used. Refer to Para 2.3.

**Values for the attribute unitOfMeasure**. The project or the organization must decide on the valid units of measure for threshold information. Refer to Para 2.3.4.

**Values for the attribute thresholdType**. The project or the organization must decide the valid values for the attribute thresholdType, (ie "threshold" or "interval"). Refer to Para 2.3.4.

**Values for the attribute inspectionType**. The project or the organization must decide on values for the inspection types. Refer to Para 2.3.6.

**Values for the attribute releaseEvent**. The project or the organization must decide on the valid values of the attribute releaseEvent (eg "with", "after", "special event"…). Refer to Para 2.3.7.

**Task groupings**. The project or the organization must decide which tasks belong to which groups. Refer to Para 2.3.12.

**Task sequence**. The project or the organization must decide how to sequence the tasks. Refer to Para 2.3.13.

**Use of the attribute `skillLevelCode`**. The project or the organization must determine the values and definitions of the skill level code. Refer to Para 2.3.13, Para 2.4, and Para 2.5.

**Values for the attribute `markerType`**. The project or the organization must establish the valid values for the attribute, `markerType`, of the <`taskMarker`> element. Refer to Para 2.3.14.

**Use of the attribute `taskCode`**. The project or the organization must decide the valid definitions for the `taskCode` attribute values. Refer to Para 2.4.

**Use of the attribute `worthinessLimit`**. The project or the organization must decide whether to use the attribute `worthinessLimit`. Refer to Para 2.4.

**Use of the attribute `reducedMaint`**. The project or the organization must decide whether to use the attribute `reducedMaint`. Refer to Para 2.4.

**Use of the attribute `skillType`**. The project or the organization must decide whether to use the attribute `skillType` and to determine the valid values for the attribute. Refer to Para 2.4.

**Values for the attribute `relatedTaskDescr`**. The project or the organization must decide on the codes to identify task relationships. Refer to Para 2.4.

**Use of the attribute `sourceOfRqmt`**. The project or the organization must establish the valid values for the attribute `sourceOfRqmt`. Refer to Para 2.4.1.

**Use of the attribute `approval`**. The project or the organization must establish the valid values for the attribute `approval`. Refer to Para 2.4.1.

**Values for the attribute `sourceCriticality`**. The project or the organization must decide on the valid values for the attribute `sourceCriticality`. Refer to Para 2.4.2.

**Values for the attribute `sourceTypeCode`**. The project or the organization must decide on the valid values for the attribute `sourceTypeCode`. Refer to Para 2.4.2.

**Use of the element <`preliminaryRqmts`>**. The project or the organization must decide whether to use the element <`preliminaryRqmts`>or not as information can also be retrieved from the referenced Data modules. Refer to Para 2.4.3.

**Control of the names of equipment**. It is important that all names are consistent. The project or the organization must decide whether a terminology database is to be used. Refer to Para 2.4.6.

**Values for the attribute `supervisorLevelCode`**. The project or the organization must define the codes for the attribute `supervisorLevelCode`. Refer to Para 2.4.7.

**Use of the element <`timeLimitCategory`>**. The schema allows for two types of category of time limit. The project or the organization must decide whether their time limit information must be separated into two types and, if so, must define those types. Refer to Para 2.5.2.

**Values for the attribute `limitUnitType`**. The project or the organization must decide on the units for limit information. Refer to Para 2.5.4.

**Values for the attribute `maintLevelCode`**. The project or the organization must decide on the values of the maintenance levels. Refer to Para 2.6.6.

# 4 Examples

## 4.1 Time limit example

```
<referencedApplicGroup>
<applic id="appl-001">
<displayText>Mountain storm Mk1 or Brook trekker
Mk9</displayText>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
</applic>
</referencedApplicGroup>
...
<maintPlanning>
<timeLimitInfo applicRefId="appl-001" timeLimitIdent="001">
<equipGroup>
<equip><name>Bicycle</name>
<identNumber><manufacturerCode>KZ555</manufacturerCode>
<partAndSerialNumber><partNumber>Bicycle-
001</partNumber></partAndSerialNumber>
</identNumber></equip>
</equipGroup>
<reqQuantity unitOfMeasure="EA">1</reqQuantity>
<timeLimitCategory/>
<timeLimit>
<limitType limitUnitType="lt07">
<threshold thresholdUnitOfMeasure="th06">
<thresholdValue>1</thresholdValue>
<tolerance toleranceLow="1" toleranceHigh="1"/>
</threshold>
</limitType>
</timeLimit>
<timeLimit>
<limitType limitUnitType="lt05">
<threshold thresholdUnitOfMeasure="th06">
<thresholdValue>1</thresholdValue>
</threshold>
</limitType>
</timeLimit>
</timeLimitInfo>
<timeLimitInfo applicRefId="appl-001" timeLimitIdent="002">
<equipGroup>
<equip><name>Brake pads</name>
<identNumber><manufacturerCode>KT444</manufacturerCode>
<partAndSerialNumber<partNumber>BR-PADS-
001</partNumber></partAndSerialNumber>
```

```
</identNumber></equip>
</equipGroup>
<reqQuantity unitOfMeasure="EA">4</reqQuantity>
<timeLimitCategory/>
<timeLimit>
<limitType limitUnitType="lt05">
<threshold thresholdUnitOfMeasure="th03">
<thresholdValue>1</thresholdValue>
</threshold>
</limitType>
</timeLimit>
</timeLimitInfo>
<timeLimitInfo applicRefId="appl-001" timeLimitIdent="003">
<equipGroup>
<equip><name>Chain</name>
<identNumber>
<manufacturerCode>KZ555</manufacturerCode>
<partAndSerialNumber><partNumber>Ch-
001</partNumber></partAndSerialNumber>
</identNumber></equip>
</equipGroup>
<timeLimit>
<limitType limitUnitType="lt05">
<threshold thresholdUnitOfMeasure="th03">
<thresholdValue>1</thresholdValue>
</threshold>
</limitType>
</timeLimit>
</timeLimitInfo>
<timeLimitInfo applicRefId="appl-001" timeLimitIdent="004">
<equipGroup>
<equip><name>Hub bearings</name>
<identNumber>
<manufacturerCode>KZ555</manufacturerCode>
<partAndSerialNumber><partNumber>HB-
001</partNumber></partAndSerialNumber>
</identNumber></equip>
</equipGroup>
<reqQuantity unitOfMeasure="EA">2</reqQuantity>
<timeLimitCategory/>
<timeLimit>
<limitType limitUnitType="lt06" changeMark="1">
<threshold thresholdUnitOfMeasure="th03">
<thresholdValue>6</thresholdValue>
<tolerance toleranceLow="1" toleranceHigh="1"/>
</threshold>
</limitType>
</timeLimit>
</timeLimitInfo>
</maintPlanning>
```

## 4.2 Task definition example

```
<referencedApplicGroup>
<applic>
<displayText>Mountain storm Mk1 or Brook trekker
Mk9</displayText>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
```

```
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
</applic>
</referencedApplicGroup>
...
<maintPlanning>
<taskDefinition applicRefId="appl-001" taskIdent="001"
taskCode="taskcd04" worthinessLimit="recommended"
reducedMaint="No"
skillType="st01"><task> <taskDescr>To do the pre-ride checks
</taskDescr></task>
<rqmtSource sourceOfRqmt="MRB" sourceIdent="doc1234"
approval="ap01">
<issueInfo issueNumber="001" inWork="01"/>
<issueDate year="2006" month="01" day="01"/>
<sourceType sourceTypeCode="stc05"/>
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## 4.3 Inspection definition example

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## 4.4 Maintenance allocation example

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Common No. 1, Less Power (SC4910-95-A74)</name>
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<toolRef toolNumber="W32593"/>
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Mounted (SC4940-95-CL-B02)</name>
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N26)</name>
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(PMCS). </simplePara></remarks>
</remarksGroup>
</remarksList>
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# Chapter 3.9.5.2.6

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# 1 General

The Crew Schema is to be used to capture and represent information to be used by crew/operators. The granularity of crew data modules is to follow the breakdown reflected by the SNS.

The use of the common entities, elements and attributes is to be as detailed in Chap 3.9.5.2.1.

# 2 Crew/Operator information

For aircrew information see Chap 5.2.2.7. For crew/operator information for land/sea Products, refer to Chap 5.2.3.

## 2.1 References

For the rules regarding the population of references, refer to Chap 3.9.5.2.1.2.

## 2.2 Warnings and cautions

For the rules regarding the population of warnings and cautions, refer to Chap 3.9.3.

## 2.3 Titles

For the rules regarding the population of references, refer to Chap 3.9.5.2.1.5.

## 2.4 Crew

**Description:** The mandatory element <`crew`> is the container for all crew/operator content (excluding references).

**Markup element:** <`crew`> (M)

**Attributes:**

- `id` (O), the identifier of the <`crew`> element. Refer to Chap 3.9.5.2.1.2.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`crewRefCard`> (O). Refer to Para 2.4.1.
- <`descrCrew`> (O). Refer to Para 2.4.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of reference card information
- Use of description information

**Markup example:**

```
<crew>
<crewRefCard>...</crewRefCard>
</crew>
```

### 2.4.1 Reference card

**Description:** The optional element <crewRefCard> is used to contain flight reference card information or its equivalent for land/sea Products.

**Markup element:** <crewRefCard> (O)

**Attributes:**

- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <crewDrill> (M). Refer to Para 2.4.1.1.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<crewRefCard>
<crewDrill>...</crewDrill>
</crewRefCard>
```

#### 2.4.1.1 Drill

**Description:** The element <crewDrill> is used to contain a crew/operator drill.

**Markup element:** <crewDrill> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <crewDrill> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.

- `cautionRefs` (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- `drillType` (O), which indicates the type of drill. This attribute can have one of the following values:
  - "`dt00`" - "`dt99`", refer to Chap 3.9.6.1.
- `orderedStepsFlag` (O), indicates whether the drill steps are a chronologically ordered list. This attribute can have one of the following values:
  - "`1`" (yes) indicates that the list is chronologically ordered
  - "`0`" (no) indicates that it is not chronologically ordered
- `crewStepCondition` (O), used to indicate special conditions associated with crew drill step. This attribute can have one of the following values:
  - "`csc00`" - "`csc99`", refer to Chap 3.9.6.1.
- `independentCheck` (O), used to indicate that the step must be checked by a supervisor with a given qualification
- `skillLevelCode` (O), to indicate the skill level required for the step. This attribute can have one of the following values:
  - "`sk01`" - "`sk99`", refer to Chap 3.9.6.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`title`> (O). Refer to Chap 3.9.5.2.1.5.
- <`thumbTabText`> (O). Refer to Para 2.4.1.1.1.
- <`warning`> (O). Refer to Chap 3.9.3.
- <`caution`> (O). Refer to Chap 3.9.3.
- <`note`> (O). Refer to Chap 3.9.3.
- <`crewMemberGroup`> (O). Refer to Para 2.4.1.1.2.
- <`para`> (O). Refer to Chap 3.9.5.2.1.10.
- <`figure`> (O). Refer to Chap 3.9.5.2.1.7.
- <`multimedia`> (O). Refer to Chap 3.9.2.4.
- <`foldout`> (O). Refer to Chap 3.9.5.2.1.7.
- <`table`> (O). Refer to Chap 3.9.5.2.1.6.
- <`crewDrillStep`> (O). Refer to Para 2.4.1.1.4.
- <`if`> (O). Refer to Para 2.4.1.1.7.
- <`elseIf`> (O). Refer to Para 2.4.1.1.11.
- <`case`> (O). Refer to Para 2.4.1.1.12.
- <`subCrewDrill`> (O). Refer to Para 2.4.1.1.13.
- <`endMatter`> (O). Refer to Para 2.4.1.1.14.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute `independentCheck`
- Use of the attribute `skillLevelCode`
- Use of the attribute `crewStepCondition`

**Markup example:**

```
<crewDrill>
<title>Brakes</title>
<subCrewDrill>...</subCrewDrill>
</crewDrill>
```

*2.4.1.1.1 Tab text*

**Description:** The element <thumbTabText> is used to contain thumb tab text for the drill or subdrill.

**Markup element:** <thumbTabText> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– <internalRef> (O). Refer to Chap 3.9.5.2.1.2.
– <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
– <symbol> (O). Refer to Chap 3.9.5.2.1.10.
– <subScript> (O). Refer to Chap 3.9.5.2.1.10.
– <superScript> (O). Refer to Chap 3.9.5.2.1.10.
– <footnoteRef> (O). Refer to Chap 3.9.5.2.1.10.
– <acronym> (O). Refer to Chap 3.9.5.2.1.10.
– <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
– <captionGroup> (O). Refer to Chap 3.9.5.2.1.4.
– <caption> (O). Refer to Chap 3.9.5.2.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<thumbTabText>
<caption><captionLine>...</captionLine></caption>
</thumbTabText>
```

*2.4.1.1.2 Crew*

**Description:** The element <crewMemberGroup> is used to identify the crew/operator responsible for carrying out an action.

**Markup element:** <crewMemberGroup> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– actionResponsibility (O). This attribute can have one of the following values:
  - "all" indicates whether all of the crew/operator listed are responsible for performing the actions
  - "any" indicates whether any of the crew/operator listed are responsible for performing the actions

**Child elements:**

– <crewMember> (M). Refer to Para 2.4.1.1.3.

**Business rules decisions:**

– None identified

**Markup example:**

```
<crewMemberGroup>
<crewMember crewMemberType="cm01">...</crewMember>
</crewMemberGroup>
```

*2.4.1.1.3 Crew member*

**Description:** The empty, conditionally mandatory element <crewMember> is used to identify a crew/operator member.

**Markup element:** <crewMember> (M)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– crewMemberType (M), used to indicate a type of crew member. This attribute can have one of the following values:
  - "cm01" - "cm99", refer to Chap 3.9.6.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the crewMemberType values

**Markup example:**

```
<crewMember crewMemberType="cm02"></crewMember>
<crewMember crewMemberType="cm03"></crewMember>
```

*2.4.1.1.4 Crew drill step*

**Description:** The element <crewDrillStep> is used to identify a step in a crew/operator data module.

**Markup element:** <crewDrillStep> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <crewDrillStep> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
– cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
– stepLabel (O), used to identify the label of the step
– keepWithNext (O), used to indicate whether a step is presented together with the next step. This attribute has no meaning when placed on a final step. This attribute can have one of the following values:

  - "1" (yes), indicates that the step should be kept with the next sibling step (if one exists) and therefore, all children of the step for which the attribute is set should be kept together as well (if possible)
  - "0" (no) (D), indicates that it need not be kept with the next sibling step
- memorizeStepsFlag (O), used to indicate whether a step must be memorized by crew/operator. This attribute can have one of the following values:
  - "1" (yes), indicates that the step should be memorized by the crew/operator
  - "0" (no) (D), indicates that it need not be memorized
- separatorStyle (O), used to indicate the separator characters between a challenge and a response. This attribute can have one of the following values:
  - "dot" to indicate a sequence of dots
  - "line" to indicate a line
  - "none" to indicate no separator
- orderedStepsFlag (O), indicates whether the drill steps are a chronologically ordered list. This attribute can have one of the following values:
  - "1" (yes) indicates that the list is chronologically ordered
  - "0" (no) indicates that it is not chronologically ordered
- crewStepCondition (O), used to indicate special conditions associated with crew drill step. This attribute can have one of the following values:
  - "csc00" - "csc99", refer to Chap 3.9.6.1.
- independentCheck (O), used to indicate that the step must be checked by a supervisor with a given qualification
- skillLevelCode (O), to indicate the skill level required for the step
  - "sk01" - "sk99", refer to Chap 3.9.6.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.
- <caption> (O). Refer to Chap 3.9.5.2.1.4.
- <crewMemberGroup> (O). Refer to Para 2.4.1.1.2.
- <crewProcedureName> (O). Refer to Para 2.4.1.1.5.
- <challengeAndResponse> (O). Refer to Para 2.4.1.1.6.
- <crewDrillStep> (O). Refer to Para 2.4.1.1.4.
- <if> (O). Refer to Para 2.4.1.1.7.
- <elseIf> (O). Refer to Para 2.4.1.1.11.
- <case> (O). Refer to Para 2.4.1.1.12.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute `keepWithNext`
- Use of the attribute `independentCheck`
- Use of the attribute `skillLevelCode`

**Markup example:**

```
<crewDrillStep>
<challengeAndResponse>...</challengeAndResponse>
</crewDrillStep>
```

*2.4.1.1.5 Crew/operator procedure*

**Description:** The element <`crewProcedureName`> is used to identify a crew/operator procedure.

**Markup element:** <`crewProcedureName`> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <`para`> (O). Refer to Chap 3.9.5.2.1.10.
- <`figure`> (O). Refer to Chap 3.9.5.2.1.7.
- <`multimedia`> (O). Refer to Chap 3.9.2.4.
- <`foldout`> (O). Refer to Chap 3.9.5.2.1.7.
- <`table`> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<crewProcedureName>
<para>Tighten clamp bolt</para>
</crewProcedureName>
```

*2.4.1.1.6 Crew/operator challenge and response*

**Description:** The element <`challengeAndResponse`> is used to identify a crew/operator challenge and response.

**Markup element:** <`challengeAndResponse`> (O)

**Attributes:**

- None

**Child elements:**

- <`challenge`> (M). Refer to Para 2.4.1.1.7.
- <`crewMemberGroup`> (O). Refer to Para 2.4.1.1.2.
- <`response`> (M). Refer to Para 2.4.1.1.8.

**Business rules decisions:**

– None identified

**Markup example:**

```
<challengeAndResponse>
<challenge>
<para>Floodlights</para>
</challenge>
<response>
<para>ON if required</para>
</response>
</challengeAndResponse>
```

*2.4.1.1.7 Challenge*

**Description:** The element <challenge> is used to identify a crew/operator challenge and response.

**Markup element:** <challenge> (M)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

– <para> (O). Refer to Chap 3.9.5.2.1.10.
– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <multimedia> (O). Refer to Chap 3.9.2.4.
– <foldout> (O). Refer to Chap 3.9.5.2.1.7.
– <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<challenge>
<para>Axel Nuts</para>
</challenge>
```

*2.4.1.1.8 Response*

**Description:** The element <response> is the expected response to the challenge.

**Markup element:** <response> (M)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <para> (O). Refer to Chap 3.9.5.2.1.10.
– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <multimedia> (O). Refer to Chap 3.9.2.4.
– <foldout> (O). Refer to Chap 3.9.5.2.1.7.
– <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<response>
<para>Tight</para>
</response>
```

*2.4.1.1.9 If statement*

**Description:** The element <if> is used to identify an "if" statement.

**Markup element:** <if> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <if> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <caseCond> (M). Refer to Para 2.4.1.1.10.
– <crewDrillStep> (O). Refer to Para 2.4.1.1.4.
– <elseIf> (O). Refer to Para 2.4.1.1.11.
– <if> (O)
– <case> (O). Refer to Para 2.4.1.1.12.

**Business rules decisions:**

– None identified

**Markup example:**

```
<if>
<caseCond>Handlebars twist in stem</caseCond>
<crewDrillStep>
<crewProcedureName><para>Tighten clamp bolt</para>
</crewProcedureName>
</crewDrillStep>
</if>
```

*2.4.1.1.10 Condition statement*

**Description:** The element <caseCond> is used to identify a condition as part of an "if" statement.

**Markup element:** <caseCond> (O)

**Attributes:**

– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <functionalItemRef> (O). Refer to Chap 3.9.5.1.
- <circuitBreakerRef> (O). Refer to Chap 3.9.5.2.1.10.
- <controlIndicatorRef> (O). Refer to Chap 3.9.5.2.1.10.
- <inlineSignificantData> (O). Refer to Chap 3.9.5.2.1.10.
- <quantity> (O). Refer to Chap 3.9.5.2.1.10.
- <internalRef> (O). Refer to Chap 3.9.5.2.1.2.
- <indexFlag> (O). Refer to Chap 3.9.5.2.1.10.
- <changeInline> (O). Refer to Chap 3.9.5.2.1.1.
- <emphasis> (O). Refer to Chap 3.9.5.2.1.10.
- <symbol> (O). Refer to Chap 3.9.5.2.1.10.
- <subScript> (O). Refer to Chap 3.9.5.2.1.10.
- <superScript> (O). Refer to Chap 3.9.5.2.1.10.
- <dmRef> (O). Refer to Chap 3.9.5.2.1.2.
- <externalPubRef> (O). Refer to Chap 3.9.5.2.1.2.
- <footnote> (O). Refer to Chap 3.9.5.2.1.10.
- <footnoteRef> (O). Refer to Chap 3.9.5.2.1.10.
- <acronym> (O). Refer to Chap 3.9.5.2.1.10.
- <acronymTerm> (O). Refer to Chap 3.9.5.2.1.10.
- <captionGroup> (O). Refer to Chap 3.9.5.2.1.4.
- <caption> (O). Refer to Chap 3.9.5.2.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<caseCond>Stem is loose</caseCond>
```

*2.4.1.1.11 Else-if statement*

**Description:** The element <elseIf> is used to identify an "if" statement to be used if another "if" condition is not met.

**Markup element:** <elseIf> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <elseIf> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <caseCond> (M). Refer to Para 2.4.1.1.10.
- <crewDrillStep> (O). Refer to Para 2.4.1.1.4.
- <case> (O). Refer to Para 2.4.1.1.12.
- <if> (O). Refer to Para 2.4.1.1.7.
- <elseIf> (O). Refer to Para 2.4.1.1.11.

**Business rules decisions:**

– None identified

**Markup example:**

```
<elseIf>
<caseCond>Clamp loose</caseCond>
<crewDrillStep>
<crewProcedureName>
<para>Tighten clamp</para>
</crewProcedureName>
</crewDrillStep>
</elseIf>
```

*2.4.1.1.12 Case statement*

**Description:** The element <case> is used to identify a case as part of a list of possible cases.

**Markup element:** <case> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <case> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <caseCond> (M). Refer to Para 2.4.1.1.10.
– <crewDrillStep> (O). Refer to Para 2.4.1.1.4.
– <case> (O). Refer to Para 2.4.1.1.12.
– <if> (O). Refer to Para 2.4.1.1.7.
– <elseIf> (O). Refer to Para 2.4.1.1.11.

**Business rules decisions:**

– None identified

**Markup example:**

```
<case>
<caseCond>Dial set to A</caseCond>
<crewDrillStep>
<crewProcedureName>
<para>Set dial to B</para>
</crewProcedureName>
</crewDrillStep>
</case>
<case>
<caseCond>Dial set to B</caseCond>
<crewDrillStep>
<crewProcedureName>
<para>Do nothing</para>
</crewProcedureName>
</crewDrillStep>
</case>
```

*2.4.1.1.13 Subdrill statement*

**Description:** The element <subCrewDrill> is used to identify a subdrill, which is part of a crew/operator drill.

**Markup element:** <subCrewDrill> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <subCrewDrill> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- orderedStepsFlag (O), indicates whether the drill steps are a chronologically ordered list. This attribute can have one of the following values:
  - "1" (yes) indicates that the list is chronologically ordered
  - "0" (no) indicates that it is not chronologically ordered
- independentCheck (O), used to indicate that the step must be checked by a supervisor with a given qualification
- skillLevelCode (O), to indicate the skill level required for the step
  - "sk01" - "sk99", refer to Chap 3.9.6.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5.
- <thumbTabText> (O). Refer to Para 2.4.1.1.1.
- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <crewMemberGroup> (O). Refer to Para 2.4.1.1.2.
- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.
- <crewDrillStep> (O). Refer to Para 2.4.1.1.4.
- <if> (O). Refer to Para 2.4.1.1.7.
- <elseIf> (O). Refer to Para 2.4.1.1.11.
- <case> (O). Refer to Para 2.4.1.1.12.

**Business rules decisions:**

- None identified

**Markup example:**

```
<subCrewDrill>
<title>Callipers</title>
<crewDrillStep>
<challengeAndResponse>
<challenge>
<para>Link Wire</para>
</challenge>
<response>
<para>Firmly attached</para>
</response>
</challengeAndResponse>
</crewDrillStep>
</subCrewDrill>
```

*2.4.1.1.14 End matter statement*

**Description:** The element <endMatter> is used to contain end matter using the element <para>.

**Markup element:** <endMatter> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<endMatter>
<para>...</para>
</endMatter>
```

**2.4.2 Descriptive information for crew/operators**

**Description:** The element <descrCrew> is to be used to contain descriptive information for use by crew/operators.

**Markup element:** <descrCrew> (O)

**Attributes:**

- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <warning> (O). Refer to Chap 3.9.3.
- <caution> (O). Refer to Chap 3.9.3.
- <note> (O). Refer to Chap 3.9.3.
- <levelledPara> (O). Refer to Chap 3.9.5.2.2, with the inclusion of <crewDrill>, refer to Para 2.4.1.1.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of descriptive information

**Markup example:**

```
<descrCrew>
<levelledPara>
<title>Introduction</title>
<para>Data about the bicycle and its control system is given in
this document. This data will help you operate the
bicycle.</para>
</levelledPara>
</descrCrew>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the reference information branch**. The project of the organization must decide whether to use the element <crewRefCard> or not. Refer to Para 2.4.1.

**Use of the attribute independentCheck**. The project or the organization must decide whether to use the attribute independenCheck or not. Refer to Para 2.4.1.1.

**Use of the attribute skillLevelCode**. The project or the organization must decide whether to use the attribute skillLevelCode or not. Refer to Para 2.4.1.1.

**Use of the attribute crewStepCondition**. The project or the organization must decide whether to use the attribute crewStepCondition or not. Refer to Para 2.4.1.1.

**Use of the attribute crewMemberType**. The project or the organization must decide whether to use the attribute crewMemberType or not. Refer to Para 2.4.1.1.3.

**Use of the attribute keepWithNext**. The project or the organization must decide whether to use the attribute keepWithNext or not. Refer to Para 2.4.1.1.4.

**Use of the descriptive information branch**. The project or the organization must decide whether to use the element <descrCrew> or not. Descriptive information could be captured using the descriptive Schema exclusively, however, for crew/operator information this is not recommended. Refer to Para 2.4.2.

# 4 Examples

```
<crewRefCard>
<crewDrill>
<crewMemberGroup>
<crewMember crewMemberType="cm02"></crewMember>
<crewMember crewMemberType="cm03"></crewMember>
</crewMemberGroup>
<crewDrillStep>
<crewProcedureName>
<para>Tighten stem</para>
</crewProcedureName>
<if>
<caseCond>Stem is loose</caseCond>
<crewDrillStep><para>Tighten clamp bolt</para></crewDrillStep>
</if>
<elseIf>
<caseCond>Handlebars twist in stem</caseCond>
<crewDrillStep></crewDrillStep>
</elseIf>
</crewDrillStep>
<crewDrillStep>
<challengeAndResponse>
<challenge>
<para></para>
</challenge>
<response>
<para></para>
</response>
</challengeAndResponse>
</crewDrillStep>
</crewDrill>
</crewRefCard>
```

# Chapter 3.9.5.2.7

## *Content section - Parts information*

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| Chap 3.9.5.2.1.2 | Common constructs - Referencing |
| Chap 3.9.5.2.1.7 | Common constructs - Figures and foldouts |
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# 1 General

The IPD Schema is to be used to capture and represent parts lists and IPD. This information can be drawn from S2000M provisioning database or from engineering data for non-S2000M projects.

# 2 Parts information

**Description:** The element <content> is the container for all parts content. This element is used to contain the illustrated parts catalog information of a data module.

**Markup element:** <content> (M)

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*Fig 1 Element <content>*

**Attributes:**

– id (O), the identifier of the <content> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <refs> (O). Refer to Chap 3.9.5.2.1.2.
– <illustratedPartsCatalog> (M). Refer to Para 2.1.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

## 2.1 Illustrated parts catalog

**Description:** The element <illustratedPartsCatalog> is used to contain the illustrated parts catalog information of a data module (excluding references).

**Markup element:** <illustratedPartsCatalog> (M)

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*Fig 2 Element <illustratedPartsCatalog>*

**Attributes:**

– None

**Child elements:**

– <figure> (O). Refer to Chap 3.9.5.2.1.7.
– <multimedia> (O). Refer to Chap 3.9.2.4.
– <initialProvisioningProject> (O). Refer to Para 2.2.
– <zoneGroup> (O). Refer to Para 2.3.
– <catalogSeqNumber> (M). Refer to Para 2.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<illustratedPartsCatalog>
<figure>...</figure>
<initialProvisioningProject>...</initialProvisioningProject>
<catalogSeqNumber catalogSeqNumberValue="72016710
010A">...</catalogSeqNumber>
</illustratedPartsCatalog>
```

## 2.2 Initial provisioning project number

**Description:** The element <initialProvisioningProject> is used to store information regarding the Initial Provisioning Project (IPP).

**Markup element:** <initialProvisioningProject> (O)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <initialProvisioningProject> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– initialProvisioningProjectNumber. (M) This mandatory attribute is used to break the complete Initial Provisioning Project Number (IPPN) information into manageable sections. This allows for the identification of spares and the regulation of processes by section. The first five characters comprise the North Atlantic Treaty Organisation (NATO) supply code for manufacturers (CAGE). The sixth to the ninth characters are a serial number allocated by the project.
– initialProvisioningProjectNumberSubject. (M) This mandatory attribute is used to store the IPPN subject. The attribute contains the first 19 characters of the "description for part" stored in accordance with S2000M.
– fileIdent. (O) The optional file identifier (FID) is used to define whether the IPPN is for the complete Product or a component. The attribute will be set to "s" to indicate the complete Product or "t" to indicate a component part of the Product.
– languageCode. (O) The optional language code (LGE) is used to determine the language in which data is transmitted and is to be populated with the user (nation) code.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <subjectVariantSegment> (O). Refer to Para 2.2.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– The sixth to ninth characters of the IPPN are controlled by the project. These codes must not be duplicated within a project.

**Markup example:**

```
<initialProvisioningProject
initialProvisioningProjectNumber="F611723121110"
initialProvisioningProjectNumberSubject="Servo actuator"
fileIdent="t">...</initialProvisioningProject>
```

### 2.2.1 Subject variant

**Description:** the element <subjectVariantSegment> is used to identify the S2000M subject variant segment (VAS). It is used as an extension of the IPPN to store information regarding the identification (PN, NSCM and NSN) of the subject for which the IPP has been prepared. In those cases where the IPP presents data against variants of the subject, then this element is repeated the appropriate number of times to hold all the variants' identifications (limited to eight as stated in S2000M).

If the element is not used, then the corresponding information can be retrieved from the first data module (figure) of the IPP, ie from all first CSNs (digits 10 to 13: item numbers and item number variants) given there.

**Markup element:** <subjectVariantSegment> (O)

**Attributes:**

– None

**Child elements:**

– <subjectIdent> (M). Refer to Para 2.2.1.1.
– <natoStockNumber> (O). Refer to Para 2.2.1.4.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

#### 2.2.1.1 Subject identification

**Description:** The element <subjectIdent> is used to store the subject's identification (SID) and provides identification of the item, or items, which are the subjects of the IPPN.

**Markup element:** <subjectIdent> (O)

**Attributes:**

– None

**Child elements:**

- <manufacturerCode> (M). Refer to Para 2.2.1.2.
- <partNumber> (M). Refer to Para 2.2.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.1.2 Manufacturer

**Description:** The element <manufacturerCode> contains an identifier for the manufacturer of the equipment. The textual content is the CAGE code for the manufacturer.

**Markup element:** <manufacturerCode> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <manufacturerCode> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Defining a list of CAGE codes

**Markup example:**

Refer to Para 4.

2.2.1.3 Part number

**Description:** The element <partNumber> is used to store the part number of an item. This part number is allocated by the design authority of the equipment.

**Markup element:** <partNumber> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <partNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.2.1.4 Subject NATO stock number

**Description:** The element <natoStockNumber> is used here to contain the NATO (or NSN for the SID.

**Markup element:** <natoStockNumber> (O)

**Attributes:**

– id (O), the identifier of the <natoStockNumber> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– natoSupplyClass. (O) This optional attribute is used to contain the NATO Supply Class (NSC).
– natoCodificationBureau. (O) This optional attribute is used to contain the first two digits of the NATO Item Identification Number (NIN) in the format of the National Codification Bureau (NCB).
– natoItemIdentNumberCore. (O) This optional attribute is used to contain the third to ninth digit of the NIN.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <fullNatoStockNumber> (O), contains the full NATO stock number
– <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– defining if the NATO Stock Number is to be split within its attribute fields or directly filled as a whole in its full NATO stock number child element

**Markup example:**

Refer to Para 4.

## 2.3 Zones

**Description:** The element <zoneGroup> is used to indicate the zoning information of a figure, in order to know where components, described in a figure, are installed on the product. For instance in case of damage it enables all the figures impacted by the damage to be easily identified.

**Markup element:** <zoneGroup> (O)

**Attributes:**

– None

**Child elements:**

– <zoneRef> (C). Refer to Para 2.3.1.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.3.1 Zone reference

**Description:** The element <zoneRef> is used to contain the zoning information (one or more) as described at Chap 3.4. It is used in accordance with the rules in Chap 4.13.2.

**Markup element:** <zoneRef> (C)

**Attributes:**

– id (O), the identifier of the <zoneRef> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– zoneNumber (O) the zone identifier. Refer to Chap 3.4.
– lsarData (O), this attribute is used to record the LSA information that is applicable to the zone.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <name> (O), the nomenclature associated with the zone.
– <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

## 2.4 Catalogue sequence number

**Description:** The mandatory repeatable element <catalogSeqNumber> is used to store the catalogue sequence number (CSN) and all related parts information.

**Markup element:** <catalogSeqNumber> (M)

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*Fig 3 Element <`catalogSeqNumber`>*

**Attributes:**

- `id` (O), the identifier of the <`catalogSeqNumber`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `catalogSeqNumberValue` (O), This attribute is used to capture a CSN. A CSN captures the location of an item within the Illustrated Parts Catalog (IPC) in terms of its SNS. The code is made up as shown in Table 2, where "b" means a single space character (blank).

*Table 2 Catalogue sequence number*

| Position | Content for chapterized IPD | Content for non-chapterized IPD |
|---|---|---|
| 1 and 2 | Chapter (from the SNS) | bb |
| 3 | Sub-chapter (from the SNS) | b |
| 4 | Sub-subchapter (from the SNS) | b |
| 5 and 6 | Unit or assembly (from the SNS) | bb |
| 7 and 8 | Figure number | Figure number |
| 9 | Figure number variant | Figure number variant |
| 10, 11 and 12 | Item number | Item number |
| 13 | Item number variant | Item number variant |

When a CSN is given for the Product (chapterized IPD), the complete content of this data element is to be provided.

Example:

```
<catalogSeqNumber catalogSeqNumberValue="72016710 000 " ...>.
```

When a CSN is contained in the separate IP presentation of equipments (non-chapterized IPD) then only the last seven characters are applicable and the first six are to be filled with spaces.

Example:

```
<catalogSeqNumber catalogSeqNumberValue="    01 001 " ...>.
```

- `indenture` (M). This attribute is used to contain the indenture (IND) of an item. This single character numeric code indicates the hierarchical level of an item within the breakdown of a figure. Indenture values must only be "`1`" thru "`9`".
- `itemItemVariantIdent` (O). This attribute is used to contain always the four characters made from the item number and the item number variant. If item number variant is not given, it must be filled with a single space character (eg `itemItemVariantIdent="0001"`).
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`functionalItemRef`> (O). Refer to Para 2.4.1.
- <`accessPointRef`> (O). Refer to Para 2.4.1.2.
- <`internalRef`> (O). Refer to Para 2.4.2.
- <`itemSequenceNumber`> (M). Refer to Para 2.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- structure and rules for the SNS and CSN

**Markup example:**

Refer to Para 4.

### 2.4.1 Function position link

**Description:** This optional link is addressed thru either functional item numbers (refer to Para 2.4.1.1) or access point's identification (refer to Para 2.4.1.2).

#### 2.4.1.1 Functional item number

**Description:** The element <`functionalItemRef`> is used to indicate a Functional Item Number (Refer to Chap 3.9.5.2.11) for the description of this element and its attributes.

**Markup element:** <`functionalItemRef`> (O)

**Attributes:**

- `id` (O), the identifier of the <`functionalItemRef`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `functionalItemNumber` (M), used to give the functional item number code.
- `functionalItemType` (O), used to indicate the functional item number type.
- `manufacturerCodeValue` (O), used to indicate the manufacturer CAGE code.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`name`> (O), the nomenclature for the functional item.
– <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.4.1.2 Access point

**Description:** The element <`accessPointRef`> is used to store the access point's identification where an item is located. It is used in accordance with the rules in Chap 3.4.

**Markup element:** <`accessPointRef`> (O)

**Attributes:**

– `id` (O), the identifier of the <`accessPointRef`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `accessPointNumber` (O), used to indicate the access panel code.
– `accessPointTypeValue` (O), used to indicate the access panel type.
– `lsarData` (O), this attribute is used to contain a reference to the applicable LSA data.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <`name`> (O), the nomenclature of the access point
– <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

**2.4.2 Internal reference**

**Description:** The element <`internalRef`> is used to indicate the internal references used within the core of the IPD data module content, it refers to the hotspots mechanism. Refer to Chap 3.9.5.2.1.2.

**Markup element:** <`internalRef`> (O).

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `internalRefId` (O), used to define the internal reference identifier.
- `internalRefTargetType` (O), used to define the internal reference target type.
- `referredFragment` (O), used to refer to a dedicated fragment.
- `targetTitle` (O), used to define the target title.
- `xlink` (O), attributes (`type, href, title, show, actuate`), which are used to manage the W3C Xlink attributes.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <`subScript`> (O). Refer to Chap 3.9.5.2.1.10.
- <`superScript`> (O). Refer to Chap 3.9.5.2.1.10

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the generic hotspots mechanism

**Markup example:**

```
<internalRef internalRefId="fig-0001-gra-0001-hot-0006"
internalRefTargetType="hotspot">...</internalRef>
```

## 2.5 Item sequence number

**Description:** The mandatory, repeatable element <`itemSequenceNumber`> is used to store the Item Sequence Number (ISN). It also contains elements which store metadata about the item.

**Markup element:** <`itemSequenceNumber`> (M)

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*Fig 4 Element <`itemSeqNumber`>*

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`itemSeqNumber`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `itemSeqNumberValue` (M), used to store the ISN. Positions one and two of the ISN comprise a sequence number, the first number being "00", which is incremented in steps of 5. Position three contains an alphanumeric variant code.

- partCharacteristic (O), used to indicate special part characteristics. Attribute values "pc00" to "pc50" are reserved for S1000D assignment as defined in Chap 3.9.6.1. Values from "pc51" to "pc99"are available for project use.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <reasonForSelection> (O) Reason for selection information Refer to Para 2.5.1.
- <quantityPerNextHigherAssy> (M) Quantity per next higher assembly Refer to Para 2.5.2.
- <manufacturerCode> (M) NATO supply code for manufacturers (CAGE) Refer to Para 2.5.3.
- <partNumber> (M) Part number information Refer to Para 2.5.4.
- <partIdentSegment> (O) Part identity information Refer to Para 2.5.5.
- <natoStockNumber> (O) NATO stock number Refer to Para 2.5.6.
- <partLocationSegment> (O) Part location information Refer to Para 2.5.7.
- <applicabilitySegment> (O) Applicability information Refer to Para 2.5.8.
- <categoryOneContainerLocation> (O) Container information Refer to Para 2.5.9.
- <locationRcmdSegment> (M) Location recommendation information Refer to Para 2.5.10.
- <referenceDesignator> (O) Reference designator Refer to Para 2.5.11.
- <ilsNumber> (O) Integrated logistic information Refer to Para 2.5.12.
- <changeAuthorityNumber> (O) Change authority information Refer to Para 2.5.13.
- <genericPartDataGroup> (O) Program specific information Refer to Para 2.5.14.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute applicRefIds

**Markup example:**

Refer to Para 4.

### 2.5.1 Reason for selection

**Description:** The element <reasonForSelection> is used to store the Reason For Selection (RFS) of an item.

**Markup element:** <reasonForSelection> (O)

**Attributes:**

- id (O), the identifier of the <reasonForSelection> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- reasonForSelectionValue (M), which be populated using data Table 3.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

*Table 3 Reason for selection*

| Value | Reason |
|---|---|
| "0" | Not a recommended spare |
| "1" | Wear |
| "2" | Maintenance damage |
| "3" | Loss |
| "4" | Vibration |
| "5" | Corrosion |
| "6" | Deterioration |
| "7" | Extreme temperature |
| "8" | Other |
| "9" | Accidental damage (Insurance) |

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.5.2 Quantity per next higher assembly

**Description:** The element <quantityPerNextHigherAssy> is used to store the Quantity per Next higher Assembly (QNA) of an item. If the item is included for reference only the letters "REF" are entered. If the quantity cannot be established or it is otherwise not appropriate to include the data, the letters "AR" (As Required) are entered.

**Markup element:** <quantityPerNextHigherAssy> (M)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.5.3 Manufacturer

**Description:** The element <manufacturerCode> is used to contain the NATO supply code for manufacturers (CAGE).

**Markup element:** <manufacturerCode> (M)

**Attributes:**

- id (O), the identifier of the <manufacturerCode> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.4 Part number

**Description:** The element <partNumber> is used to store the part number of an item. This part number is allocated by the design authority of the equipment.

**Markup element:** <partNumber> (M)

**Attributes:**

- id (O), the identifier of the <partNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.5 PAS data

**Description:** The element <partIdentSegment> is used to identify a S2000M Part Identity Segment (PAS). This element is optional to allow the use of external reference to the parts information data of the technical information repository data module.

**Markup element:** <partIdentSegment> (O)

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*Fig 5 Element <partIdentSegment>*

**Attributes:**

– None

**Child elements:**

– <descrForPart> (M). Refer to Para 2.5.5.1.
– <descrForItem> (O). Refer to Para 2.5.5.2.
– <unitOfIssue> (O). Refer to Para 2.5.5.3.
– <unitOfIssueQualificationSegment> (O). Refer to Para 2.5.5.4.
– <specialStorage> (O). Refer to Para 2.5.5.5.
– <fitmentCode> (O). Refer to Para 2.5.5.6.
– <physicalSecurityPilferageCode> (O). Refer to Para 2.5.5.7.
– <calibrationMarker> (O). Refer to Para 2.5.5.8.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.1 Description for part

**Description:** The element <descrForPart> is used to hold a detailed Description For a Part (DFP). This should be the identifying noun of the item followed by and appropriate adjective and further details if necessary.

**Markup element:** <descrForPart> (M)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.2 Description for Item

**Description:** The element <`descrForItem`> is used to hold a detailed Description of the Item and could be populated as given in Table 4.

**Markup element:** <`descrForItem`> (M)

**Attributes:**

– `descrForItemCode` (O) which is used to identify the type of part and should be populated using data from Table 4.

*Table 4 Type of Part*

| Value | Meaning |
|---|---|
| "`part`" | Identifies the part as a standard part |
| "`exp`" | Identifies the part as an expendable part |
| "`coei`" | Identifies the part as a components of end item part |
| "`bii`" | Identifies the part as a basic issue item part |
| "`aal`" | Identifies the part as an item required to operate equipment |
| "`tool`" | Identifies the part as a tool item |
| "`special tool`" | Identifies the part as a special tool |

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.3 Unit of issue

**Description:** The element <unitOfIssue > is used to store Unit of Issue (UOI) information. The unit of issue is used to indicate the physical measurement, count or container in which the item is issued.

**Markup element:** <unitOfIssue > (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.4 PCS data

**Description:** The element <unitOfIssueQualificationSegment> is used to identify a S2000M Unit of Issue Qualification Segment (PCS) segment.

**Markup element:** <unitOfIssueQualificationSegment> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– unitOfMeasure (M). This mandatory attribute is used to store the unit of measurement for the item.

**Child elements:**

– <quantityPerUnit> (M). This element contains the quantity of items per unit of issue.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– allowable values for the attribute unitOfMeasure

2.5.5.5 Special storage

**Description:** The element <specialStorage> is used to record whether an item requires special storage. A value of "0" indicates that the item does not require special storage. A value of "1" indicates that the item has special storage requirements. If the value of <specialStorage> is set to "1" then the element <reasonForSelection> must not be set to "0".

**Markup element:** <specialStorage> (O)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.6 Fitment code

**Description:** The element <`fitmentCode`> is used to indicate whether an item can be fitted as supplied.

**Markup element:** <`fitmentCode`> (O)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `fitmentCodeValue` (M) This mandatory attribute is used to store the fitment code value. A value of "`1`" indicates that the part needs drilling, reaming or trimming during fitting which should usually be carried out at organizational or intermediate level. A value of "`m`" indicates that the part needs depot or industrial maintenance organization level facilities for fitting.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.5.7 Physical security/pilferage code

**Description:** The element <`physicalSecurityPilferageCode`> is used to indicate the degree of security or pilferage risk associated with the item.

**Markup element:** <`physicalSecurityPilferageCode`> (O)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– list of allowable values for the element <physicalSecurityPilferageCode>

**Markup example:**

Refer to Para 4.

2.5.5.8 Calibration marker

**Description:** The element <calibrationMarker> is used to identify items that require calibration. This element should be set to "1" if an item requires calibration.

**Markup element:** <calibrationMarker> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

**2.5.6 NATO stock number (NSN)**

**Description:** The element <natoStockNumber> is used to contain the NATO (or NSN for the CSN.

**Markup element:** <natoStockNumber> (O)

**Attributes:**

– id (O), the identifier of the <natoStockNumber> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– natoSupplyClass (O).. This optional attribute is used to contain the NATO Supply Class (NSC).
– natoCodificationBureau (O). This optional attribute is used to contain the first two digits of the NATO Item Identification Number (NIN) in the format of the NCB.
– natoItemIdentCodeCore (O). This optional attribute is used to contain the third to ninth digit of the NIN.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <fullNatoStockNumber> (O), this element is used to store a full NSN
– <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.5.7 Part location data

**Description:** The element <partLocationSegment> is used to identify a S2000M Part Location Data Segment (CBS).

**Markup element:** <partLocationSegment> (O)

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*Fig 6 Element <partLocationSegment>*

**Attributes:**

– None

**Child elements:**

– <attachStoreShipPart> (O). Refer to Para 2.5.7.1.
– <notIllustrated> (O). Refer to Para 2.5.7.2.
– <referTo> (O). Refer to Para 2.5.7.3.
– <selectOrManufactureFromIdent> (O). Refer to Para 2.5.7.4.
– <descrForLocation> (O). Refer to Para 2.5.7.6.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

#### 2.5.7.1 Attaching storage or shipping part

**Description:** The element <attachStoreShipPart> is used to indicate if an item is an attaching, storage or shipping part using the attribute

**Markup element:** <attachStoreShipPart> (O)

**Attributes:**

- id (O), the identifier of the <attachStoreShipPart> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- attachStoreShipPartCode (M). A value of "1" indicates an attaching part, "2" a storage part and "3" a shipping part. Storage parts are used only when a unit is in storage and shipping parts are used only when a unit is being shipped.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.5.7.2 Not illustrated

**Description:** The element <notIllustrated> is used to indicate that an item has not been illustrated. If an item has not been illustrated this element is populated with a hyphen "-".

**Markup element:** <notIllustrated> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.5.7.3 Refer to

**Description:** The element <referTo> is used to contain a reference to multiple IPP or CSN.

**Note**

The next higher assembly and refer for detail values provides a two way link between the two locations that an item has when it appears in the breakdown of one figure and is 'referred out' to a separate figure which is created to present the breakdown of that item.

**Markup element:** <referTo> (O)

**Attributes:**

- id (O), the identifier of the <referTo> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- refType(O), this optional attribute is used to qualify the "refer to" link and should be populated using data from Table 5.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

*Table 5 Refer to types*

| Value | Reason | Meaning |
|---|---|---|
| "nha" | Next higher assembly | Refer to next higher assembly |
| "det" | See for details | Refer for details |
| "equivalent" | Equivalent part | A part that has the same form, fit and function of the original part and performs to the same operating parameters. The parts have the same application |
| "substitute" | Substitute part | A part that has the same form and fit of the original part, but can differ in function or operating parameters. The substitute part is capable of being used under specific conditions or for particular applications and without alteration of the item itself or those adjoining it. Degradation of equipment performance can result when substitute parts are used |
| "attaching" | Attaching part | A part used to attach parts to the product or to each other. |

**Child elements:**

- <initialProvisioningProjectRef>. Refer to Para 2.5.7.3.1.
- <catalogSeqNumberRef> Refer to Para 2.5.7.3.2.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

*2.5.7.3.1 Refer to IPP*

**Description:** The element <initialProvisioningProjectRef> is used to contain only a reference to another IPP for non-chapterized IPD (in an electronic (IPDP) it mainly will address the first CSN of this referenced IPPN).

**Markup element:** <initialProvisioningProjectRef> (O)

**Attributes:**

- `id` (O), the identifier of the <`initialProvisioningProjectRef`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `initialProvisioningProjectValue` (M), this attribute contains the IPPN of the referenced IPP.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

*2.5.7.3.2 Refer to CSN*

**Description:** The element <`catalogSeqNumberRef`> is used to contain a reference to another CSN.

**Markup element:** <`catalogSeqNumberRef`> (O)

**Attributes:**

- `id` (O), the identifier of the <`catalogSeqNumberRef`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `catalogSeqNumberValue`(M) , used to store a referenced CSN.
- `itemSeqNumberValue` (O) - used to store a referenced ISN.
- `initialProvisioningProjectValue` (O) - used to store a referenced IPPN for non-chapterized CSN references only.
- `responsiblePartnerCompanyCode` (O) - used to store the NSCM (CAGE) of a referenced Responsible Partner Company (RPC)
- `xlink` (O), attributes (`type, href, title, show, actuate`), which are used to manage the W3C Xlink attributes.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.5.7.4 Select or manufacture from identifier

**Description:** The element <selectOrManufactureFromIdent> is used to indicate that an item must be selected to suit specific operating conditions, or that the item can be locally manufactured.

**Markup element:** <selectOrManufactureFromIdent> (O)

**Attributes:**

- id (O), the identifier of the <selectOrManufactureFromIdent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- selectOrManufactureValue (M) is used to store this information and is set in accordance with Table 6.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

*Table 6 Select or manufacture from*

| Value | Reason | Meaning |
|---|---|---|
| "f" | Select on fit | Applied against items which vary in physical dimension (eg washers, shims, oversize/undersize parts) |
| "t" | Select on test | Applied against items which vary in electrical characteristics (eg resistors, capacitors) |
| "m" | Manufacture from | Applied against items which can be locally manufactured or programmed |
| "r" | Reworked from | Applied against items which can be produced by the reworking of a pre-modified item. Reference to modification instructions is obligatory |
| "p" | Repaired from | Applied against items which can be repaired from special repair parts, repair kits or part kits |

**Child elements:**

- <selectOrManufacture> Refer to Para 2.5.7.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- list of allowable values for the element <selectOrManufactureFromIdent>

**Markup example:**

Refer to Para 4.

2.5.7.5 Select or manufacture

**Description:** The element <selectOrManufacture> is used to identify the range of items to be used for the selection, manufacture, rework or repair of an item. Items should be identified using the CSN, figure number and item number or just item number as appropriate.

**Markup element:** <selectOrManufacture> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.7.6 Description for location

**Description:** The element <descrForLocation> is used to store a description for the location of the item which complements the description of the item stored in the element <descrForPart>.

**Markup element:** <descrForLocation> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

**2.5.8 CCS data**

**Description:** The element <applicabilitySegment> is used to identify an S2000M Applicability Segment (CCS).

**Markup element:** <applicabilitySegment> (O)

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*Fig 7 Element <applicabilitySegment>*

**Attributes:**

– None

**Child elements:**

– <usableOnCodeEquip> Refer to Para 2.5.8.1.
– <usableOnCodeAssy> Refer to Para 2.5.8.2.
– <interchangeability> Refer to Para 2.5.8.3.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.8.1 Usable on code equipment

**Description:** The element <usableOnCodeEquip> is used to record the equipment variants and configurations to which the item is applied.

**Markup element:** <usableOnCodeEquip> (O)

**Attributes:**

– id (O), the identifier of the <usableOnCodeEquip> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– list of allowable values for the element <usableOnCodeEquip>

**Markup example:**

Refer to Para 4.

2.5.8.2 Usable on code assembly

**Description:** The element <usableOnCodeAssy> is used to record the assembly variants and configurations variants to which the item is applied.

**Markup element:** <usableOnCodeAssy> (O)

**Attributes:**

- id (O), the identifier of the <usableOnCodeAssy> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- list of allowable values for the element <usableOnCodeAssy>

**Markup example:**

Refer to Para 4.

2.5.8.3 Interchangeability

**Description:** The element <interchangeability> is used to record the interchangeability of two or more items at the same location. This element will only be populated if the element <reasonForSelection> is not set to "0".

**Markup element:** <interchangeability> (O)

**Attributes:**

- id (O), the identifier of the <interchangeability> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- list of allowable values for the element <interchangeability>

**Markup example:**

Refer to Para 4.

### 2.5.9 Category 1 container location

**Description:** The element <categoryOneContainerLocation> is used to record the location at which the data record of an item's category 1 container is held.

**Markup element:** <categoryOneContainerLocation> (O)

**Attributes:**

- id (O), the identifier of the <categoryOneContainerLocation> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- catalogSeqNumberValue(M) - used to store the CSN of the item's category 1 container.
- itemSeqNumberValue(O) - used to store the ISN of the item's category 1 container
- xlink (O), attributes (type, href, title, show, actuate), which are used to manage the W3C Xlink attributes.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.10 CES data

**Description:** The element <locationRcmdSegment> is used to identify an S2000M location recommendation segment (CES). As specified above, this element is only mandatory for S2000M programs.

**Markup element:** <locationRcmdSegment> (O)

**Attributes:**

- None

**Child elements:**

- <locationRcmd> provide information for each location recommendation. Refer to Para 2.5.10.1.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.5.10.1 Location recommendation

**Description:** The element <`locationRcmd` > provides information for each location recommendation

**Markup element:** <`locationRcmd` > (M)

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*Fig 8 Element <`locationRcmd` >*

**Attributes:**

– None

**Child elements:**

– <`service`>. Refer to Para 2.5.10.2.
– <`sourceMaintRecoverability`>. Refer to Para 2.5.10.3.
– <`modelVersion`>. Refer to Para 2.5.10.4.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.10.2 Service

**Description:** The element <`service`> is used to identify the user service to which specific data is applicable. The first two characters of this element should be populated with the user nation code. The third character is project specific.

**Markup element:** <`service`> (M)

**Attributes:**

– `id` (O), the identifier of the <`service`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– list of allowed values for the third character of the initial provisioning project

**Markup example:**

Refer to Para 4.

2.5.10.3 Source maintenance and recoverability

**Description:** The element <sourceMaintRecoverability> is used to identify maintenance activities which are performed on an item. The population of this element is in accordance with Table 7.

*Table 7 Source maintenance and recoverability*

| Position | Content |
|---|---|
| 1 and 2 | Source code indicating the means of acquiring the item |
| 3 | Maintenance code indicating the lowest maintenance level allowed to remove, replace or use the item |
| 4 | Maintenance code indicating the lowest maintenance level allowed to repair the item |
| 5 | Recoverability code indicating disposal action to be taken for unserviceable items |
| 6 | Defined by project |

**Markup element:** <sourceMaintRecoverability> (O)

**Attributes:**

– id (O), the identifier of the <sourceMaintRecoverability> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– the allowable values for the sixth character of this code

**Markup example:**

Refer to Para 4.

2.5.10.4 Model version

**Description:** The element <modelVersion> is used to identify the specific version of the equipment to which the item is fitted in this location.

**Markup element:** <modelVersion> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- modelVersionValue (M) is used to identify the specific version of the equipment to which the item is fitted in this location.

**Child elements:**

- <effectivity> (O) is used to identify a range of units or engines to which the item is fitted in this location.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- list of allowable values for this element

**Markup example:**

Refer to Para 4.

2.5.10.5 Effectivity

**Description:** The element <effectivity> is used to identify a range of units or engines to which the item is fitted in this location.

**Markup element:** <effectivity> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- list of allowable values for unit/engine numbers

**Markup example:**

Refer to Para 4.

**2.5.11 Reference designator**

**Description:** The element <referenceDesignator> contains a cross reference to parts in wiring diagrams, hydraulic diagrams, etc. It is populated with letters, numbers or symbols as appropriate to the target diagram.

**Markup element:** <referenceDesignator> (O)

**Attributes:**

- id (O), the identifier of the <referenceDesignator> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- installationIdent(O), the installation identifier
- contextIdent (O), the context identifier
- manufacturerCodeValue (O), used to indicate the manufacturer CAGE code
- itemOriginator (O), used to indicate the origin of the equipment, eg if an equipment is an aircraft manufacturer equipment or a vendor equipment
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.12 Integrated logistic support number

**Description:** The element <ilsNumber> contains an interdisciplinary cross reference to an integrated logistic support number.

**Markup element:** <ilsNumber> (O)

**Attributes:**

- id (O), the identifier of the <ilsNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.13 Change authority number

**Description:** The element <changeAuthorityNumber> is used to store the change authority number (CAN).

**Markup element:** <changeAuthorityNumber> (O)

**Attributes:**

- `id` (O), the identifier of the <`changeAuthorityNumber`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.14 Non S2000M data

**Description:** The element <`genericPartDataGroup`> is used to store any program specific data.

The current IPD structure strongly relies on the S2000M data organization. For non S2000M programs some specific data cannot be covered by the existing S2000M elements. For that purpose this element will allow the definition and storage of any kind of non-already existing S2000M element within the IPD content.

The IPD team must nevertheless first analyze the correspondence between source data and S2000M elements already addressable thru the current IPD Schema elements. If there is compliance, the existing S2000M element must be used otherwise the new data is placed in this new element with its name and value.

**Markup element:** <`genericPartDataGroup`> (O)

ICN-S1000D-A-030905-D-F6117-00009-A-001-01

*Fig 9 Element <`genericPartDataGroup`>*

**Attributes:**

- None

**Child elements:**

– <genericPartData>. Refer to Para 2.5.14.1.

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.5.14.1 Generic Part data

**Description:** The element <genericPartData> is used to identify the specific version of the equipment to which the item is fitted in this location.

**Markup element:** <genericPartData> (M)

**Attributes:**

– genericPartDataName, used to store the Text Element Name (TEI)

**Child elements:**

– <genericPartDataValue>, used to store the element value

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the BREX feature for attribute genericPartDataName

**Markup example:**

Refer to Para 4.

2.5.14.2 Generic Part data value

**Description:** The element <genericPartDataValue> is used to store the non S2000M element value.

**Markup element:** <genericPartDataValue> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

## 2.6 Parts data element mapping

As the IPD Schema can to be used to capture and represent parts lists and IPD initially drawn from a S2000M parts database, Table 8 describes the mapping between the initial S2000M elements (defined through their S2000M TEI) and the IPD Schema elements and attributes.

*Table 8 Parts data element mapping*

| Text element identifier | Data element name | M/O | Mapping to Schema elements/attributes |
|---|---|---|---|
| ASP | Attaching, storage or shipping part | O | `<attachStoreShipPart attachStoreShipPartCode="...">` |
| CAN | Change authority number | O | `<changeAuthorityNumber>...</changeAuthorityNumber>` |
| CMK | Calibration marker | O | `<calibrationMarker>...</calibrationMarker>` |
| CSN | Catalogue sequence number | M | `<catalogSeqNumber catalogSeqNumberValue="..." catalogItemNumber="...">` |
| CTL | Category 1 container location | O | `<categoryOneContainerLocation catalogSeqNumberValue="..." itemSeqNumberValue="...">` |
| DFL | Description for location | O | `<descrForLocation>...</descrForLocation>` |
| DFP | Description for part | M | `<descrForPart>...</descrForPart>` |
| EFY | Effectivity | O | `<effectivity>...</effectivity>` |
| FTC | Fitment code | O | `<fitmentCode fitmentCodeValue="...">` |
| ICN | Information control number | O | `<graphic infoEntityIdent="ICN-...">` |
| ICY | Interchangeability | O | `<interchangeability>...</interchangeability>` |
| ILS | Integrated logistic support number | O | `<ilsNumber>...</ilsNumber>` |
| IND | Indenture | M | `<catalogSeqNumber indenture="...">` |
| IPP | Initial provisioning project number | M | `<initialProvisioningProject initialProvisioningProjectNumber="...">` |
| IPS | Initial provisioning project number subject | M | `<initialProvisioningProject initialProvisioningProjectNumberSubject="...">` |
| ISN | Item sequence number | M | `<itemSeqNumber itemSeqNumberValue="...">` |
| LGE | Language code | M | `<initialProvisioningProject languageCode="...">` |
| MFC | NATO supply code for manufacturers | M | `<manufacturerCode>...</manufacturerCode>` |
| MFM | Select or manufacture from range | O | `<selectOrManufacture>...</selectOrManufacture>` |

| Text element identifier | | Data element name | M/O | Mapping to Schema elements/attributes |
|---|---|---|---|---|
| MOI | | Model identification | M | `<modelIdentCode>...</modelIdentCode>` |
| MOV | | Model version | O | `<modelVersion modelVersionValue="...">` |
| NIL | | Not illustrated | O | `<notIllustrated>` |
| NSN | | NATO stock number | O | Composite data element composed of NSC and NIN |
| | NSC | NATO supply class | M | `<natoStockNumber natoSupplyClass="...">` |
| | NIN | NATO item identification number | O | `<natoStockNumber natoCodificationBureau="..." natoItemIdentNumberCore="...">` |
| PNR | | Part number | M | `<partNumber>...</partNumber>` |
| PSC | | Physical security pilferage code | O | `<physicalSecurityPilferageCode>...</physicalSecurityPilferageCode>` |
| QNA | | Quantity per next higher assembly | M | `<quantityPerNextHigherAssy>...</quantityPerNextHigherAssy>` |
| QUI | | Quantity per unit of issue | O | `<quantityPerUnit>...</quantityPerUnit>` |
| RFD | | Reference designator | O | `<referenceDesignator>...</referenceDesignator>` |
| RFS | | Reason for selection | O | `<reasonForSelection reasonForSelectionValue="..."/>` |

| Text element identifier | Data element name | M/O | Mapping to Schema elements/attributes |
|---|---|---|---|
| RTX | Refer to | O | `<referTo>`<br>`<initialProvisioningProjectRef initialProvisioningProjectValue="...">`<br>or<br>`<initialProvisioningProjectRef initialProvisioningProjectValue="..." responsiblePartnerCompanyCode="...">`<br>or<br>`<catalogSeqNumberRef catalogSeqNumberValue="..." itemSeqNumberValue="...">`<br>or<br>`<catalogSeqNumberRef initialProvisioningProjectValue="..." responsiblePartnerCompanyCode="..." catalogSeqNumberValue="..." itemSeqNumberValue="...">`<br>`</referTo>` |
| SID | Subject identification | M | Composite data element composed of (MFC) and (PNR)<br>`<subjectIdent><manufacturerCode>...</manufacturerCode><partNumber>..</partNumber></subjectIdent>` |
| SMF | Select or manufacture from identifier | O | `<selectOrManufactureFromIdent selectOrManufactureValue ="...">` |
| SMR | Source maintenance recoverability | M | `<sourceMaintRecoverability>...</sourceMaintRecoverability>` |
| SRV | Service | M | `<service>...</service>` |
| STR | Special storage | O | `<specialStorage>...</specialStorage>` |
| UCA | Usable on code assembly | O | `<usableOnCodeAssy>...</usableOnCodeAssy>` |
| UCE | Usable on code equipment | O | `<usableOnCodeEquip>...</usableOnCodeEquip>` |
| UOI | Unit of issue | O | `<unitOfIssue>...</unitOfIssue>` |
| UOM | Unit of measure | O | `<unitOfIssueQualificationSegment unitOfMeasure="...">` |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**CSN codification**. The codes used to make up the CSN are based on the SNS. The structure and rules for the SNS and CSN must be agreed at the start of the project. Refer to Para 2.4.

**Note**

Due to a potential mismatch between the S2000M fixed length CSN definition and the flexible data module code SNS structure, the project or the organization must clearly define these conversion rules.

**Hotspots mechanism**. The project or the organization must decide if the generic hotspots mechanism is addressed within the IPD data module content. Refer to Para 2.4.2.

**Use of the attribute `applicRefIds`**. For S2000M programs, the MOV and EFY will still be stored under the CES data (as defined below) as it reflects the corresponding elements within the S2000M database. Nevertheless, for non-S2000M programs, a choice is given to allow either the use of S2000M applicability structure or S1000D applicability structure. Refer to Para 2.5.

**Reason for selection**. The project or the organization must decide the list of allowable values for the attribute `selectOrManufactureValue`. Refer to Para 2.5.1.

**Unit of measure**. The project or the organization must decide the list of allowable values for the attribute `unitOfMeasure`. When the IP data modules are created from S2000M, the list of allowed UOM values must contain those defined in the data element definition in S2000M. When S2000M is used, it is strongly recommended that the S2000M UOM values are used throughout the project. Refer to Para 2.5.5.4.

**Physical security**. The project or the organization must decide the list of allowable values for the element <`physicalSecurityPilferageCode`>. When S2000M is used, the list must be as stated in the Data Element Definition for the S2000M element PSC. Refer to Para 2.5.5.7.

**Select or manufacture from range**. The project or the organization must decide the list of allowable values for the element <`selectOrManufactureFromIdent`>. Refer to Para 2.5.3.

**Usable on code equipment**. The project or the organization must decide the list of allowable values for the element <`usableOnCodeEquip`>. When S2000M is used, the list must be as stated in the Data Element Definition for the S2000M element UCE. Refer to Para 2.5.8.1.

**Usable on code assembly**. The project or the organization must decide the list of allowable values for the element <`usableOnCodeAssy`>. When S2000M is used, the list must be as stated in the Data Element Definition for the S2000M element UCA. Refer to Para 2.5.8.2.

**Interchangeability**. The project or the organization must decide the list of allowable values for the element <`interchangeability`>. When S2000M is used, the list must be as stated in the Data Element Definition for the S2000M element ICY. Refer to Para 2.5.8.3.

**Service**. The project or the organization must decide must decide a list of allowed values for the third character of the initial provisioning project. Refer to Para 2.5.10.2.

**Source maintenance and recoverability**. The project or the organization must decide the allowable values for the sixth character of this code. Refer to Para 2.5.10.3.

**Model version**. The project or the organization must decide the list of allowable values for the element <`modelVersion`>. When S2000M is used, the list must be as stated in the Data Element Definition for the S2000M element MOV. Refer to Para 2.5.10.4.

**Effectivity**. The project or the organization must decide the list of allowable values for unit/engine numbers. Refer to Para 2.5.10.5.

**The use of the BREX feature for attribute `genericPartDataName`**. The project or the organization must decide whether to use this feature to manage non-S2000M compliant data. Refer to Para 2.5.14.1.

# 4 Examples

## 4.1 Refer to

A reference from one item to two higher assemblies (item 040 part of project 23121101 and item 010 part of project 23121110) will be authored as follows:

```
<referTo refType="nha">
<catalogSeqNumberRef responsiblePartnerCompanyCode="F6117"
initialProvisioningProjectValue="23121101"
catalogSeqNumberValue="040"></catalogSeqNumberRef>
<catalogSeqNumberRef responsiblePartnerCompanyCode="F6117"
initialProvisioningProjectValue="23121110"
catalogSeqNumberValue="010"></catalogSeqNumberRef>
</referTo>
```

A reference from one item to a sub decomposition item (item 050 part of project 23121101 will be authored as follows :

```
<referTo refType="det">
<catalogSeqNumberRef responsiblePartnerCompanyCode="F6117"
initialProvisioningProjectValue="23121101"
catalogSeqNumberValue="040"></catalogSeqNumberRef>
</referTo>
```

If the sub-decomposition item referred is designed on a non chapterized ipd, then a direct reference to the ippn only will be addressed

```
<referTo refType="det">
<initialProvisioningProjectRef
initialProvisioningProjectValue="KZ9990001"></initialProvisionin
gProjectRef>
</referTo>
```

## 4.2 Generic Parts data

Examples of markup examples for the management of ie distributing level (nid), keywords (key) desiccating standard (dhy), storage container (emb) nota (xnt) could be authored as follows:

```
<genericPartDataGroup>
<genericPartData genericPartDataName="nid">
<genericPartDataValue>2</genericPartDataValue></genericPartData>
<genericPartData genericPartDataName="key">
<genericPartDataValue>Bicycle</genericPartDataValue></genericPar
tData>
<genericPartData genericPartDataName="dhy">
<genericPartDataValue>F2408:1-
4UD:02</genericPartDataValue></genericPartData>
<genericPartData genericPartDataName="emb">
<genericPartDataValue>KZ999:LNS10276051</genericPartDataValue>
```

```
</genericPartData>
<genericPartData genericPartDataName="xnt">
<genericPartDataValue>SP</genericPartDataValue></genericPartData
>
</genericPartDataGroup>
```

## 4.3 Illustrated Parts data content

```
<illustratedPartsCatalog>
<figure id="fig-0001">
<title>Bicycle</title>
<graphic
infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-00536-A-01-
1">
</graphic>
</figure>
<initialProvisioningProject
initialProvisioningProjectNumber="KZ9990001"
initialProvisioningProjectNumberSubject="BICYCLE"
fileIdent="s"/>
<catalogSeqNumber catalogSeqNumberValue="00000000A000 "
indenture="1" catalogItemNumber="000 ">
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="0"/>
<quantityPerNextHigherAssy>REF</quantityPerNextHigherAssy>
<manufacturerCode>KZ999</manufacturerCode>
<partNumber>BICYCLE-001</partNumber>
<partIdentSegment><descrForPart>Bicycle</descrForPart></partIden
tSegment>
<locationRcmdSegment>
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>XB</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB"></modelVersion>
</locationRcmd>
</locationRcmdSegment>
<genericPartDataGroup>
<genericPartData
genericPartDataName="qre"><genericPartDataValue>2</genericPartDa
taValue></genericPartData>
<genericPartData
genericPartDataName="xnt"><genericPartDataValue>SP</genericPartD
ataValue></genericPartData>
<genericPartData
genericPartDataName="key"><genericPartDataValue>Bicycle</generic
PartDataValue></genericPartData>
<genericPartData
genericPartDataName="emb"><genericPartDataValue>KZ999:LNS1027605
1</genericPartDataValue> </genericPartData>
<genericPartData
genericPartDataName="nse"><genericPartDataValue>8145144345</gene
ricPartDataValue></genericPartData>
<genericPartData
```

```
genericPartDataName="dhy"><genericPartDataValue>F2408:1-
4UD:02</genericPartDataValue>
</genericPartData>
</genericPartDataGroup>
</itemSequenceNumber>
</catalogSeqNumber>
<catalogSeqNumber catalogSeqNumberValue="00000000A001 "
indenture="2" catalogItemNumber="001 ">
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="1"/>
<quantityPerNextHigherAssy>1</quantityPerNextHigherAssy>
<manufacturerCode>KZ999</manufacturerCode>
<partNumber>BICYCLE-001/1</partNumber>
<partIdentSegment>
<descrForPart>Frame assembly</descrForPart>
<unitOfIssue>EA</unitOfIssue>
<specialStorage>0</specialStorage>
</partIdentSegment>
<locationRcmdSegment>
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>PAODD</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB">
</modelVersion>
</locationRcmd>
</locationRcmdSegment>
</itemSequenceNumber>
</catalogSeqNumber>
...
<catalogSeqNumber catalogSeqNumberValue="00000000A006 "
indenture="3" catalogItemNumber="006 ">
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="1"/>
<quantityPerNextHigherAssy>1</quantityPerNextHigherAssy>
<manufacturerCode>KZ777</manufacturerCode>
<partNumber>LRU1001</partNumber>
<partIdentSegment>
<descrForPart>Light system</descrForPart>
<unitOfIssue>EA</unitOfIssue>
<specialStorage>1</specialStorage>
<physicalSecurityPilferageCode>J</physicalSecurityPilferageCode>
</partIdentSegment>
<partLocationSegment>
<referTo refType="nha">
<catalogSeqNumberRef responsiblePartnerCompanyCode="KZ777"
initialProvisioningProjectValue="23121101"
catalogSeqNumberValue="040"></catalogSeqNumberRef>
<catalogSeqNumberRef responsiblePartnerCompanyCode="KZ777"
initialProvisioningProjectValue="23121110"
catalogSeqNumberValue="010"></catalogSeqNumberRef>
</referTo>
</partLocationSegment>
<locationRcmdSegment>
```

```
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>PAFFD</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB">
</modelVersion>
</locationRcmd>
</locationRcmdSegment>
</itemSequenceNumber>
</catalogSeqNumber>
...
</illustratedPartsCatalog>
```

### 4.3.1 Illustrated Part Data content with hotspots

**Note**

In case of project decision to use the generic hot spots mechanism within illustrated part data modules, the previous markup becomes

```
<illustratedPartsCatalog>
<figure id="fig-0001">
<title>Bicycle</title>
<graphic
infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-00536-A-01-
1">
<hotspot applicationStructureIdent="HOT0001"
applicationStructureName="1" id="fig-0001-gra-0001-hot-
0001"></hotspot>
...
<hotspot applicationStructureIdent="HOT0006"
applicationStructureName="6" id="fig-0001-gra-0001-hot-
0006"></hotspot>
...
</graphic>
</figure>
<initialProvisioningProject
initialProvisioningProjectNumber="KZ9990001"
initialProvisioningProjectNumberSubject="BICYCLE"
fileIdent="s"/>
<catalogSeqNumber catalogSeqNumberValue="00000000A000 "
indenture="1" catalogItemNumber="000 ">
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="0"/>
<quantityPerNextHigherAssy>REF</quantityPerNextHigherAssy>
<manufacturerCode>KZ999</manufacturerCode>
<partNumber>BICYCLE-001</partNumber>
<partIdentSegment><descrForPart>Bicycle</descrForPart>
</partIdentSegment>
<locationRcmdSegment>
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>XB</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB"></modelVersion>
</locationRcmd>
</locationRcmdSegment>
<genericPartDataGroup>
<genericPartData genericPartDataName="qre">
```

```
<genericPartDataValue>2</genericPartDataValue>
</genericPartData>
<genericPartData genericPartDataName="xnt">
<genericPartDataValue>SP</genericPartDataValue>
</genericPartData>
<genericPartData genericPartDataName="key">
<genericPartDataValue>Bicycle</genericPartDataValue>
</genericPartData>
<genericPartData genericPartDataName="emb">
<genericPartDataValue>KZ999:LNS10276051</genericPartDataValue>
</genericPartData>
<genericPartData genericPartDataName="nse">
<genericPartDataValue>8145144345</genericPartDataValue>
</genericPartData>
<genericPartData genericPartDataName="dhy">
<genericPartDataValue>F2408:1-4UD:02</genericPartDataValue>
</genericPartData>
</genericPartDataGroup>
</itemSequenceNumber>
</catalogSeqNumber>
<catalogSeqNumber catalogSeqNumberValue="00000000A001 "
indenture="2" catalogItemNumber="001 ">
<internalRef internalRefId="fig-0001-gra-0001-hot-0001"
internalRefTargetType="hotspot">
</internalRef>
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="1"/>
<quantityPerNextHigherAssy>1</quantityPerNextHigherAssy>
<manufacturerCode>KZ999</manufacturerCode>
<partNumber>BICYCLE-001/1</partNumber>
<partIdentSegment>
<descrForPart>Frame assembly</descrForPart>
<unitOfIssue>EA</unitOfIssue>
<specialStorage>0</specialStorage>
</partIdentSegment>
<locationRcmdSegment>
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>PAODD</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB"></modelVersion>
</locationRcmd>
</locationRcmdSegment>
</itemSequenceNumber>
</catalogSeqNumber>
...
<catalogSeqNumber catalogSeqNumberValue="00000000A006 "
indenture="3" catalogItemNumber="006 ">
<internalRef internalRefId="fig-0001-gra-0001-hot-0006"
internalRefTargetType="hotspot">
</internalRef>
<itemSequenceNumber itemSeqNumberValue="00A">
<reasonForSelection reasonForSelectionValue="1"/>
<quantityPerNextHigherAssy>1</quantityPerNextHigherAssy>
<manufacturerCode>KZ777</manufacturerCode>
<partNumber>LRU1001</partNumber>
<partIdentSegment>
<descrForPart>Light system</descrForPart>
<unitOfIssue>EA</unitOfIssue>
<specialStorage>1</specialStorage>
<physicalSecurityPilferageCode>J</physicalSecurityPilferageCode>
```

```
</partIdentSegment>
<partLocationSegment>
<referTo refType="nha">
<catalogSeqNumberRef responsiblePartnerCompanyCode="KZ777"
initialProvisioningProjectValue="23121101"
catalogSeqNumberValue="040"></catalogSeqNumberRef>
<catalogSeqNumberRef responsiblePartnerCompanyCode="KZ777"
initialProvisioningProjectValue="23121110"
catalogSeqNumberValue="010"></catalogSeqNumberRef>
</referTo>
</partLocationSegment>
<locationRcmdSegment>
<locationRcmd>
<service>UKA</service>
<sourceMaintRecoverability>PAFFD</sourceMaintRecoverability>
<modelVersion modelVersionValue="MB">
</modelVersion>
</locationRcmd>
</locationRcmdSegment>
</itemSequenceNumber>
</catalogSeqNumber>
...
</illustratedPartsCatalog>
```

# Chapter 3.9.5.2.8

## *Content section - Battle damage assessment and repair information*

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*Table 1 References*

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|---|---|
| None | |

## 1 General

The battle damage assessment and repair Schema and the guidelines for its use will be included in a future issue of this specification.

# Chapter 3.9.5.2.9

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| Chap 3.9.5.2.9.1 | Wiring data - Wiring data Schema basic rules |
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## 1 General

Wiring data consists of two data module types, each with a dedicated Schema:

- wiring data
- wiring data description

The purpose of the wiring data description data modules is to define the occurrence, the names and the meanings of the elements and attributes that are used in the wiring data modules.

Although the use of the wiring data description data module type is a project or an organization decision, it is recommended that wiring data description data modules are created for the project.

## 2 Wiring data

The content section of wiring data data modules is described in the following chapters:

- Wiring data - Wiring data Schema basic rules. Refer to Chap 3.9.5.2.9.1.
- Wiring data - Wire. Refer to Chap 3.9.5.2.9.2.
- Wiring data - Harness. Refer to Chap 3.9.5.2.9.3.
- Wiring data - Electrical equipment. Refer to Chap 3.9.5.2.9.4.
- Wiring data - Standard parts, Connector. Refer to Chap 3.9.5.2.9.5.
- Wiring data - Standard parts, Distribution part. Refer to Chap 3.9.5.2.9.6.
- Wiring data - Standard parts, Accessory. Refer to Chap 3.9.5.2.9.7.
- Wiring data - Standard parts, Solder sleeve. Refer to Chap 3.9.5.2.9.8.
- Wiring data - Standard parts, Shrink sleeve. Refer to Chap 3.9.5.2.9.9.
- Wiring data - Standard parts, Identification sleeve. Refer to Chap 3.9.5.2.9.10.
- Wiring data - Standard parts, Conduit. Refer to Chap 3.9.5.2.9.11.
- Wiring data - Standard parts, Wire material. Refer to Chap 3.9.5.2.9.12.
- Wiring data - Wiring data description Schema basic rules. Refer to Chap 3.9.5.2.9.13.

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of wiring data description data modules.** The project or the organization must decide whether wiring data description data modules are to be produced or not in order to reflect all decisions concerning elements and attributes of the wiring data Schema.

# Chapter 3.9.5.2.9.1

## *Wiring data - Wiring data Schema basic rules*

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## 1 General

The wiring data Schema is used to capture and represent the wiring data of the Product such as wire data, harness data, electrical equipment data and standard parts data. The use of the common elements and attributes is detailed in Chap 3.9.5.2.1.

The granularity of a wiring data data module is determined by the application of the SNS and the data module coding guidance given in Chap 5.2.1.4.

## 2 Wiring data Schema basic rules

The wiring data data module Schema holds the major element <wiringData>, which contains the element <wireGroup>, the element <harnessGroup>, the element <electricalEquipGroup> and the element <standardPartGroup> as follows:

- List of wires (<wireGroup>). Refer to Chap 3.9.5.2.9.2.
- List of harnesses (<harnessGroup>). Refer to Chap 3.9.5.2.9.3.
- List of electrical equipment (<electricalEquipGroup>). Refer to Chap 3.9.5.2.9.4.
- List of electrical standard parts (<standardPartGroup>) with the following child elements:
  - List of connectors (<connectorGroup>). Refer to Chap 3.9.5.2.9.5.
  - List of distribution parts (<distributionPartGroup>). Refer to Chap 3.9.5.2.9.6.
  - List of accessories (<accessoryGroup>). Refer to Chap 3.9.5.2.9.7.
  - List of solder sleeves (<solderSleeveGroup>). Refer to Chap 3.9.5.2.9.8.
  - List of shrink sleeves (<shrinkSleeveGroup>). Refer to Chap 3.9.5.2.9.9.
  - List of identification sleeves (<identSleeveGroup>). Refer to Chap 3.9.5.2.9.10.
  - List of conduits (<conduitGroup>). Refer to Chap 3.9.5.2.9.11.
  - List of wire materials (<wireMaterialGroup>). Refer to Chap 3.9.5.2.9.12.

# Chapter 3.9.5.2.9.2

## *Wiring data - Wire*

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# 1 General

The element <wire> and its child elements are used to capture and represent the wires, which are installed in the Product, and the related information.

# 2 Element <wire> and child elements

**Description:** The element <wire>, within the list of wires element <wireGroup>, contains wire information about the Product's wiring. The wires are the electrical connections between two equipment, different contacts of an equipment, etc. Electrical wires of a system are often bundled into harnesses.

**Markup element:** <wire> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a wire by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1
- wireState (O), the electrical state of a wire. Normally, wires are divided into physical electrical wires and logical connections, eg the connection of a circuit breaker to the bus bar by a screw. This attribute can have only one of the following values:
  - "active" for wires which are active in one of the systems circuits
  - "stowed" for wires which are stowed (not connected) at least on one end
  - "pigtail" for wires which are connected only at one end to an equipment of the system for measurement purposes
  - "notactiv" for wires which are not active in one of the systems circuits
  - "logconn" for electrical connections in one of the systems circuits which are not realized by a physical wire or do not have wire identification (in some cases called flying leads)
- changeInfo (O), the change information of a wire in connection with the related modification. This attribute can have only one of the following values:
  - "add" for wires which are added to the systems circuits by a modification
  - "delete" for wires which are removed from the systems circuits by a modification
  - "modify" for wires which are modified in the systems circuits by a modification

**Child elements:**

- <wireIdent> (M), the wire identification
- <wireConnection> (M), the wire connection
- <wireInfo> (O), the wire information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute changeInfo="delete" for removed wires
- Use and definition of applicability information for wires

– Use and definition of change attributes for wires

**Markup example:**

```
<wiringData>
<wireGroup>
<wire wireState="active" applicRefId="app-0001">
<wireIdent>...</wireIdent>
<wireConnection>...</wireConnection>
<wireInfo>...</wireInfo>
</wire>
...
</wireGroup>
</wiringData>
```

## 2.1 Wire identification

**Description:** The wire identification element is the unique identifier of a wire in the system.

**Markup element:** <wireIdent> (M)

**Attributes:**

– contextIdent (O), the context identification which is used in combination with the attribute manufacturerCodeValue to ensure the uniqueness of vendor wire data. Context identification contains an identifier, eg the part number of the next higher assembly that has been given to the assembly by the vendor.
– manufacturerCodeValue (O), the identification of the vendor, eg the CAGE code, which is used in combination with the attribute contextIdent to ensure uniqueness of vendor wire data.
– itemOriginator (O), indicates the origin of the wire, ie if a wire is an aircraft manufacturer wire or a vendor wire. Values and their meanings are defined by using the BREX mechanism. Refer to Chap 3.9.6.1 and Chap 4.10

**Child elements:**

– <circuitIdent> (O), the circuit code
– <wireNumber> (M), the wire identification number
– <sectionIdent> (O), the wire section identification

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the attributes contextIdent, manufacturerCodeValue and itemOriginator
– Definition of rules for the population of attribute manufacturerCodeValue in conjunction with the population of element <manufacturerCode>

**Markup example:**

```
<wireIdent contextIdent="PN-AC-12561"
manufacturerCodeValue="F0001" itemOriginator="orig01">
<wireNumber>BT2AA</wireNumber>
</wireIdent>
```

### 2.1.1 Circuit code

**Description:** Projects with electrical wiring often consist of several systems or circuits. If the allocation of a wire to a system must be reflected in the wire identification, the circuit code must be populated with the identifier for this system/circuit. Table 2 gives examples of circuit codes.

*Table 2 Circuit codes*

| Circuit code | System/Circuit |
|---|---|
| AG | Gun system |
| LD | Lighting control |
| YD | Armament control system |

**Markup element:** <circuitIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of circuit codes

### 2.1.2 Wire identification number

**Description:** All wires must have a wire identification number. If there is no further breakdown, by the use of the circuit code element <circuitIdent> and the wire section identification element <sectionIdent>, then the element <wireNumber> must contain the complete wire identification.

If a conductor runs through non-functional breaks, eg a terminal junction module or a splice, the wire identification number must be the same for the two wires, but the section identifications are different.

**Markup element:** <wireNumber> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

### 2.1.3 Wire section identification

**Description:** Wires which are connected by non-functional breaks such as connectors, terminal junction modules, splices, etc, often get the same wire identification number and different section identifications. In this case, the wire section identification element must be populated with the identifiers for these different sections.

**Markup element:** <sectionIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire section identification
– Definition of the values for the population of element <sectionIdent>

### 2.1.4 Markup examples

2.1.4.1 Wire identification example using circuit code and section identification
The following markup example shows the wire identification for section AA of wire number 0486 within the armament control system (YD).

```
<wireIdent>
<circuitIdent>YD</circuitIdent>
<wireNumber>0486</wireNumber>
<sectionIdent>AA</sectionIdent>
</wireIdent>
```

2.1.4.2 Wire identification example without using circuit code and section identification
The following example shows the markup of wire W5250-2023B-24 that is installed in the panel with the part number P1650-411, supplied by the vendor with the identification F2345:

```
<wireIdent contextIdent="P1650-411"
manufacturerCodeValue="F2345" itemOriginator="orig02">
<wireNumber>W5250-2023B-24</wireNumber>
</wireIdent>
```

## 2.2 Wire connection

**Description:** The wire connection element contains connection information for the two ends of a wire. In special cases, eg wires with wireState = "pigtail" or "notactiv", only the connection of one wire end is used.

**Markup element:** <wireConnection> (M)

**Attributes:**

– None

**Child elements:**

– <fromEquip> (M), the from equipment information
– <toEquip> (O), the to equipment information which must be populated for all wires with two relevant wire ends, otherwise not

**Business rules decisions:**

– None identified

**Markup example:**

```
<wireConnection>
<fromEquip>...</fromEquip>
<toEquip>...</toEquip>
</wireConnection>
```

### 2.2.1 Content model electrical equipment

**Description:** The content model electrical equipment defines the child elements of elements <fromEquip> and <toEquip>, which contain the wire connection information for the two wire ends.

**Markup elements:** <fromEquip> (M) and <toEquip> (O)

**Attributes:**

– None

**Child elements:**

– <referenceDesignator> (M), the reference designator
– <contactInfo> (O), the contact information
– <screenGroup> (O), the list of screens
– <twistGroup> (O), the twist information group
– <wireInstallationCode> (O), the wire installation code

**Business rules decisions:**

– None identified

**Markup example:**

```
<fromEquip>
<referenceDesignator>Sensor</referenceDesignator>
<contactInfo>...</contactInfo>
<screenGroup>...</screenGroup>
</fromEquip>
```

#### 2.2.1.1 Reference designator

**Description:** The reference designator element contains the identification of the electrical equipment to which the wire end is connected. The population of this element must be in accordance with Chap 3.9.5.2.9.4.

**Markup element:** <referenceDesignator> (M)

**Attributes:**

– id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2
– changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1
– installationIdent (O), used to achieve uniqueness for multiple occurrence equipment. Multiple occurrence equipment is equipment that is more than once installed in the Product, eg an aircraft, and have allocated the same reference designator for all installation instances.
– contextIdent (O), manufacturerCodeValue (O) and itemOriginator (O). Refer to Para 2.1
– securityClassification (O), commercialClassification (O) and caveat (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the reference designator element <referenceDesignator> and the related attributes to achieve uniqueness of vendor equipment

**Markup example:**

```
<referenceDesignator installationIdent="d1">Diode
</referenceDesignator>
```

2.2.1.2 Contact information

**Description:** The contact information element contains child elements that identify the contact to which the wire end is connected.

**Markup element:** <contactInfo> (O)

**Attributes:**

– None

**Child elements:**

– <contact> (O), the contact identification
– <wireConnectionCode> (O), the wire connection code
– <networkAnalysisCode> (O), the network analysis code
– <groupCode> (O), the group code

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the contact information element <contactInfo>

**Markup example:**

```
<contactInfo>
<contact contactIdent="GND"/>
<wireConnectionCode>...</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
<groupCode>G1-</groupCode>
</contactInfo>
```

*2.2.1.2.1 Contact identification*

**Description:** This element describes the contact identification by its attributes. Normally, wires are connected to contacts with designation identification. If not, the contact designation identification attribute contactIdent has no value for those contacts where at least one of the other attributes is used. If none of the attributes is used, the element <contact> must not be used at all.

**Markup element:** <contact> (O)

**Attributes:**

– contactIdent (M), contains the identification of the contact, eg "A", "1"
– contactFunction (O), contains the functional identification of the contact, eg "ON", "OFF", "BRIGHT" or "DIM"
– contactType (O), contains the type of the contact, eg "BASE", "PIN", "SOCKET", "COAX" or "BUS"

- `connectedFlag` (O), gives the information whether the wire is connected to the contact or not (stowed wires). The value "`0`" (no) indicates that the wire is not connected to the contact. The value "`1`" (yes) indicates that the wire is connected to the contact.
- `contactPartNumber` (O), contains the part number of the contact to which the wire end is connected
- `wireInstallationDirection` (O), contains direction information for non-symmetric wires

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the contact identification element <`contact`> and its attributes

**Markup examples:**

```
<contact contactIdent="1" contactFunction="BRIGHT"/>
<contact contactIdent="A1" contactType="(BASE)"/>
<contact contactIdent="1" contactPartNumber="(JN)1003S-12"/>
<contact contactIdent="AA1" wireInstallationDirection="A"/>
```

*2.2.1.2.2 Wire connection code*

**Description:** The wire connection code is used for generic identification of the electrical potential to which a wire end is connected. This can be the basis to arrange the ends of the wires in a specific order for graphical display purposes and to generate a connection analysis.

**Markup element:** <`wireConnectionCode`> (O)

**Attributes:**

- None

**Child elements:**

- <`screenOrder`> (O), the shielding order information
- <`specialConnection`> (O), the special connections information
- <`electricalPotential`> (C), the electrical potential information
- <`potentialConnectionsOrder`> (O), the potential connections information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the wire connection code element <`wireConnectionCode`> and its child elements

**Markup example:**

```
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
```

*2.2.1.2.3 Shielding order*

**Description:** The shielding order element <screenOrder> contains an ascending numerical value, which represents the order of the wires connected to an equipment, for graphical presentation of the shielding situation.

**Note**

Screen connections, eg from a screen to the shell of an equipment, must always have a lower value than the wires which are shielded by this screen.

**Markup element:** <screenOrder> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the shielding order element <screenOrder>

**Markup example:**

```
<screenOrder>3</screenOrder>
```

*2.2.1.2.4 Special connections*

**Description:** The special connections element <specialConnection> contains a numerical value and must be used for all wires, that are connected to "special contacts" of an equipment, such as stowed wires and wires connected to the shell of this equipment.

In the graphical presentation, these wires are always, depending on the given value, shown after the wires, which are connected to real contacts of the equipment.

Wires with the wire state value "logconn", which are connected to special contacts, eg when a shield is electrically connected to the shell of a connector by the cable clamp that is represented by the logical connection wire, must not get allocated data in the special connections element <specialConnection>.

**Markup element:** <specialConnection> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the values for the special connections element <specialConnection>

**Markup example:**

```
<specialConnection>100</specialConnection>
```

*2.2.1.2.5 Electrical potential*

**Description:** The electrical potential element <electricalPotential> is used to order the wires based on project or organization specific rules, using the relation to termination module, block and shunt or pole and position, and the contact identification.

There are two different cases for coding of the electrical potential information:

- Equipment without internal logic
- Equipment with internal logic

Equipment without internal logic. Equipment, such as connectors, earth bolts etc do not have an internal logic. The ascending values in the contact order child element <contactOrderValue> represent the order of the equipment contacts to facilitate graphical presentation and connection analysis. Contacts of the equipment to which no physical wire is connected are included by wires with the wire state value "notactiv". For equipment without internal logic, the termination module grouping child element <terminationModuleGroupingValue>, the block grouping child element <blockGroupingValue> and the shunt grouping child element <shuntGroupingValue> must not be used.

Equipment with internal logic. Equipment, such as switches, relays and terminal junction modules have an internal logic. That means, the equipment has internal connections, which connect different contacts of the equipment electrically. For switches and relays, these electrical connections depend on the switch/relay position. The internal electrical connections are the basis for the coding of the termination module grouping child element <terminationModuleGroupingValue>, the block grouping child element <blockGroupingValue> and the shunt grouping child element <shuntGroupingValue>. Examples for the population of these elements are given in Para 4.1.

**Markup element:** <electricalPotential> (M)

**Attributes:**

- None

**Child elements:**

- <terminationModuleGroupingValue> (O), used for contacts that belong to the same module of a termination module assembly
- <blockGroupingValue> (O), used for contacts that belong to the same block of a termination module assembly or the same pole of a switch or a relay
- <shuntGroupingValue> (O), contains an identical alphanumerical value for all contacts that belong to the same shunt/bus of a termination module or the same position of a switch or a relay
- <contactOrderValue> (O), contains an alphanumerical value that represents the ascending order of the equipment contacts to facilitate graphical presentation and connection analysis. Contacts of the equipment to which no physical wire is connected are included by wires with the wire state value "notactiv".

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the child elements of the electrical potential element <electricalPotential>

**Markup example:**

```
<electricalPotential>
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
<blockGroupingValue>1</blockGroupingValue>
<shuntGroupingValue>1</shuntGroupingValue>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
```

*2.2.1.2.6 Termination module grouping information*

**Description:** This element is only used for equipment with internal logic. It provides grouping information for contacts that belong to the same module of a termination module assembly.

It must contain an identical alphanumerical value for all these contacts.

**Markup element:** <terminationModuleGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the termination module grouping element <terminationModuleGroupingValue>

**Markup example:**

```
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
```

*2.2.1.2.7 Block grouping information*

**Description:** This element is only used for equipment with internal logic. It provides grouping information for contacts that belong to the same block of a termination module assembly or the same pole of a switch or a relay.

It must contain an identical alphanumerical value for all these contacts.

**Markup element:** <blockGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the block grouping element <blockGroupingValue>

**Markup example:**

```
<blockGroupingValue>1</blockGroupingValue>
```

*2.2.1.2.8 Shunt grouping information*

**Description:** This element is only used for equipment with internal logic. It provides grouping information for contacts that belong to the same shunt/bus of a termination module or the same position of a switch or a relay.

It must contain an identical alphanumerical value for all these contacts.

**Markup element:** <shuntGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the shunt grouping element <shuntGroupingValue>

**Markup example:**

```
<shuntGroupingValue>1</shuntGroupingValue>
```

*2.2.1.2.9 Contact order information*

**Description:** The contact order element <contactOrderValue> is used to order the wire ends, connected to equipment with internal logic, in addition to the termination module, block and shunt grouping elements.

All wires, which are not connected to base contacts of switches and relays, must get values higher than the values of base contacts. In this case, the base contact (supply) will be shown before the different positions of the switch/relay in the graphical presentation of the wires connected to this equipment.

When more than one wire is connected to an electrical potential, all these wires must have the same content in the contact order element <contactOrderValue>.

**Note**

More than one wire can be connected to earth bolts. But also modifications in the wiring and splits in the applicability of the system can cause that more than one wire is connected to the same contact of equipment, because for coding purposes the wires of all applicability ranges and modifications are taken into consideration.

More than one wire can also be connected to data bus contacts. The contact is composed of physically different pins. Therefore, the wire ends that are connected to the physically different pins of the composed contact must get different values in the contact order element <contactOrderValue>.

**Markup element:** <contactOrderValue> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the contact order element <contactOrderValue>

**Markup example:**

```
<contactOrderValue>3</contactOrderValue>
```

2.2.1.2.10 *Potential connections order*

**Description:** This element is used in the situation when more than one wire is connected to an electrical potential, eg an earth bolt. All these wires must have the same value for the electrical potential block grouping information in the wire connection code. In this case, these wires must have ascending numerical values at the potential connections of the wire connection code, which orders the wire to facilitate graphical presentation.

**Markup element:** <potentialConnectionsOrder> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the potential connections order element <potentialConnectionsOrder>

**Markup example:**

```
<potentialConnectionsOrder>2</potentialConnectionsOrder>
```

2.2.1.2.11 *Network analysis code*

**Description:** The network analysis code describes the behavior of the wire end in the network connection analysis in relation to other wires via the equipment. It is based on the behavior of the equipment to which the wire end is connected. This element can be used as the basis for the analysis of electrical connections in a system.

The network analysis code must contain a two-digit numerical value and is used for the analysis of the electrical connections in a system. It defines for every wire end, whether it is a starting point, the end of a connection analysis or whether the analysis is continued via equipment connections, eg connectors, switches etc.

The values given in Table 3 are recommended.

*Table 3 Network analysis codes*

| Value | Meaning for connection analysis |
|---|---|
| 01 | Starting point and end of connection analysis |
| 02 | Starting point, analysis continued via a plug/receptacle connection (transfer point) |
| 03 | Starting point, analysis continued via an equipment connection with internal logic, eg terminal junction modules (transfer point) |
| 04 | Starting point, analysis continued via an equipment connection with internal logic and alternative switch positions, eg switches and relays (transfer point) |

| Value | Meaning for connection analysis |
|---|---|
| 05 | No starting point and end of connection analysis |
| 06 | No starting point, analysis continued at the same equipment |
| 07 | Starting point with special usage (depth of iteration 1) and end of connection analysis |
| 08 | Starting point and end of connection analysis with special usage |
| 11 | Starting point and end of connection analysis for data bus systems (similar to value 01) |
| 12 | Starting point, analysis continued via a plug/receptacle connection (transfer point) for data bus systems (similar to value 02) |
| 17 | Starting point with special usage (depth of iteration 1) and end of connection analysis for data bus systems (similar to value 07) |

**Markup element:** <networkAnalysisCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the network analysis code element <networkAnalysisCode>

**Markup example:**

```
<networkAnalysisCode>04</networkAnalysisCode>
```

*2.2.1.2.12 Group code*

**Description:** The group code element <groupCode> indicates the physical grouping of wires connected to the same contact. For example, where multiple wires are connected to a terminal stud using multiple ring terminals, each wire connected to the same ring terminal must have the same group code, eg A. Wires that are connected to the same terminal stud but to another ring terminal must have another group code, eg B. This means that an identical group code indicates wires, which are physically connected to the same ring terminal.

**Markup element:** <groupCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the group code for wires that are connected to the same contact

**Markup example:**

```
<groupCode>B</groupCode>
```

2.2.1.3 List of screens

**Description:** The list of screens element <screenGroup> is used as a container for the subordinate screen/shield information elements.

**Markup element:** <screenGroup> (O)

**Attributes:**

– None

**Child elements:**

– <screen> (C), the screen/shield information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the list of screens element <screenGroup>

**Markup example:**

```
<screenGroup>
<screen>...</screen>
<screen>...</screen>
</screenGroup>
```

*2.2.1.3.1 Screen/shield information*

**Description:** The element <screen> and its attributes contain information of the type of the wire in a shielding situation and the identification of the screen to which the wire end is connected.

**Note**

The term 'shielding situation' is used in this chapter when it is necessary to describe the terminations of screens that shield wires. This information is essential for maintenance personnel in order to enable them to make the correct terminations of screens.

The screen/shield information provides a unique identifier to screens, eg over all screens or screens of a cable, which shield a wire or a cable. When shielded wires are connected to equipment, the ends of their screens are connected to a pin or a chassis of the equipment by using an active wire or by clamping or soldering the screen with the shell as for wiring data with a logical connection. It is also possible that the screen end is left open, which means that there is no connection to any equipment.

It is recommended to populate the element <screen> and the available attributes as follows:

In special cases an over all screen covers shielded wires. For graphical display purposes the attribute screenLevel defines the hierarchy of the screens with two-digit numeric data for screen connections. Inner screens must have lower values, starting with value "01". Shielded wires must have the screen level attribute screenLevel value "00".

The attribute screenType defines the type of wire in the shielding situation with two-digit numeric data. The attribute screenType is used for graphical display purposes. The values given in Table 4 are recommended.

*Table 4 Types of wires in a shielding situation*

| Value | Meaning (Type of wire) |
|---|---|
| 01 | Shielded wires |
| 02 | Virtual screen connections |
| 03 | Connections from a screen to a shell |
| 04 | Connections from a screen to a pin of the equipment (pin screen) |
| 05 | Connections of two screens (screen link) |
| 06 | Connections from a screen to another equipment (screen follower) and PIGTAIL wires to a screen |
| 07 | Connections from a screen to one of the shielded wires |
| 90 | Unshielded wires |
| 99 | Wires, which shielding situation can not be shown |

The attribute `screenStyle` defines the presentation format of a screen. It is only used for screen connections. Shielded wires must have the screen style attribute `screenStyle` value "`00`". If used, the values given in Table 5 are recommended.

*Table 5 Types of screens*

| Value | Meaning (Type of screen) |
|---|---|
| 01 | Normal screens |
| 02 | Screens of data bus cables |
| 03 | Screens of coaxial cables |
| 04 | Outer screens of tri-axial cables |
| 05 | Inner screens of tri-axial cables |

The element <`screen`> itself contains, if applicable, the identification of the screen to which the wire is connected

**Markup element:** <`screen`> (C)

**Attributes:**

- `screenLevel` (O), describes the physical level of the screen in a shielding situation. Outer screens (over all screens) must have higher values than inner screens (screens of cables)
- `screenType` (O), describes the type of the wire in a shielding situation

**Note**

The attribute `screenType` describes the connection type of a wire (normally on both ends of the screen, a wire is connected to, eg pin screens), connected to this screen or the shielded wire itself. Screen information for the complete screen is provided in the element <`wireInfo`>. Therefore it is recommended not to use the screen type attribute `screenType` in this context.

– `screenStyle` (O), describes the style for the graphical presentation of the screen in a shielding situation

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <`screen`> and its attributes

**Markup example:**

```
<screen screenLevel="01" screenType="03" screenStyle="01">
SCT1</screen>
```

2.2.1.4 Twisting of twisted wires

**Description:** The twisting of twisted wires element <`twistGroup`> is used as a container for the subordinate twist information elements.

**Markup element:** <`twistGroup`> (O)

**Attributes:**

– None

**Child elements:**

– <`twist`> (C), the twist information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the twisting of twisted wires element <`twistGroup`>

**Markup example:**

```
<twistGroup>
<twist>...</twist>
<twist>...</twist>
</twistGroup>
```

*2.2.1.4.1 Twist information*

**Description:** The element <`twist`> and its attribute `twistingType` contain information about the twisting of a wire. The element <`twist`> must contain all twist information of the wire. The available twisting type attribute `twistingType` specifies the type of twisting in coded form. Twist information can be different on both sides of a wire. The element <`twist`> must contain the twist information on this side of the wire.

Table 6 gives the recommended codes for twisting types.

*Table 6 Twist type codes*

| Twisting type code | Twisting type |
|---|---|
| 1 | Twisting of multi-core cables |
| 2 | Manually twists |

| Twisting type code | Twisting type |
|---|---|
| 3 | Manually twists of already twisted wires |

**Markup element:** <twist> (C)

**Attributes:**

– twistingType (O), specifies the type of twisting

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the element <twist>
– Use and definition of the attribute twistingType

**Markup example:**

The following markup example shows the twisting of a wire that is manually twisted with one or more other wires. All wires that are twisted together have the same twist identifier T%CM0005AA.

```
<twist twistingType="2">T%CM0005AA</twist>
```

2.2.1.5 Wire installation code

**Description:** This element contains the information for preparation and finishing of the wire for connection purposes.

**Markup element:** <wireInstallationCode> (O)

**Attributes:**

– None

**Child elements:**

– <preparationInfo> (O), the wire preparation information
– <finishingInfo> (O), the wire finishing information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the wire installation code element <wireInstallationCode>

**Markup example:**

The following markup example shows the preparation information for a wire end. It shows the preparation instruction in coded form PRE609 and gives a reference to the instruction sheet.

```
<wireInstallationCode>
<preparationInfo>
<instructionIdent>PRE609</instructionIdent>
<refs>
<dmRef>
<dmRefIdent>
```

```
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="20"
subSystemCode="9" sub-subsystemCode="0" assyCode="16"
disassyCode="09" disassyCodeVariant="A" infoCode="010"
infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>
</refs>
</preparationInfo>
</wireInstallationCode>
```

2.2.1.5.1 *Content model preparationInfo/finishingInfo*

**Description:** For wires, the content model preparationInfo/finishingInfo defines the child elements <preparationInfo> and <finishingInfo>.

**Markup elements:** <preparationInfo> (O) and <finishingInfo> (O)

**Attributes:**

– None

**Child elements:**

– <instructionIdent> (O), the wire preparation or finishing information in coded form
– <refs> (O), used for references to detailed instructions for preparation or finishing of a wire

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the wire preparation information element <preparationInfo> and the wire finishing information element <finishingInfo>

**Markup example:**

```
<preparationInfo>
<instructionIdent>...</instructionIdent>
<refs>...</refs>
</preparationInfo>
```

2.2.1.5.2 *Preparation/finishing information identification*

**Description:** The element <instructionIdent> gives wire preparation or finishing information in coded form.

**Markup element:** <instructionIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire preparation or finishing information encoding element <instructionIdent>

**Markup example:**

```
<instructionIdent>PRE609</instructionIdent>
```

*2.2.1.5.3 References*

**Description:** The element <refs> contains links to other parts of the project's publications, which give the detailed instructions for preparation or finishing of a wire. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <refs> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the references element <refs>

## 2.3 Wire information

**Description:** The wire information element <wireInfo> contains child elements, which describe properties of the wire and other information related to the complete wire.

**Markup element:** <wireInfo> (O)

**Attributes:**

– None

**Child elements:**

– <wireCode> (O), the wire code
– <partNumber> (O), the wire part number
– <harnessIdent> (O), the identification of the harness to which the wire belongs
– <wireSeqNumber> (O), the wire sequential number
– <circuitIdent> (O), the circuit code. Refer to Para 2.1.1
– <sectionIdent> (O), the wire section identification. Refer to Para 2.1.3
– <screenGroup> (O), the list of screens. Refer to Para 2.2.1.3
– <twistGroup> (O), the twisting information of twisted wires. Refer to Para 2.2.1.4
– <coaxialCableFlag> (O), the coaxial information
– <triaxialCableFlag> (O), the tri-axial information
– <emcCode> (O), the electromagnetic compatibility (EMC) code
– <length> (O), the wire length
– <wireColor> (O), the wire color
– <signalInfo> (O), the wire signal information
– <responsiblePartnerCompany> (O), the company or the organization, which is responsible for the wire data
– <routing> (O), the wire routing information
– <wireRoute> (O), the wire route lane code
– <restriction> (O), the wire restriction information
– <nextHigherAssy> (O), the identification of the next higher assembly

– <functionalDescrRef> (O), the functional description reference
– <illustrationRef> (O), the reference to circuit or wiring diagrams

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the wire information element <wireInfo> and its child elements

**Markup example:**

```
<wireInfo>
<harnessIdent>2309VB</harnessIdent>
<wireColor>B</wireColor>
<signalInfo>115V AC, 400Hz</signalInfo>
</wireInfo>
```

### 2.3.1 Wire code

**Description:** This element gives information on the type of a wire and its gauge.

**Markup element:** <wireCode> (O)

**Attributes:**

– None

**Child elements:**

– <wireType> (C), the wire type
– <wireGauge> (O), the wire gauge

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the wire code element <wireCode> and its child element <wireGauge>

**Markup example:**

```
<wireCode>
<wireType>CH</wireType>
</wireCode>
```

#### 2.3.1.1 Wire type

**Description:** This element gives information on the type of a wire. Normally, the wire type is defined in coded form. Table 7 gives examples for the coding of wire types.

*Table 7 Wire type codes*

| Wire type code | Wire type |
|---|---|
| CH | 600V, 150°C, Single, Nickel-Coated Copper |
| PC | 600V, 150°C, Multi-Core, 2 cores, Overall Sheathed, Nickel-Coated Copper |
| QC | 600V, 150°C, Multi-Core, 3 cores, Overall Sheathed, Nickel-Coated Copper |

**Markup element:** <wireType> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the wire type content/codes

**Markup example:**

```
<wireType>QC</wireType>
```

2.3.1.2 Wire gauge

**Description:** This element contains the gauge of a wire. The measure type is given in the gauge type attribute `wireGaugeType`.

**Markup element:** <`wireGauge`> (O)

**Attributes:**

– `wireGaugeType`> (C), the type of measure for the wire gauge. This attribute must have one of the following values:
  - "`proj`" for wires which gauge type is measured in a project or an organization specific unit
  - "`awg`" for wires which gauge type is measured in accordance with the American Wire Gauge units
  - "`mt`" for wires which gauge type is measured in a metric unit

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<wireGauge wireGaugeType="awg">006</wireGauge>
```

**2.3.2 Wire part number**

**Description:** The wire part number element <`partNumber`> contains the project specific part number of a wire. If applicable, the properties of a wire with a specific part number are given in the wire material section of the standard parts, refer to Chap 3.9.5.2.9.12. The part number is then the unique identifier. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <`partNumber`> (O)

**Attributes:**

– `id` (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2
– `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O) indicate change in accordance with Chap 3.9.5.2.1.1
– `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire part number

**Markup example:**

```
<partNumber>JN1018QC020</partNumber>
```

### 2.3.3 Harness identification

**Description:** The harness identification element <harnessIdent> contains the identification of the harness to which the wire belongs. For more detailed information about the population of this element, refer to Chap 3.9.5.2.9.3.

**Markup element:** <harnessIdent> (O)

**Attributes:**

– contextIdent (O), manufacturerCodeValue (O) and itemOriginator (O), used to further qualify the harness identification. Refer to Chap 3.9.5.2.9.3

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the harness identification for a wire

**Markup example:**

```
<harnessIdent>1109VB</harnessIdent>
```

### 2.3.4 Wire sequential number

**Description:** The wire sequential number element <wireSeqNumber> contains the sequential number of a wire, which can be part of the entire wire identification.

**Markup element:** <wireSeqNumber> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire sequential number as part of the wire information section

**Markup example:**

The following markup example shows a wire with the identification W0237-0161-24B. The sequential number of the wire (0161), eg in the harness, is given in element <wireSeqNumber>.

```
<wire wireState="active">
<wireIdent>
```

```
<wireNumber>W0237-0161-24B</wireNumber>
</wireIdent>
...
<wireInfo>
<wireSeqNumber>0161</wireSeqNumber>
</wireInfo>
...
</wire>
```

### 2.3.5 Circuit code

**Description:** For projects that do not use the circuit code of a wire in the identification of the wire itself, the circuit code element <circuitIdent> is additionally available in the wire information element <wireInfo>.

**Markup element:** <circuitIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the circuit code in the wire information section

**Markup example:**

```
<circuitIdent>234</circuitIdent>
```

### 2.3.6 Wire section identification

**Description:** For projects that do not use the wire section identification in the identification of the wire itself, the wire section identification element <sectionIdent> is additionally available in the wire information element <wireInfo>.

**Markup element:** <sectionIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire section identification in the wire information section

**Markup example:**

```
<sectionIdent>567</sectionIdent>
```

### 2.3.7 List of screens

**Description:** The list of screens element <screenGroup> contains the subordinate screen/shield information elements. Refer to Para 2.2.1.3.

### 2.3.8 Twisting of twisted wires

**Description:** The twisting of twisted wires element <twistGroup> contains the subordinate twist information elements. Refer to Para 2.2.1.4.

### 2.3.9 Coaxial information

**Description:** The coaxial information element <coaxialCableFlag> identifies coaxial cables. In many cases, a coaxial cable is indicated by the letter "Y" in the element content.

**Markup element:** <coaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the coaxial information in the wire information section

**Markup example:**

```
<coaxialCableFlag>Y</coaxialCableFlag>
```

### 2.3.10 Tri-axial information

**Description:** The element <triaxialCableFlag> identifies tri-axial cables. In many cases, a tri-axial cable is indicated by the letter "Y" in the element content.

**Markup element:** <triaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the tri-axial information in the wire information section

**Markup example:**

```
<triaxialCableFlag>Y</triaxialCableFlag>
```

### 2.3.11 Electromagnetic compatibility code

**Description:** The electromagnetic compatibility (EMC) code element <emcCode> identifies the EMC classification of a wire.

Normally, the EMC classification is defined in coded form. Table 8 gives examples for the coding of EMC classifications.

*Table 8 EMC codes*

| EMC code | EMC classification |
|---|---|
| E | Emissive wire |
| S | Susceptible wire |

**Markup element:** <emcCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the EMC classification and coding in the wire information section

**Markup example:**
The following markup example shows the EMC code of an emissive wire (EMC-code = E).

```
<emcCode>E</emcCode>
```

### 2.3.12 Length information

**Description:** The length information element <length> contains the length of a wire. It is recommended to specify in the length type attribute wireLengthType, whether the length information gives the design length, the real length of the wire or a critical length.

**Markup element:** <length> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the wire length
– wireLengthType (O), the type of wire length information. The following values are available:
  - "critical", indicates that the new wire must have exactly this defined length when a wire change is performed. Otherwise, the data delivered through the wire will not be accurate
  - "estimated", indicates that the wire length corresponds with the cut length without any constraints to the final length (after installation of the wire)
  - "final", indicates that the wire length corresponds with the length after installation of the wire

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the wire length, the type of length information and the unit of measure

**Markup example:**
The following markup example shows the length information of a wire with an estimated length of 2150 millimeter.

```
<length unitOfMeasure="mm" wireLengthType="estimated">2150
</length>
```

### 2.3.13 Color information

**Description:** The color information element <wireColor> identifies the color of a wire. Normally, the color information is defined in coded form. Table 9 gives examples for the coding of color information.

*Table 9 Color codes*

| Color code | Color of the wire sheathing |
|---|---|
| W | White |
| Y | Yellow |
| R | Red |
| G | Green |
| B | Blue |
| BK | Black |

**Markup element:** <wireColor> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of color information in the wire information section

**Markup example:**

The following markup example shows the color information of a red sheathed wire.

```
<wireColor>R</wireColor>
```

### 2.3.14 Signal information

**Description:** The signal information element <signalInfo> contains information about the signals on a wire. This can be the signal name, the effective voltage, the effective current or the waveform of the signal.

**Markup element:** <signalInfo> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of signal information in the wire information section

**Markup example:**

The following markup example shows the information for a signal on the wire, which is specified as a 115 Volt alternating current with a frequency of 400Hz.

```
<signalInfo>115V AC, 400Hz</signalInfo>
```

### 2.3.15 Responsible partner company

**Description:** The responsible partner company element <responsiblePartnerCompany> indicates the company or the organization, which is responsible for the wire data. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <responsiblePartnerCompany> (O)

**Attributes:**

– id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2
– enterpriseCode (O), the CAGE code of the responsible company or organization

**Child elements:**

– <enterpriseName> (O), the name of the responsible company or organization

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of responsible partner company information in the wire information section

**Markup example:**

The following markup example shows the responsible partner company information of a wire. The responsible partner company is indicated by its CAGE code.

```
<responsiblePartnerCompany enterpriseCode="K0999"/>
```

#### 2.3.15.1 Responsible partner company name

**Description:** The responsible partner company name element <enterpriseName> gives the name of the company or the organization, which is responsible for the data. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <enterpriseName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the responsible partner company name element <enterpriseName>

**Markup example:**

```
<enterpriseName>Amphenol Ltd</enterpriseName>
```

**2.3.16 Routing**

**Description:** The element <routing> contains routing information of a wire via clipping points and special components, eg current transformers, panels or bungs, through which wires pass.

**Markup element:** <routing> (O)

**Attributes:**

– None

**Child elements:**

– <clippingPoint> (O), the clipping point information for a wire
– <feedThru> (O), the information about the equipment through which a wire passes

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the routing information element <routing> and its subordinate information in the wire information section

**Markup example:**

```
<routing>
<clippingPoint>...</clippingPoint>
<clippingPoint>...</clippingPoint>
<feedThru>...</feedThru>
</routing>
```

2.3.16.1 Clipping point information

**Description:** The clipping points of a wire that fasten it to the structure of an aircraft, an equipment etc, are listed in the <clippingPoint> elements. If used, every clipping point must be populated in exactly one of the <clippingPoint> elements, ie the clipping point identification contains one clipping point that fastens the wire to the structure.

**Markup element:** <clippingPoint> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the clipping point identification in the wire information section

**Markup example:**

```
<clippingPoint>271-11</clippingPoint>
```

2.3.16.2 Feed-through information

**Description:** If a wire passes through equipment, eg a current transformer, this is identified by using the feed-through element <feedThru>.

**Markup element:** <feedThru> (O)

**Attributes:**

– holeIdent (O), the hole identifier

**Child elements:**

– <referenceDesignator> (C), the identification of the equipment through which a wire passes. Refer to Para 2.2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the feed-through information including its attributes

**Markup example:**

The following markup example shows a wire that passes through the hole with the identification '3' of equipment '42XU4T'.

```
<feedThru holeIdent="3">
<referenceDesignator>42XU4T</referenceDesignator>
</feedThru>
```

**2.3.17 Wire route lane code**

**Description:** The element <wireRoute> contains lane codes for wires, which belong to a primary system and must be given a routing apart from other wires of the system.

**Markup element:** <wireRoute> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of wire route lane codes in the wire information section

**Markup example:**

The following markup example shows a wire that belongs to lane 'L1'.

```
<wireRoute>L1</wireRoute>
```

**2.3.18 Wire restriction**

**Description:** The wire restriction information element <restriction> contains restrictions concerning a wire.

**Markup element:** <restriction> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of wire restrictions in the wire information section

### 2.3.19 Next higher assembly

**Description:** For wires that are part of a physical or logical assembly, eg a box and/or a panel, the next higher assembly element <nextHigherAssy> can be used to identify this equipment.

**Markup element:** <nextHigherAssy> (O)

**Attributes:**

– None

**Child elements:**

– <referenceDesignator> (C), the identification of the physical or logical assembly to which the wire belongs. Refer to Para 2.2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the next higher assembly element <nextHigherAssy> in the wire information section

**Markup example:**

The following markup example shows a wire that is installed in the next higher assembly 231VU.

```
<nextHigherAssy>
<referenceDesignator>231VU</referenceDesignator>
</nextHigherAssy>
```

### 2.3.20 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about a wire, eg a description of how it is made and its function. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references in the wire information section

### 2.3.21 Illustration reference

**Description:** The illustration reference element <illustrationRef> contains references to other parts of the electrical system publications that contain wiring illustrations. Such an illustration can show circuit or wiring diagrams. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references in the wire information section

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the attribute changeInfo="delete" for removed wires**. The project or the organization must decide whether the attribute changeInfo="delete" is used on element <wire> for removed wires or not. Refer to Para 2.

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for wires. It is strongly recommended to define the wire applicability precisely and populate the elements and attributes in accordance with the project or the organization specific rules. It is recommended to use at least the version and version number information given in the products cross-reference table. Wires with modifications must in addition use the information given in the conditions cross-reference table. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for wire data. Refer to Para 2.

**Use of the element <wireIdent>**. The project or the organization must decide the use and the definition of the context identification attribute contextIdent, the manufacturer attribute manufacturerCodeValue and the originator attribute itemOriginator. It is recommended to apply the same rules for the population of the attribute manufacturerCodeValue, which are defined for the element <manufacturerCode> that is used in several contexts of wiring data. Refer to Para 2.1.

**Use of the element <circuitIdent>**. The project or the organization must decide the use and the definition of circuit codes. If applicable, the circuit codes must be specified and the element <circuitIdent> contains only specified codes. Examples of circuit codes are given in Table 2. Refer to Para 2.1.1 and Para 2.1.2.

**Use of the element <sectionIdent>**. The project or the organization must decide the use and the definition of the section identification. The values for population of the element <sectionIdent> must be defined in project or organization specific rules. Refer to Para 2.1.3 and Para 2.1.2.

**Use of the element <referenceDesignator>**. The project or the organization must define the use of the reference designator element <referenceDesignator> and the related attributes to achieve uniqueness of vendor equipment. Refer to Para 2.2.1.1.

**Use of the element <contactInfo>**. The project or the organization must define the use of the contact information element <contactInfo>.

**Use of the element <contact>**. The project or the organization must decide the use and the definition of the contact identification element <contact> and its attributes. Refer to Para 2.2.1.2.1.

**Use of the element <wireConnectionCode>**. The project or the organization must decide the use and the definition of the child elements of the wire connection code element <wireConnectionCode>. It is recommended to populate the child elements of the wire connection code as described in Para 2.2.1.2.2.

**Use of the element <networkAnalysisCode>**. The project or the organization must decide the use and the definition of the network analysis code. Examples of network analysis codes are given in Table 3. Refer to Para 2.2.1.2.11.

**Use of the element <groupCode>**. The project or the organization must decide the use and the definition of group codes for wires that are connected to the same contact. If used, the project or the organization must define the use of the group code for all situations similar to the connection of wires to a stud via ring terminals. Refer to Para .

**Use of the element <screenGroup>**. The project or the organization must decide the use and the definition of the list of screens and subordinate screen/shield information. Refer to Para 2.2.1.3.

**Use of the element <twistGroup>**. The project or the organization must decide the use and the definition of element <twistGroup> and element <twist> including its attribute twistingType. Refer to Para 2.2.1.4.

**Use of the element <instructionIdent>**. The project or the organization must decide and define the use of the element <instructionIdent> as subordinate information of installation preparation and finishing installation of a wire. If used, it is recommended to populate the element <instructionIdent> consistently. Refer to Para 2.2.1.5.

**Use of the element <refs>**. The project or the organization must decide the use and the definition of references to detailed instructions for preparation or finishing of a wire. If used, references must be given consistently. Refer to Para 2.2.1.5.3.

**Use of the element <wireInfo>**. The project or the organization must decide the use and the definition of the wire information section. Refer to Para 2.3.

**Use of the element <wireCode>**. The project or the organization must decide the use and the definition of the wire code element <wireCode> and its child elements. Refer to Para 2.3.1.

**Use of the element <wireType>**. The project or the organization must decide the use and the definition of wire types. Examples of wire type codes are given in Table 7. Refer to Para 2.3.1.1.

**Use of the element <partNumber>**. The project or the organization must decide the use and the definition of wire part numbers. Refer to Para 2.3.2.

**Use of the element <harnessIdent>**. The project or the organization must decide the use and the definition of harness identification for a wire. Refer to Chap 3.9.5.2.9.3 and Para 2.3.3.

**Use of the element <wireSeqNumber>**. The project or the organization must decide the use and the definition of the wire sequential number. The wire sequential number must be used when the entire wire identification including its sequential number is not given in the wire number element <wireNumber>. For projects that hold the sequential wire number in element <wireNumber> of the wire identification, the wire sequential number element <wireSeqNumber> must not be used. Refer to Para 2.3.4.

**Use of the element <circuitIdent>**. The project or the organization must decide the use and the definition of the circuit code in the wire information section. For projects or organizations that hold the circuit code in child element <circuitIdent> of the wire identification, the circuit code element <circuitIdent> must not be used in the wire information section. Refer to Para 2.3.5.

**Use of the element <sectionIdent>**. The project or the organization must decide the use and the definition of the wire section identification in the wire information section. For projects or organizations that hold the wire section identification in element <sectionIdent> of the wire identification, the wire section identification element <sectionIdent> must not be used in the wire information section. Refer to Para 2.3.6.

**Use of the element <coaxialCableFlag>**. The project or the organization must decide the use and the definition of the coaxial information. Refer to Para 2.3.9.

**Use of the element <triaxialCableFlag>**. The project or the organization must decide the use and the definition of the tri-axial information. Refer to Para 2.3.10.

**Use of the element <emcCode>**. The project or the organization must decide the use and the definition of EMC classification and coding. Refer to Para 2.3.11.

**Use of the element <length>**. The project or the organization must decide the use and the definition of the wire length, the type of length information and the unit of measure. Refer to Para 2.3.12.

**Use of the element <wireColor>**. The project or the organization must decide the use and the definition of color information. Refer to Para 2.3.13.

**Use of the element <signalInfo>**. The project or the organization must decide the use and the definition of signal information for a wire. Refer to Para 2.3.14.

**Use of the element <responsiblePartnerCompany>**. The project or the organization must decide the use and the definition of responsible partner company information for a wire. As the attribute enterpriseCode is optional, a project or an organization must decide on its use. If used, then its use must be consistent and mandatory for the whole project. Using the child element <enterpriseName> can increase considerably the amount of data to be stored and exchanged. Therefore it is recommended to use only the attribute enterpriseCode in context with the element <wire> to indicate the responsible partner company instead of or in addition using the child element <enterpriseName>. Refer to Para 2.3.15.

**Use of the element <routing>**. The project or the organization must decide the use of wire routing information. If used, every clipping point must be populated in one element <clippingPoint>. Refer to Para 2.3.16.

**Use of the element <clippingPoint>**. The project or the organization must decide the use and the definition of the clipping point identification. The clipping point identification contains one clipping point. Refer to Para 2.3.16.1.

**Use of the element <feedThru>**. The project or the organization must decide the use and the definition of the feed-through element <feedThru> and the hole identifier attribute holeIdent. If used, the equipment, through which the wire passes, must be defined in the subordinate reference designator element <referenceDesignator>. Refer to Para 2.3.16.2.

**Use of the element <wireRoute>**. The project or the organization must decide the use and the definition of wire route lane codes. Refer to Para 2.3.17.

**Use of the element <restriction>**. The project or the organization must decide the use and the definition of the wire restrictions element <restriction>. Refer to Para 2.3.18.

**Use of the element <nextHigherAssy>**. The project or the organization must decide and define the use of the next higher assembly element <nextHigherAssy>. If used, it is recommended to populate the element <nextHigherAssy> consistently. Refer to Para 2.3.19.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.3.20.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently. Refer to Para 2.3.21.

# 4 Examples

## 4.1 Wire connection code examples

### 4.1.1 Connector with six contacts

The following Fig 1 and Table 10 show the content of the wire connection code and its child elements for a connector with six contacts.

ICN-C0419-S1000D00124-A-004-01

*Fig 1 Coding of wire connection code child elements - Connector*

*Table 10 Coding of wire connection code child elements - Connector*

| Contact identification | Screen order | Special connection | Electrical potential Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | Potential connections order |
|---|---|---|---|---|---|---|---|
| A | | | | | | 1 | |
| B | | | | | | 2 | |
| C | | | | | | 3 | |
| D | | | | | | 4 | |
| E | | | | | | 5 | |
| F | | | | | | 6 | |

### 4.1.2 Connector with five contacts and shielded wires

The following Fig 2 and Table 11 show the content of the wire connection code and its child elements for a connector with five contacts when shielded wires are connected to.

ICN-C0419-S1000D00187-A-002-01

*Fig 2 Coding of wire connection code child elements - Connector with shielded wires*

*Table 11 Coding of wire connection code child elements - Connector with shielded wires*

| Contact identification | Screen order | Special connection | Electrical potential Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | Potential connections order |
|---|---|---|---|---|---|---|---|
| | 1 | 1 | | | | 0 | |
| A | 2 | | | | | 1 | |
| B | 3 | | | | | 2 | |
| C | 5 | | | | | 3 | |
| D | 6 | | | | | 4 | |
| E | 4 | | | | | 5 | |

### 4.1.3 Switch with two poles and two positions

In the following example a switch with two poles (1-2-3, 4-5-6) and two positions (OFF-ON) is shown. Refer to Fig 3. In this example, all contacts, which are not base contacts, have allocated a higher value than the base contacts by adding an offset of 100 to order the base contacts before the non-base contacts. Refer to Table 12.

ICN-C0419-S1000D00125-A-003-01

*Fig 3 Coding of wire connection code child elements - Switch*

*Table 12 Coding of wire connection code child elements - Switch*

| Contact identification | Screen order | Special connection | Electrical potential Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | Potential connections order |
|---|---|---|---|---|---|---|---|
| 1 | | | | 1 | 1 | 101 | |
| 2 | | | | 1 | 1 | 2 | |
| 3 | | | | 1 | 2 | 103 | |
| 4 | | | | 2 | 1 | 104 | |
| 5 | | | | 2 | 1 | 5 | |
| 6 | | | | 2 | 2 | 106 | |

### 4.1.4 Relay with two poles

A relay with two poles (1-2-3, 4-5-6) is shown in the following example. Refer to Fig 4. Here, again all contacts of a pole, which are not base contacts, have allocated a higher value than the base contacts by adding an offset of 100. The coil of the relay has the lowest block grouping value 1 and will be displayed in a graphical presentation before the poles of the relay. Refer to Table 13.

ICN-C0419-S1000D00126-A-003-01

*Fig 4 Coding of wire connection code child elements - Relay*

*Table 13 Coding of wire connection code child elements - Relay*

| Contact identification | Screen order | Special connection | Electrical potential Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | Potential connections order |
|---|---|---|---|---|---|---|---|
| A | | | | 1 | 1 | 7 | |
| B | | | | 1 | 1 | 8 | |
| 1 | | | | 2 | 1 | 101 | |
| 2 | | | | 2 | 1 | 2 | |
| 3 | | | | 2 | 2 | 103 | |
| 4 | | | | 3 | 1 | 104 | |
| 5 | | | | 3 | 1 | 5 | |
| 6 | | | | 3 | 2 | 106 | |

### 4.1.5 Block of a termination module assembly

The following example shows one block of a termination module assembly. The block contains three shunts/busses. Refer to Fig 5. The contacts are ordered alphabetically by the contact order value. The different values for the shunt grouping information can be used to group and order the wires, connected to the same busses, for graphical presentation purposes. Refer to Table 14.

ICN-C0419-S1000D00127-A-003-01

*Fig 5 Coding of wire connection code child elements - Terminal junction module*

*Table 14 Coding of wire connection code child elements - Terminal junction module*

| Contact identification | Screen order | Special connection | Electrical potential | | | | Potential connections order |
|---|---|---|---|---|---|---|---|
| | | | Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | |
| A | | | 1 | 1 | 1 | 1 | |
| B | | | 1 | 1 | 1 | 2 | |
| C | | | 1 | 1 | 1 | 3 | |
| D | | | 1 | 1 | 1 | 4 | |
| E | | | 1 | 1 | 2 | 5 | |
| F | | | 1 | 1 | 2 | 6 | |
| G | | | 1 | 1 | 3 | 7 | |
| H | | | 1 | 1 | 3 | 8 | |
| J | | | 1 | 1 | 3 | 9 | |
| K | | | 1 | 1 | 3 | 10 | |

### 4.1.6 Earth bolt

Wires, connected to earth bolts, must have allocated the same value in the contact order element <`contactOrderValue`> and ascending values in the potential connections order element <`potentialConnectionsOrder`> as shown in Fig 6 and Table 15.

ICN-C0419-S1000D00188-A-002-01

*Fig 6 Coding of wire connection code child elements - Earth bolt*

*Table 15 Coding of wire connection code child elements - Earth bolt*

| Contact identification | Screen order | Special connection | Electrical potential | | | | Potential connections order |
|---|---|---|---|---|---|---|---|
| | | | Termination module grouping value | Block grouping value | Shunt grouping value | Contact order value | |
| | | | | | | 1 | 1 |
| | | | | | | 1 | 2 |
| | | | | | | 1 | 3 |

## 4.2 Wire end information of a screened and twisted wire

This example shows the wire end information of a screened and twisted wire that is connected to contact A of the connector 1071VP.

```
<fromEquip>
<referenceDesignator>1071VP</referenceDesignator>
<contactInfo>
<contact contactIdent="A"/>
<wireConnectionCode>
<screenOrder>2</screenOrder>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
<twistGroup>
<twist>C%FM0447AB</twist>
</twistGroup>
</fromEquip>
```

## 4.3 Wire end information of a logical connection wire

This example shows the wire end information of a logical connection wire, connecting screen FM0447AB to the shell of the connector 1071VP.

```
<fromEquip>
<referenceDesignator>1071VP</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>1</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="01" screenType="03" screenStyle="01">
FM0447AB</screen>
</screenGroup>
</fromEquip>
```

## 4.4 Wire end information of wires connecting a plug and a receptable

The following example shows the wire end information of the wires, connecting plug 6QXA and receptacle 6712VR as shown in Fig 7.

ICN-C0419-S1000D0186-002-01

*Fig 7 Wire connection markup example 6QXA - 6712VR*

```
<wireGroup>
<wire wireState="active">
<wireIdent>
<wireNumber>QX0024QA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<contact contactIdent="A"/>
<wireConnectionCode>
<screenOrder>3</screenOrder>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<contact contactIdent="A"/>
<wireConnectionCode>
<screenOrder>3</screenOrder>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>
```

```
<wire wireState="active">
<wireIdent>
<wireNumber>QX0025QA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<contact contactIdent="B"/>
<wireConnectionCode>
<screenOrder>4</screenOrder>
<electricalPotential>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<contact contactIdent="B"/>
<wireConnectionCode>
<screenOrder>4</screenOrder>
<electricalPotential>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>QX0026QA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<contact contactIdent="C"/>
<wireConnectionCode>
<screenOrder>5</screenOrder>
<electricalPotential>
<contactOrderValue>3</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
```

```
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<contact contactIdent="C"/>
<wireConnectionCode>
<screenOrder>5</screenOrder>
<electricalPotential>
<contactOrderValue>3</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="00" screenType="01" screenStyle="00">
</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="logconn">
<wireIdent>
<wireNumber>NC00001LC</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>1</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="02" screenType="03" screenStyle="01">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>1</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
```

```
<screen screenLevel="02" screenType="03" screenStyle="01">
6673VO</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="logconn">
<wireIdent>
<wireNumber>NC00002LC</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>2</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="01" screenType="03" screenStyle="01">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6QXA</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>2</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="01" screenType="03" screenStyle="01">
QX0024QA</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="logconn">
<wireIdent>
<wireNumber>NC00003LC</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>1</screenOrder>
<electricalPotential>
```

```
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="02" screenType="03" screenStyle="01">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>1</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="02" screenType="03" screenStyle="01">
6673VO</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="logconn">
<wireIdent>
<wireNumber>NC00004LC</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>2</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="01" screenType="03" screenStyle="01">
</screen>
</screenGroup>
</fromEquip>
<toEquip>
<referenceDesignator>6712VR</referenceDesignator>
<contactInfo>
<wireConnectionCode>
<screenOrder>2</screenOrder>
<electricalPotential>
<contactOrderValue>0</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
```

```
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
<screenGroup>
<screen screenLevel="01" screenType="03" screenStyle="01">
QX0024QA</screen>
</screenGroup>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>
</wireGroup>
```

## 4.5 Wire end information of wires in a relay box

The following example shows the wire end information of some wires in a relay box, connecting relay 61UR, terminal junction module 3209VVB and receptacle on the relay box 3209VE as shown in Fig 8.

ICN-C0419-S1000D0185-002-01

*Fig 8 Wire connection markup example 3209VE*

```
<wireGroup>
<!-- ... -->
<wire wireState="active">
<wireIdent>
<wireNumber>PA0168FD</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VEB*</referenceDesignator>
<contactInfo>
<contact contactIdent="B"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
```

```
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="X2"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>01</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>108</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>PA0360FA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VEB*</referenceDesignator>
<contactInfo>
<contact contactIdent="A"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="X1"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>01</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>107</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>UR0443FC</wireNumber>
</wireIdent>
<wireConnection>
```

```
<fromEquip>
<referenceDesignator>3209VEA*</referenceDesignator>
<contactInfo>
<contact contactIdent="C"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>3</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>3209VVB</referenceDesignator>
<contactInfo>
<contact contactIdent="S"/>
<wireConnectionCode>
<electricalPotential>
<terminationModuleGroupingValue>01</terminationModuleGroupingVal
ue>
<blockGroupingValue>01</blockGroupingValue>
<shuntGroupingValue>06</shuntGroupingValue>
<contactOrderValue>19</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>UR0443FD</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VVB</referenceDesignator>
<contactInfo>
<contact contactIdent="U"/>
<wireConnectionCode>
<electricalPotential>
<terminationModuleGroupingValue>01</terminationModuleGroupingVal
ue>
<blockGroupingValue>01</blockGroupingValue>
<shuntGroupingValue>06</shuntGroupingValue>
<contactOrderValue>21</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="A1"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>02</blockGroupingValue>
```

```
<shuntGroupingValue>02</shuntGroupingValue>
<contactOrderValue>101</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>UR0443FE</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VVB</referenceDesignator>
<contactInfo>
<contact contactIdent="T"/>
<wireConnectionCode>
<electricalPotential>
<terminationModuleGroupingValue>01</terminationModuleGroupingVal
ue>
<blockGroupingValue>01</blockGroupingValue>
<shuntGroupingValue>06</shuntGroupingValue>
<contactOrderValue>20</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>03</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="B1"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>03</blockGroupingValue>
<shuntGroupingValue>02</shuntGroupingValue>
<contactOrderValue>104</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>UR0445FA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VEA*</referenceDesignator>
<contactInfo>
<contact contactIdent="A"/>
<wireConnectionCode>
```

```
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="B2"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>03</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>5</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>UR0446FA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3209VEA*</referenceDesignator>
<contactInfo>
<contact contactIdent="B"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>02</networkAnalysisCode>
</contactInfo>
</fromEquip>
<toEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="A2"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>02</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>2</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>04</networkAnalysisCode>
</contactInfo>
</toEquip>
</wireConnection>
<!-- ... -->
</wire>
```

```
<wire wireState="notactiv">
<wireIdent>
<wireNumber>NC00001NA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="A3"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>02</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>103</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="notactiv">
<wireIdent>
<wireNumber>NC00002NA</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>61UR</referenceDesignator>
<contactInfo>
<contact contactIdent="B3"/>
<wireConnectionCode>
<electricalPotential>
<blockGroupingValue>03</blockGroupingValue>
<shuntGroupingValue>01</shuntGroupingValue>
<contactOrderValue>106</contactOrderValue>
</electricalPotential>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>
</wireGroup>
```

## 4.6 Grouping of wires

The following example shows the grouping of four wires that are connected to the terminal stud with the contact identifier T5. The wires W-001 and W-002 are connected to one ring terminal, the wires W-003 and W-004 are connected to another ring terminal. Refer to Fig 9. Group code "A" is assigned to W-001 and W-002 and group code "B" to W-003 and W-004.

ICN-C0419-S1000D0206-001-01

*Fig 9 Group code example*

```
<wireGroup>
<wire wireState="active">
<wireIdent>
<wireNumber>W-001</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3000VN</referenceDesignator>
<contactInfo>
<contact contactIdent="T5"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
<potentialConnectionsOrder>1</potentialConnectionsOrder>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
<groupCode>A</groupCode>

</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>W-002</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3000VN</referenceDesignator>
<contactInfo>
<contact contactIdent="T5"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
<potentialConnectionsOrder>2</potentialConnectionsOrder>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
<groupCode>A</groupCode>
```

```
</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>W-003</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3000VN</referenceDesignator>
<contactInfo>
<contact contactIdent="T5"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
<potentialConnectionsOrder>3</potentialConnectionsOrder>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
<groupCode>B</groupCode>

</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>

<wire wireState="active">
<wireIdent>
<wireNumber>W-004</wireNumber>
</wireIdent>
<wireConnection>
<fromEquip>
<referenceDesignator>3000VN</referenceDesignator>
<contactInfo>
<contact contactIdent="T5"/>
<wireConnectionCode>
<electricalPotential>
<contactOrderValue>1</contactOrderValue>
</electricalPotential>
<potentialConnectionsOrder>4</potentialConnectionsOrder>
</wireConnectionCode>
<networkAnalysisCode>01</networkAnalysisCode>
<groupCode>B</groupCode>

</contactInfo>
</fromEquip>
</wireConnection>
<!-- ... -->
</wire>
</wireGroup>
```

## 4.7 Wire information

The following markup example shows the wire information for a shielded and twisted wire of type TB with the project specific wire gauge 002. The wire belongs to harness 2309VB. Further wire information elements are shown in the example.

```
<wireInfo>
<wireCode>
<wireType>TB</wireType>
<wireGauge wireGaugeType="proj">002</wireGauge>
</wireCode>
<harnessIdent>2309VB</harnessIdent>
<screenGroup>
<screen>FC0342AH</screen>
</screenGroup>
<twistGroup>
<twist twistingType="1">C%FC0342AH</twist>
</twistGroup>
<coaxialCableFlag>N</coaxialCableFlag>
<triaxialCableFlag>N</triaxialCableFlag>
<emcCode>E</emcCode>
<length unitOfMeasure="mm">3000</length>
<wireColor>B</wireColor>
<signalInfo>115V AC, 400Hz</signalInfo>
<responsiblePartnerCompany enterpriseCode="K0999"/>
<routing>
<clippingPoint>271-11</clippingPoint>
<clippingPoint>273-2</clippingPoint>
</routing>
<wireRoute>L1</wireRoute>
<illustrationRef>
<refs>
 <dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="91"
subSystemCode="3" sub-subsystemCode="1" assyCode="10"
disassyCode="00" disassyCodeVariant="A" infoCode="051"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</illustrationRef>
</wireInfo>
```

# Chapter 3.9.5.2.9.3

## *Wiring data - Harness*

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# 1 General

The element <harness> and its child elements are used to capture and represent the harnesses, which are installed in the Product, and the related information.

# 2 Element <harness> and child elements

**Description:** The element <harness> is contained within the list of harnesses element <harnessGroup>. It contains harness information of the Product's wiring. The electrical wires of a system are often divided into separate harnesses.

**Markup element:** <harness> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a harness by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1
- changeInfo (O), the change information of a harness in connection with the related modification. This attribute must have one of the following values:
  - "add" for harnesses which are added to the systems circuits by a modification
  - "delete" for harnesses which are removed from the systems circuits by a modification
  - "modify" for harnesses which are modified in the systems circuits by a modification

**Child elements:**

- <harnessIdent> (M), the harness identification
- <harnessInfo> (O), the harness information
- <routing> (O), the harness routing information
- <responsiblePartnerCompany> (O), the company or the organization which is responsible for the harness data
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to harness illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute changeInfo="delete" for removed harnesses
- Use and definition of applicability information for harnesses
- Use and definition of change attributes for harnesses

**Markup example:**

```
<wiringData>
<harnessGroup>
<harness applicRefId="app-0001">
<harnessIdent>...</harnessIdent>
<harnessInfo>...</harnessInfo>
<routing>...</routing>
<responsiblePartnerCompany>...</responsiblePartnerCompany>
<functionalDescrRef>...</functionalDescrRef>
<illustrationRef>...</illustrationRef>
</harness>
...
```

```
</harnessGroup>
</wiringData>
```

## 2.1 Harness identification

**Description:** The harness identification is the unique identifier of a harness in the system. It is the link between the harness and the included wires.

**Markup element:** <harnessIdent> (M)

**Attributes:**

- contextIdent (O), the context identification which is used in combination with the attribute manufacturerCodeValue to ensure the uniqueness of vendor harness data. Context identification contains an identifier, eg the part number of the next higher assembly that has been given to the assembly by the vendor.
- manufacturerCodeValue (O), the identification of the vendor, eg the CAGE code, which is used in combination with the attribute contextIdent to ensure uniqueness of vendor harness data.
- itemOriginator (O), indicates the origin of the harness, ie if a harness is an aircraft manufacturer harness or a vendor harness. Values and their meanings are defined by using the BREX mechanism. Refer to Chap 3.9.6.1 and Chap 4.10

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the attributes contextIdent, manufacturerCodeValue and itemOriginator
- Definition of rules for the population of attribute manufacturerCodeValue in conjunction with the population of element <manufacturerCode>

**Markup example:**

The first example shows a harness with the identification 1310VB.

```
<harnessIdent>1310VB</harnessIdent>
```

The second example shows the markup of harness W5250 that is installed in the panel with the part number P1650-411, supplied by the vendor with the identification 01234.

```
<harnessIdent contextIdent="P1650-411"
manufacturerCodeValue="01234" itemOriginator="orig02">W5250
</harnessIdent>
```

## 2.2 Harness information

**Description:** The element <harnessInfo> contains harness information for the detailed identification of a harness, eg the part number and alternative identifications that can be used to identify this harness.

**Markup element:** <harnessInfo> (O)

**Attributes:**

- None

**Child elements:**

- <partNumber> (O), the harness part number
- <altIdentGroup> (O), the list of alternative harness identifications
- <harnessVariantIdent> (O), the harness variant identification
- <harnessVariantIssue> (O), the harness variant issue
- <harnessName> (O), the harness name
- <emcCode> (O), the harness separation code
- <temperature> (O), the harness temperature rating
- <harnessEnvironment> (O), the harness environmental information
- <sleeveGroup> (O), the list of harness sleeves

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the harness information element <harnessInfo> and its child elements

**Markup example:**

```
<harnessInfo>
<partNumber>J92101310-407</partNumber>
<harnessVariantIdent>407</harnessVariantIdent>
<harnessVariantIssue>B</harnessVariantIssue>
<harnessName>E ROUTE RH</harnessName>
<emcCode>E</emcCode>
</harnessInfo>
```

### 2.2.1 Part number

**Description:** The element <partNumber> contains the project or the organization specific part number of the harness. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <partNumber> (O)

**Attributes:**

- id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O) and caveat (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the harness part number

**Markup example:**

```
<partNumber>J92223100-410</partNumber>
```

### 2.2.2 Alternative identifications

**Description:** The list of alternative harness identifications element <altIdentGroup> is used as a container for the subordinate alternative identification elements.

**Markup element:** <altIdentGroup> (O)

**Attributes:**

– None

**Child elements:**

– <altIdent> (C), the alternative identification

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the list of alternative harness identifications element <altIdentGroup>

**Markup example:**

```
<altIdentGroup>
<altIdent>...</altIdent>
<altIdent>...</altIdent>
</altIdentGroup>
```

2.2.2.1 Alternative identification

**Description:** The alternative identification element <altIdent> is used for additional identification of a harness. An alternative identification can contain a manufacturer part number and the related manufacturer code.

**Markup element:** <altIdent> (C)

**Attributes:**

– None

**Child elements:**

– <partNumber> (O), the harness alternative part number. Refer to Para 2.2.1
– <manufacturerCode> (O), the CAGE code of the harness manufacturer

**Business rules decisions:**

– None identified

**Markup example:**

The following markup example shows alternative identification information of a harness.

```
<altIdentGroup>
<altIdent>
<partNumber>LO3100FEB</partNumber>
<manufacturerCode>12345</manufacturerCode>
</altIdent>
</altIdentGroup>
```

*2.2.2.1.1 Harness manufacturer code*

**Description:** The harness manufacturer code element <manufacturerCode> is used in conjunction with the alternative harness part number. It contains the CAGE code of the harness manufacturer.

**Markup element:** <manufacturerCode> (O)

**Attributes:**

- `id` (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O) indicate change in accordance with Chap 3.9.5.2.1.1
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Consistent use and population of the element <`manufacturerCode`> in conjunction with <`partNumber`> across wiring data

**Markup example:**

```
<manufacturerCode>F0001</manufacturerCode>
```

### 2.2.3 Harness variant

**Description:** The harness variant identification element <`harnessVariantIdent`> contains the variant of a harness. Improvements during series production or engineering requirements are reasons why different harnesses are used in one type of system. This element identifies the different harnesses. A harness variant can be part of the project or the organization specific part number.

**Markup element:** <`harnessVariantIdent`> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the harness variant identification

**Markup example:**

The following markup example shows the variant 410 of harness J92223100-410.

```
<harnessVariantIdent>410</harnessVariantIdent>
```

### 2.2.4 Harness issue

**Description:** The harness variant issue element <`harnessVariantIssue`> contains the issue of a harness variant.

**Markup element:** <`harnessVariantIssue`> (O)

**Attributes:**

- None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the harness variant issue information

**Markup example:**

```
<harnessVariantIssue>A</harnessVariantIssue>
```

### 2.2.5 Harness name

**Description:** The harness name element <harnessName> gives the name of a harness.

**Markup element:** <harnessName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the harness name

**Markup example:**

```
<harnessName>FCS LANE 1 FORWARD EQUIPMENT BAY</harnessName>
```

### 2.2.6 Harness separation code

**Description:** The harness separation code element <emcCode> contains the electromagnetic compatibility (EMC) classification of a harness.

**Markup element:** <emcCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of harness separation code information

**Markup example:**

```
<emcCode>E</emcCode>
```

### 2.2.7 Harness temperature rating

**Description:** The element <temperature> describes the minimum and maximum temperature rating, for which the harness is approved.

**Markup element:** <temperature> (O)

**Attributes:**

– None

**Child elements:**

– <minTemperature> (O), the minimum temperature rating
– <maxTemperature> (O), the maximum temperature rating

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of harness temperature rating

**Markup example:**

The following markup example shows the maximum temperature rating for a harness, in this case 500 degrees Fahrenheit.

```
<temperature>
<maxTemperature unitOfMeasure="degF">500</maxTemperature>
</temperature>
```

2.2.7.1 Harness temperature rating child elements

**Description:** The elements <minTemperature> and <maxTemperature> give the lower and upper temperature rating boundaries for a harness.

**Markup elements:** <minTemperature> (O) and <maxTemperature> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the temperature

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of harness minimum and/or maximum temperature rating including the unit of measure

**Markup example:**

```
<temperature>
<minTemperature unitOfMeasure="degC">-10</minTemperature>
<maxTemperature unitOfMeasure="degC">60</maxTemperature>
</temperature>
```

**2.2.8 Harness environment**

**Description:** The element <harnessEnvironment> gives information concerning the environment in which a harness is located.

**Markup element:** <harnessEnvironment> (O)

**Attributes:**

– `highVibrationFlag` (O), indicates if a harness is located in a high vibration environment. The following values are available:
  - "`0`" (D), the harness is not located in a high vibration environment
  - "`1`", the harness is located in a high vibration environment

– `hydraulicFlag` (O), indicates if a harness is located in a hydraulic environment
  - "`0`" (D), the harness is not located in a hydraulic environment
  - "`1`", the harness is located in a hydraulic environment

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of harness environment information element <`harnessEnvironment`> and its attributes

**Markup example:**

```
<harnessEnvironment highVibrationFlag="1" hydraulicFlag="0"/>
```

### 2.2.9 List of harness sleeves

**Description:** The element <`sleeveGroup`> contains a list of sleeves that are used on the harness.

**Markup element:** <`sleeveGroup`> (O)

**Attributes:**

– None

**Child elements:**

– <`sleeve`> (C), the harness sleeve information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the list of sleeves element <`sleeveGroup`>

**Markup example:**

```
<sleeveGroup>
<sleeve>...</sleeve>
<sleeve>...</sleeve>
</sleeveGroup>
```

#### 2.2.9.1 Harness sleeve information

**Description:** The element <`sleeve`> gives information about a harness sleeve.

**Markup element:** <`sleeve`> (C)

**Attributes:**

– `sleeveMaterial` (O), indicates the material of which the sleeve is made

**Child elements:**

– <partNumber> (O), the part number of the harness sleeve. Refer to Para 2.2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the attribute sleeveMaterial and the child element <partNumber>

**Markup example:**

```
<sleeveGroup>
<sleeve sleeveMaterial="Teflon">
<partNumber>SLV-5678</partNumber>
</sleeve>
</sleeveGroup>
```

## 2.3 Routing

**Description:** The element <routing> contains routing information of a harness via clipping points. It can also contain routing information through special components, eg panels or bungs.

**Markup element:** <routing> (O)

**Attributes:**

– None

**Child elements:**

– <clippingPoint> (O), the clipping point information for a harness. Refer to Chap 3.9.5.2.9.2
– <feedThru> (O), the information about the equipment through which a harness passes. Refer to Chap 3.9.5.2.9.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the routing information element <routing> and its subordinate information for harnesses

**Markup example:**

```
<routing>
<clippingPoint>271-11</clippingPoint>
<clippingPoint>273-2</clippingPoint>
</routing>
```

## 2.4 Responsible partner company

**Description:** The responsible partner company element <responsiblePartnerCompany> indicates the company or the organization, which is responsible for the harness data. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <responsiblePartnerCompany> (O)

**Attributes:**

– id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.

– `enterpriseCode` (O), the CAGE code of the responsible company or organization

**Child elements:**

– <`enterpriseName`> (O), the name of the responsible company or organization

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of responsible partner company information for harnesses

**Markup example:**

The following markup example shows the responsible partner company information of a harness. The responsible partner company is indicated by its CAGE code.

```
<responsiblePartnerCompany enterpriseCode="K0378"/>
```

### 2.4.1 Responsible partner company name

**Description:** The responsible partner company name element <`enterpriseName`> gives the name of the company or the organization, which is responsible for the data. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <`enterpriseName`> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the responsible partner company name element <`enterpriseName`>

**Markup example:**

```
<enterpriseName>Amphenol Ltd</enterpriseName>
```

## 2.5 Functional description reference

**Description:** The functional description reference element <`functionalDescrRef`> contains references to other parts of the electrical system publications for further information about a harness, eg a description of how it is made and its function. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <`functionalDescrRef`> (O)

**Attributes:**

– None

**Child elements:**

– <`refs`> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for harnesses

## 2.6 Illustration reference

**Description:** The illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show harness illustrations. These illustrations can show the routing of the harness. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for harnesses

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the attribute changeInfo="delete" for removed harnesses**. The project or the organization must decide the use of the attribute changeInfo="delete" for removed harnesses. Refer to Para 2.

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for harnesses. It is strongly recommended to define the harness applicability precisely and populate it in accordance with the project or the organization specific rules. It is recommended to use at least the version and version number information given in the products cross-reference table. Harnesses with modifications must in addition use the information given in the conditions cross-reference table. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for harness data. Refer to Para 2.

**Use of the element <harnessIdent>**. The project or the organization must decide the content of the element <harnessIdent> and the use and values of its attributes. Refer to Para 2.1.

**Use of the element <harnessInfo>**. The project or the organization must decide the use of harness information. If used, it is recommended that at least the contained element <partNumber> is populated for detailed identification of the harness. Refer to Para 2.2.

**Use of the element <partNumber>**. The project or the organization must decide the use and the definition of harness part numbers. Refer to Para 2.2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide the use of alternative identifications. If used, it is recommended to populate the elements <partNumber> in conjunction with <manufacturerCode> as child elements of <altIdent>. Refer to Para 2.2.2.

**Use of the element <harnessVariantIdent>**. The project or the organization must decide the use and the definition of harness variant identifications. Refer to Para 2.2.3.

**Use of the element <harnessVariantIssue>**. The project or the organization must decide the use and the definition of harness variant issue information. Refer to Para 2.2.4.

**Use of the element <harnessName>**. The project or the organization must decide the use and the definition of harness name information. Refer to Para 2.2.5.

**Use of the element <emcCode>**. The project or the organization must decide the use and the definition of harness separation code information. Refer to Para 2.2.6.

**Use of the element <temperature>**. The project or the organization must decide the use of harness temperature rating information. Refer to Para 2.2.7.

**Use of the element <harnessEnvironment>**. The project or the organization must decide the use of harness environmental information and the use of the attributes highVibrationFlag and hydraulicFlag. Refer to Para 2.2.8.

**Use of the element <sleeveGroup>**. The project or the organization must decide the use and the definition of the list of harness sleeves and the subordinate sleeve information. This includes the use and the definition of the attribute sleeveMaterial and the element <partNumber>. If used, the part number gives a link to the standard parts information of the wiring data. Refer to Para 2.2.9.

**Use of the element <routing>**. The project or the organization must decide the use of harness routing. If used, every clipping point must be populated in one element <clippingPoint>. Refer to Para 2.3.

**Use of the element <clippingPoint>**. The project or the organization must decide the use and definition of the clipping point identification. The clipping point identification contains one clipping point. Refer to Para 2.3.

**Use of the element <feedThru>**. Feed-through is mainly intended to be used for wires that pass through special components, eg current transformers and bungs. But also parts of a harness or a complete harness can pass through special components, eg bungs. This is indicated by using the element <feedThru>. Then the project or the organization must decide the use and the definition of feed-through information for harnesses. Refer to Para 2.3.

**Use of the element <responsiblePartnerCompany>**. The project or the organization must decide the use and the definition of responsible partner company information for a harness. As the attribute enterpriseCode is optional, a project or an organization must decide on its use. If used, then its use must be consistent and mandatory for the whole project. Using the child element <enterpriseName> can increase considerably the amount of data to be stored and exchanged. Therefore it is recommended to use only the attribute enterpriseCode in context with the element <harness> to indicate the responsible partner company instead of or in addition using the child element <enterpriseName>. Refer to Para 2.4.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.5.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently. Refer to Para 2.6.

# Chapter 3.9.5.2.9.4

## *Wiring data - Electrical equipment*

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| Chap 3.9.5.2.1.1 | Common constructs - Change marking |
| Chap 3.9.5.2.1.2 | Common constructs - Referencing |
| Chap 3.9.5.2.9.2 | Wiring data - Wire |
| Chap 3.9.5.3 | Data modules - Applicability |
| Chap 3.9.6.1 | Attributes - Project configurable values |
| Chap 4.10 | Information management - Business rules exchange |

# 1 General

The element <`electricalEquip`> and the child elements are used to capture and represent the electrical equipment, that is installed in the Product, and related information.

# 2 Element <`electricalEquip`> and child elements

**Description:** The element <`electricalEquip`> is contained within the list of electrical equipment element <`electricalEquipGroup`>. It contains electrical equipment information of the Product's wiring.

**Markup element:** <`electricalEquip`> (C)

**Attributes:**

- `applicRefId` (O), defines the applicability of equipment by referencing the element <`applic`> in the referenced applicability group as described in Chap 3.9.5.3
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O) indicate change in accordance with Chap 3.9.5.2.1.1
- `changeInfo` (O), the change information of equipment connection with the related modification. This attribute must have one of the following values:
  - "`add`" for electrical equipment that is added to the systems circuits by a modification
  - "`delete`" for electrical equipment that is removed from the systems circuits by a modification
  - "`modify`" for electrical equipment that is modified in the systems circuits by a modification
- `equipState` (O), describes the electrical state of equipment. The different values of this attribute are used to distinguish equipment with allocated reference designator, equipment

that have no reference designator allocated, and placeholders for empty positions on panels, etc. This attribute can have only one of the following values:

- "active" for electrical equipment, which is installed in one of the systems circuits and have allocated a reference designator
- "notactiv" for electrical equipment, which is not active in one of the systems circuits. A not active equipment is used as a placeholder, where eg no component is installed in a position of a circuit breaker panel
- "logequip" for electrical equipment, which is installed in one of the systems circuits and have no reference designator allocated

**Child elements:**

- <referenceDesignator> (M), the reference designator
- <partNumber> (O), the part number
- <altIdentGroup> (O), the list of alternative identifications
- <assyInstruction> (O), the assembly instruction information
- <maxMountingPositions> (O), the maximum number of mounting positions
- <systemBreakdownCode> (O), the system breakdown code
- <transverseLink> (O), the transverse link information
- <connectionListClass> (O), the connection list class
- <electricalLogic> (O), the electrical logic information
- <responsiblePartnerCompany> (O), the company or the organization which is responsible for the electrical equipment data
- <equipName> (O), the electrical equipment name
- <reqQuantity> (O), the required quantity information
- <installationInfo> (O), the installation information
- <equipDescrRef> (O), the equipment description reference
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to equipment illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute changeInfo="delete" for removed equipment
- Use and definition of applicability information for electrical equipment
- Use and definition of change attributes for electrical equipment

**Markup example:**

```
<wiringData>
<electricalEquipGroup>
<electricalEquip equipState="active" applicRefId="app-0001">
<referenceDesignator>...</referenceDesignator>
<partNumber>...</partNumber>
<connectionListClass>...</connectionListClass>
<electricalLogic>...</electricalLogic>
<responsiblePartnerCompany>...</responsiblePartnerCompany>
<equipName>...</equipName>
<installationInfo>...</installationInfo>
</electricalEquip>
...
</electricalEquipGroup>
</wiringData>
```

## 2.1 Reference designator

**Description:** The reference designator is the unique identifier of electrical equipment in the system.

**Markup element:** <`referenceDesignator`> (M)

**Attributes:**

- `id` (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O) indicate change in accordance with Chap 3.9.5.2.1.1
- `installationIdent` (O), used to achieve uniqueness for multiple occurrence equipment. Multiple occurrence equipment is equipment that is more than once installed in the Product, eg an aircraft, and have allocated the same reference designator for all installation instances.
- `contextIdent` (O), the context identification which is used in combination with the attribute `manufacturerCodeValue` to ensure the uniqueness of vendor equipment data. Context identification contains an identifier, eg the part number of the next higher assembly that has been given to the assembly by the vendor.
- `manufacturerCodeValue` (O), the identification of the vendor, eg the CAGE code, which is used in combination with the attribute `contextIdent` to ensure uniqueness of vendor equipment data.
- `itemOriginator` (O), indicates the origin of the equipment, ie if the equipment is aircraft manufacturer equipment or vendor equipment. Values and their meanings are defined by using the BREX mechanism. Refer to Chap 3.9.6.1 and Chap 4.10
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the reference designator element <`referenceDesignator`> and the related attributes to achieve uniqueness of vendor equipment

**Markup example:**

The following example shows the markup of a connector with the reference designator 1071VP:

```
<referenceDesignator>1071VP</referenceDesignator>
```

The following second example shows the markup of equipment EQ12 that is installed in the panel with the part number N1254443-A, supplied by the vendor with the identification F2345:

```
<referenceDesignator manufacturerCodeValue="F2345"
contextIdent="N1254443-A"
itemOriginator="orig02">EQ12</referenceDesignator>
```

## 2.2 Part number

**Description:** The part number element <`partNumber`> contains the project or the organization specific part number of the equipment. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <`partNumber`> (O)

**Attributes:**

- `id` (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- `changeType` (O), `changeMark` (O) and `reasonForUpdateRefIds` (O) indicate change in accordance with Chap 3.9.5.2.1.1
- `securityClassification` (O), `commercialClassification` (O) and `caveat` (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the equipment part number

**Markup example:**

```
<partNumber>JN1022-GA45AX</partNumber>
```

## 2.3 Alternative identifications

**Description:** The list of alternative identifications element <`altIdentGroup`> is used as a container for the subordinate alternative identification elements.

**Markup element:** <`altIdentGroup`> (O)

**Attributes:**

- None

**Child elements:**

- <`altIdent`> (C), the alternative identification

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the list of alternative equipment identifications element <`altIdentGroup`>

**Markup example:**

```
<altIdentGroup>
<altIdent>...</altIdent>
<altIdent>...</altIdent>
</altIdentGroup>
```

### 2.3.1 Alternative identification

**Description:** The alternative identification element <`altIdent`> is used for additional identification of equipment. An alternative identification can contain a manufacturer part number and the related manufacturer code.

**Markup element:** <`altIdent`> (C)

**Attributes:**

- None

**Child elements:**

- <partNumber> (O), the equipment alternative part number. Refer to Para 2.2
- <manufacturerCode> (O), the CAGE code of the equipment manufacturer

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- None identified

**Markup example:**

The following markup example shows an alternative identification for part number JN1032A3:

```
<altIdentGroup>
<altIdent>
<partNumber>711-5016-3(462)</partNumber>
<manufacturerCode>K5678</manufacturerCode>
</altIdent>
</altIdentGroup>
```

2.3.1.1 Equipment manufacturer code

**Description:** The equipment manufacturer code element <manufacturerCode> is used in conjunction with the alternative equipment part number. It contains the CAGE code of the equipment manufacturer.

**Markup element:** <manufacturerCode> (O)

**Attributes:**

- id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O) and caveat (O), used for security and restrictive markings in accordance with Chap 3.6

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Consistent use and population of the element <manufacturerCode> in conjunction with <partNumber> across wiring data

## 2.4 Assembly instructions

**Description:** The element <assyInstruction> is used as a container for the subordinate electrical equipment assembly information.

**Markup element:** <assyInstruction> (O)

**Attributes:**

- None

**Child elements:**

- <assy> (O), the assembly information for the equipment

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the assembly instructions element <assyInstruction>

**Markup example:**

```
<assyInstruction>
<assy>...</assy>
<assy>...</assy>
</assyInstruction>
```

### 2.4.1 Assembly information

**Description:** The equipment assembly information element <assy> contains subordinate assembly information for the equipment in coded form and references to detailed assembly instructions.

**Markup element:** <assy> (O)

**Attributes:**

– None

**Child elements:**

– <instructionIdent> (O), the equipment assembly information in coded form
– <refs> (O), used for references to detailed instructions for assembling the equipment

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the equipment assembly information element <assy>

**Markup example:**

```
<assy>
<instructionIdent>...</instructionIdent>
<refs>...</refs>
</assy>
```

#### 2.4.1.1 Assembly information identification

**Description:** The element <instructionIdent> gives equipment assembly information in coded form.

**Markup element:** <instructionIdent> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the equipment assembly information encoding element <instructionIdent>

**Markup example:**

```
<instructionIdent>ASSY806</instructionIdent>
```

2.4.1.2 References

**Description:** The element <refs> contains links to other parts of the systems publication, which give the detailed instructions assembling the equipment. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <refs> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the references element <refs>

## 2.5 Maximum number of mounting positions

**Description:** The maximum number of mounting positions element <maxMountingPositions> contains the number of mounting positions on a next higher assembly, eg a circuit breaker panel. This element is only used for equipment that has mounting positions for other electrical equipment, eg connectors or circuit breakers.

**Markup element:** <maxMountingPositions> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the maximum number of mounting positions information

**Markup example:**

The following markup example shows the next higher assembly panel AC1650, which has six mounting positions.

```
<electricalEquip equipState="active">
<referenceDesignator>AC1650</referenceDesignator>
<maxMountingPositions>6</maxMountingPositions>
</electricalEquip>
```

## 2.6 System breakdown code

**Description:** Equipment of complex systems is divided into subsystems using the system breakdown code element <systemBreakdownCode>. This element can be used to provide the system breakdown code of such equipment.

**Markup element:** <systemBreakdownCode> (O)

**Attributes:**

– id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the system breakdown code element <systemBreakdownCode>

**Markup example:**

```
<systemBreakdownCode>24-31-02-00</systemBreakdownCode>
```

## 2.7 Transverse link

**Description:** The transverse link element <transverseLink> provides information about internally or externally realized electrical connections of different contacts/bolts of equipment, eg terminal strips.

**Markup element:** <transverseLink> (O)

**Attributes:**

– None

**Child elements:**

– <electricalEquipConnection> (O), the equipment connection information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of transverse link information

**Markup example:**

```
<transverseLink>
<electricalEquipConnection>...</electricalEquipConnection>
<electricalEquipConnection>...</electricalEquipConnection>
</transverseLink>
```

### 2.7.1 Electrical equipment connections

**Description:** The electrical equipment connection element <electricalEquipConnection> gives information about the electrical connections that belong to a transverse link.

**Markup element:** <electricalEquipConnection> (O)

**Attributes:**

– connectionType (O), the type of connection. As an example, consider a relay. The connections of the poles are direct, done by a piece of metal, but the contacts of the relay coil(s) must also be shown. In this case connectionType="direct" means it is a direct connection, connectionType="coil" means that a coil has to be shown

between the contacts. Connection types can also be identified by using coded values like "1" - direct connection, "2" - coil, etc.

**Child elements:**

– <contact> (C), the contact identification

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of electrical equipment connection information

2.7.1.1 Contact identification

**Description:** The element <contact> describes the contact identification by its attributes. This element must be populated in accordance with Chap 3.9.5.2.9.2.

**Markup element:** <contact> (C)

**Attributes:**

– Refer to Chap 3.9.5.2.9.2.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the contact identification attributes

**Markup example:**

The following example shows the markup for coding the transverse links of the equipment. The contacts/bolts 1, 2, 3 and 4 are electrically connected, and the contacts/bolts 5 and 6 are electrically connected.

```
<transverseLink>
<electricalEquipConnection>
<contact contactIdent="1"/>
<contact contactIdent="2"/>
<contact contactIdent="3"/>
<contact contactIdent="4"/>
</electricalEquipConnection>
<electricalEquipConnection>
<contact contactIdent="5"/>
<contact contactIdent="6"/>
</electricalEquipConnection>
</transverseLink>
```

## 2.8 Connection list class

**Description:** The connection list class element <connectionListClass> describes special groups of equipment, eg switches, connectors etc, in coded form.

It is recommended to use the connection list class element <connectionListClass> as given in Table 2.

*Table 2 Connection list classes*

| Connection list class | Equipment group |
|---|---|
| 1 | Connectors, single |
| 2 | VR-/VP- Connectors, single |
| 3 | VR-/VP- Connectors |
| 4 | VE- Connectors, single |
| 5 | VE- Connectors |
| 6 | Earth bolts |
| 7 | Terminal junction modules |
| 8 | Terminal strips, single |
| 9 | Terminal strips, double |
| 10 | Relays, Contactors |
| 11 | Bung |
| 12 | Splices |
| 13 | Equipment whose connected wires are not part of the considered project wiring |
| 14 | Bus bars |
| 15 | Switches |
| 16 | Equipment with no internal logic |
| 17 | Virtual connectors |
| 18 | Equipment with internal logic |
| 19 | Terminal for bonding |
| 20 | Connectors, data bus, single |
| 21 | Data bus coupler |
| 23 | Connectors, data bus |
| 25 | Circuit breakers, fuses |

**Markup element:** <`connectionListClass`> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the connection list class element <connectionListClass>

**Markup example:**

The following markup example shows the connection list class information of a switch.

```
<connectionListClass>15</connectionListClass>
```

## 2.9 Electrical logic

**Description:** The electrical logic element <electricalLogic> provides an optional container for electrical states and internal connections between contacts for electrical or electronic equipment.

**Markup element:** <electricalLogic> (O)

**Attributes:**

– None

**Child elements:**

– <electricalEquipState> (C), the electrical equipment state

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the electrical logic element <electricalLogic>

**Markup example:**

```
<electricalLogic>
<electricalEquipState>...</electricalEquipState>
<electricalEquipState>...</electricalEquipState>
</electricalLogic>
```

### 2.9.1 Electrical equipment state

**Description:** The electrical equipment state element <electricalEquipState> provides state information for each connection to some particular electrical equipment.

**Markup element:** <electricalEquipState> (C)

**Attributes:**

– initialStateFlag (O), indicates whether the state information is the initial state of the equipment or not. The following values must be used:
  - "1" for electrical states that are initial states
  - "0" for electrical states that are not initial states. In this case, the attribute initialStateFlag can be dropped

**Child elements:**

– <electricalEquipConnection> (M), the equipment connection information
– <electricalStateDescr> (O), the description of an electrical state

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the initial state flag attribute initialStateFlag
– Use and definition of the electrical state description

2.9.1.1 Electrical equipment connections

**Description:** The electrical equipment connection element <electricalEquipConnection> must be used and gives information about the connections that belong to the same electrical state. Refer to Para 2.7.1.

2.9.1.2 Electrical state description

**Description:** The electrical state description element <electricalStateDescr> contains the narrative description of an electrical state, eg “ENERGIZED".

**Markup element:** <electricalStateDescr> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the electrical state description element <electricalStateDescr>

**Markup example:**

The following markup example describes a switch, which has two states: DEENERGIZED and ENERGIZED. In the initial state or the default state (initialStateFlag="1"), the switch connects contacts C and NC. In the other state (initialStateFlag="0") it connects contacts C and NO.

```
<electricalLogic>
<electricalEquipState initialStateFlag="1">
<electricalEquipConnection>
<contact contactIdent="C"/>
<contact contactIdent="NC"/>
</electricalEquipConnection>
<electricalStateDescr>DEENERGIZED</electricalStateDescr>
</electricalEquipState>
<electricalEquipState>
<electricalEquipConnection>
<contact contactIdent="C"/>
<contact contactIdent="NO"/>
</electricalEquipConnection>
<electricalStateDescr>ENERGIZED</electricalStateDescr>
</electricalEquipState>
</electricalLogic>
```

## 2.10 Responsible partner company

**Description:** The responsible partner company element <responsiblePartnerCompany> indicates the company or the organization, which is responsible for the equipment. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** <responsiblePartnerCompany> (O)

**Attributes:**

- `id` (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1.2.
- `enterpriseCode` (O), the CAGE code of the responsible company or organization

**Child elements:**

- `<enterpriseName>` (O), the name of the responsible company or organization

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of responsible partner company information for electrical equipment

**Markup example:**

```
<responsiblePartnerCompany enterpriseCode="K0378"/>
```

### 2.10.1 Responsible partner company name

**Description:** The responsible partner company name element `<enterpriseName>` gives the name of the company or the organization, which is responsible for the data. This element must be populated in accordance with Chap 3.9.5.1.

**Markup element:** `<enterpriseName>` (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the responsible partner company name element `<enterpriseName>`

**Markup example:**

```
<enterpriseName>Amphenol Ltd</enterpriseName>
```

## 2.11 Electrical equipment name

**Description:** The electrical equipment name element `<equipName>` describes the equipment. A standard name like SWITCH can be used or a name that defines the equipment in conjunction with its use on the system, eg BATTERY MASTER SWITCH.

**Markup element:** `<equipName>` (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the electrical equipment name element `<equipName>`

**Markup example:**

```
<equipName>BATTERY MASTER SWITCH</equipName>
```

## 2.12 Quantity

**Description:** The quantity element <reqQuantity> contains the number of multiple occurrence equipment installed in the Product, eg an aircraft.

**Markup element:** <reqQuantity> (O)

**Attributes:**

- unitOfMeasure (O), the unit of measure for the quantity
- id (O), the identifier of the markup element. Refer to Chap 3.9.5.2.1

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the quantity element <reqQuantity> and its attributes for multiple occurrence electrical equipment

**Markup example:**

The following markup shows an example for using the element <reqQuantity> for multiple occurrence equipment that is installed three times in the aircraft.

```
<reqQuantity>3</reqQuantity>
```

## 2.13 Installation information

**Description:** The element <installationInfo> contains electrical equipment installation information. The element is repeatable to cover multiple occurrence equipment.

**Markup element:** <installationInfo> (O)

**Attributes:**

- installationIdent (O), contains a unique value for every instance of the reference designator. The instance identifier is necessary to achieve a 1:1 relationship between a plug and the mating connector

**Child elements:**

- <installationLocation> (O), the installation location
- <siblingPlugIdent> (O), the twin connector identification
- <accessDoorOrPanel> (O), the access door or panel
- <nextHigherAssy> (O), the next higher assembly
- <positionOnNextHigherAssy> (O), the position on the next higher assembly

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the installation information element <installationInfo> and its attribute installationIdent

**Markup example:**

Refer to Para 4.1.

### 2.13.1 Installation location

**Description:** The repeatable element <installationLocation> contains the installation location information of the equipment instances.

**Markup element:** <installationLocation> (O)

**Attributes:**

- unitOfMeasure (O), the unit of measure for the installation location if applicable for the installation location type
- installationLocationType (O), the type of the installation location information, eg zone, section, station. Values and their meanings are defined by using the BREX mechanism. Refer to Chap 3.9.6.1 and Chap 4.10

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the installation location information, its attributes and child elements

**Markup example:**

Refer to Para 4.2.

### 2.13.2 Twin connector identification

**Description:** The element <siblingPlugIdent> contains the reference designator of the mate connector in the subordinate element <referenceDesignator>. That means, the plug gets as twin connector identification the reference designator of the receptacle, and the receptacle gets as twin connector identification the reference designator of the plug.

**Markup element:** <siblingPlugIdent> (O)

**Attributes:**

- None

**Child elements:**

- <referenceDesignator> (C), the reference designator of the twin connector. Refer to Para 2.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the twin connector identification element <siblingPlugIdent>

**Markup example:**

The following markup example shows the identification twin connector 1071VR (of the connector 1071VP).

```
<siblingPlugIdent>
<referenceDesignator>1071VR</referenceDesignator>
</siblingPlugIdent>
```

### 2.13.3 Access door or panel

**Description:** The element <accessDoorOrPanel> contains information about doors or panels to be opened for getting access to the equipment.

**Markup element:** <accessDoorOrPanel> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the access door or panel information element <accessDoorOrPanel>

**Markup example:**

The following markup example shows that door L107 has to be opened for getting access to the equipment.

```
<accessDoorOrPanel>L107</accessDoorOrPanel>
```

### 2.13.4 Next higher assembly

**Description:** Equipment, which is part of a physical or logical assembly, eg a box, the next higher assembly element <nextHigherAssy> can be used to identify this assembly.

**Markup element:** <nextHigherAssy> (O)

**Attributes:**

– None

**Child elements:**

– <referenceDesignator> (C), the identification of the next higher assembly of the equipment. Refer to Para 2.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the next higher assembly element <nextHigherAssy> of the electrical equipment

**Markup example:**

The following markup example shows equipment, which is part of the box 1004VE.

```
<nextHigherAssy>
<referenceDesignator>1004VE</referenceDesignator>
</nextHigherAssy>
```

### 2.13.5 Position on next higher assembly

**Description:** Equipment, which is mounted on a physical assembly, eg a box or a panel, has allocated the identification of the position on the next higher assembly element <positionOnNextHigherAssy>. The position is indicated either by a direct position or by grid coordinates.

**Markup element:** <positionOnNextHigherAssy> (O)

**Attributes:**

- mountPosition (O), the direct position number on which the equipment is mounted to the next higher assembly
- mountRow (O), the row information on which the equipment is mounted to the next higher assembly. This attribute is normally used in combination with the attribute mountColumn
- mountColumn (O), the column information on which the equipment is mounted to the next higher assembly. This attribute is normally used in combination with the attribute mountRow

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the position on next higher assembly element <positionOnNextHigherAssy> and its attributes

**Markup example:**

Refer to Para 4.3.

## 2.14 Equipment description reference

**Description:** The equipment description reference element <equipDescrRef> contains references to other parts of the electrical system publications, which give further information about this equipment, such as the description of how it is made.

**Markup element:** <equipDescrRef> (O)

**Attributes:**

- None

**Child elements:**

- <refs> (C), the equipment description reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of equipment description references for electrical equipment

## 2.15 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about the equipment, eg a description of its function. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

- None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for electrical equipment

## 2.16 Illustration reference

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the equipment. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for electrical equipment

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the attribute changeInfo="delete" for removed harnesses**. The project or the organization must decide the use of the attribute changeInfo="delete" for removed harnesses. Refer to Para 2.

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for the equipment. It is strongly recommended to define the equipment applicability precisely and populate it in accordance with the project or the organization specific rules. It is recommended to use at least the version and version number information given in the products cross-reference table. Equipment with modifications must in addition use the information given in the conditions cross-reference table. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for electrical equipment data. Refer to Para 2.

**Use of the element <referenceDesignator>**. The reference designator is the link between the electrical equipment and the connected wires. Therefore it is necessary to define project or organization specific rules for the use and population of this element and its attributes. Refer to Para 2.1.

**Use of the element <partNumber>**. The project or the organization must decide the use and the definition of part numbers for electrical equipment. Refer to Para 2.2.

**Use of the element <altIdentGroup>**. The project or the organization must decide the use of alternative identifications. If used, it is recommended to populate the elements

<partNumber> in conjunction with <manufacturerCode> as child elements of <altIdent>. Refer to Para 2.3.

**Use of the element <assyInstruction> and its child elements**. The project or the organization must decide and define the use of equipment assembly information, in particular the assembly instruction information in coded form, which can be given by element <instructionIdent>. If used, this element must be populated consistently. Refer to Para 2.4.

**Use of the element <maxMountingPositions>**. The project or the organization must decide and define the use of the maximum number of mounting positions, which can be given by element <maxMountingPositions>. If used, this element must be populated consistently. Refer to Para 2.5.

**Use of the element <systemBreakdownCode>**. The project or the organization must decide and define the use of the system breakdown code element <systemBreakdownCode> for electrical equipment. If used, this element must be populated consistently. Refer to Para 2.6.

**Use of the element <transverseLink>**. The project or the organization must decide and define exactly the use of transverse link information. When using it for the description of electrical connections, this element and its child elements and attributes must be used consistently. Refer to Para 2.7.

**Use of the element <connectionListClass>**. The project or the organization must decide and define the use of connection list class information for grouping of electrical equipment. It is recommended to populate this element as proposed in Table 2. Refer to Para 2.8.

**Use of the element <electricalLogic>**. The project or the organization must decide the use of electrical logic information including subordinate electrical state and connection information to describe electric or electronic equipment in more detail. Refer to Para 2.9.

**Use of the element <responsiblePartnerCompany>**. The project or the organization must decide the use and the definition of responsible partner company information for electrical equipment. As the attribute enterpriseCode is optional, a project or an organization must decide on its use. If used, then its use must be consistent and mandatory for the whole project. Using the child element <enterpriseName> can increase considerably the amount of data to be stored and exchanged. Therefore it is recommended to use only the attribute enterpriseCode in context with the element <electricalEquip> to indicate the responsible partner company instead of or in addition using the child element <enterpriseName>. Refer to Para 2.10.

**Use of the element <equipName>**. The project or the organization must decide the use and the exact definition of equipment name information. If using it for the description of equipment, it must be used consistently. Refer to Para 2.11.

**Use of the element <reqQuantity>**. The project or the organization must decide and define the use of the quantity element <reqQuantity>. It is recommended to use quantity only for multiple occurrence equipment. Refer to Para 2.12.

**Use of the element <installationInfo>**. The project or the organization must decide and define the use of equipment installation information including location and position information through its child elements and attributes. If used, this element and its child elements and attributes must be populated consistently. Refer to Para 2.13.

**Use of the element <siblingPlugIdent>**. The project or the organization must decide and define the use of twin connector identification information. The twin connector identification is the identification of the mate connector for connection analysis. It is therefore recommended to define business rules for use and population of this element. Refer to Para 2.13.2.

**Use of the element <accessDoorOrPanel>**. The project or the organization must decide and define the use of the access door or panel element <accessDoorOrPanel>. If used, the element must be populated consistently. Refer to Para 2.13.3.

**Use of the element <nextHigherAssy>**. The project or the organization must decide and define the use of the next higher assembly element <nextHigherAssy>. If used, the element must be populated consistently. Refer to Para 2.13.4.

**Use of the element <positionOnNextHigherAssy>**. The project or the organization must decide and define the use of the position on next higher assembly element <positionOnNextHigherAssy> and the available attributes. If used, the attributes must be populated consistently. Refer to Para 2.13.5.

**Use of the element <equipDescrRef>**. The project or the organization must decide the use and the definition of equipment description references. If used, references must be given consistently. Refer to Para 2.14.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.15.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently. Refer to Para 2.16.

# 4 Markup examples

## 4.1 Multiple occurrence equipment

The following markup example shows the use of attribute installationIdent for multiple occurrence equipment. The equipment M35001 OXY BOX (PSU) with the reference designator M35001 is used four times in this example. The four equipment instances are connected to D35150P thru D35153P. For details refer to Fig 1.

The markup example also shows a reference to the fourth instance D35153P in the second occurrence of element <electricalEquip>.

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*Fig 1 Multiple occurrence equipment example*

```
<electricalEquip>
<referenceDesignator>M35001</referenceDesignator>
<installationInfo installationIdent="1">
<installationLocation installationLocationType="instloctyp03">
398</installationLocation>
<siblingPlugIdent>
<referenceDesignator>D35150P</referenceDesignator>
</siblingPlugIdent>
</installationInfo>
<installationInfo installationIdent="2">
<installationLocation installationLocationType="instloctyp03">
421</installationLocation>
<siblingPlugIdent>
<referenceDesignator>D35151P</referenceDesignator>
</siblingPlugIdent>
</installationInfo>
<installationInfo installationIdent="3">
<installationLocation installationLocationType="instloctyp03">
442</installationLocation>
<siblingPlugIdent>
<referenceDesignator>D35152P</referenceDesignator>
</siblingPlugIdent>
</installationInfo>
<installationInfo installationIdent="4">
<installationLocation installationLocationType="instloctyp03">
463</installationLocation>
<siblingPlugIdent>
<referenceDesignator>D35153P</referenceDesignator>
</siblingPlugIdent>
</installationInfo>
</electricalEquip>
<electricalEquip>
<referenceDesignator>D35153P</referenceDesignator>
<installationInfo>
<installationLocation installationLocationType="instloctyp03">
```

```
463</installationLocation>
<siblingPlugIdent>
<referenceDesignator
installationIdent="4">M35001</referenceDesignator>
</siblingPlugIdent>
</installationInfo>
</electricalEquip>
```

## 4.2 Installation location

### 4.2.1 Installation location in coded form

The following markup example shows an installation location in coded form, using the subzone.

```
<installationLocation installationLocationType="instloctyp01">
148</installationLocation>
```

### 4.2.2 Installation location in clear text

The following markup example shows an installation location in clear text.

```
<installationLocation>Side console and rear pressure bulkhead
plug break RH (rear cockpit)</installationLocation>
```

### 4.2.3 Installation location with dimensions

The following example shows the installation location of equipment by populating the element <installationLocation> with station, water line and buttock line information. The unit of measurement is centimeter.

```
<installationLocation installationLocationType="instloctyp03"
unitOfMeasure="cm">199</installationLocation>
<installationLocation installationLocationType="instloctyp04"
unitOfMeasure="cm">170</installationLocation>
<installationLocation installationLocationType="instloctyp05"
unitOfMeasure="cm">L057</installationLocation>
```

## 4.3 Position on next higher assembly

### 4.3.1 Connector

The following markup example shows connector D4532J, which is mounted on position 5 of the next higher assembly AC1650.

```
<electricalEquip equipState="active">
<referenceDesignator>D4532J</referenceDesignator>
<installationInfo>
<nextHigherAssy>
<referenceDesignator>AC1650</referenceDesignator>
</nextHigherAssy>
<positionOnNextHigherAssy mountPosition="5">
</positionOnNextHigherAssy>
</installationInfo>
</electricalEquip>
```

### 4.3.2 Circuit breaker

The following markup example shows circuit breaker CB0225, which is mounted in row C and column 7 of the next higher assembly P320.

```
<electricalEquip equipState="active">
<referenceDesignator>CB0225</referenceDesignator>
```

```
<installationInfo>
<nextHigherAssy>
<referenceDesignator>P320</referenceDesignator>
</nextHigherAssy>
<positionOnNextHigherAssy mountRow="C" mountColumn="7">
</positionOnNextHigherAssy>
</installationInfo>
</electricalEquip>
```

# Chapter 3.9.5.2.9.5

## *Wiring data - Standard parts, Connector*

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## 1 General

The element <connector> and its child elements are used to capture and represent connectors, which are used for the Product, and the related standard parts information.

# 2 Element <connector> and child elements

**Description:** The element <connector> is contained in the connector list element <connectorGroup>. The list of connectors is a child element of the list of standard parts element <standardPartGroup>.

The element <connector> contains information concerning the properties of connectors used in the Product's wiring. It is also used to describe terminal modules, switches and relays.

**Markup element:** <connector> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a connector by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the connector
- <altIdentGroup> (O), the list of alternative identifications
- <mass> (O), the mass information
- <orientation> (O), the orientation information
- <assyInstruction> (O), the assembly instruction information
- <rack> (O), the rack information
- <contactCount> (O), the contact count
- <contactDescrGroup> (O), the list of contact descriptions
- <electricalLogic> (O), the electrical logic information
- <connectorAccessories> (O), the list of accessories
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for connectors
- Use and definition of change attributes for connectors

**Markup example:**

```
<wiringData>
<standardPartGroup>
<connectorGroup>
<connector>...</connector>
<connector>...</connector>
</connectorGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The element <partNumber> contains the project or the organization specific part number of a connector. This element must be populated in accordance with Chap 3.9.5.1. The part number serves as a link to the equipment. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.4

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains a list of alternative identifications for connectors, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.4

## 2.3 Mass

**Description:** The element <mass> contains the mass of a connector.

**Markup element:** <mass> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the connector mass

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="kg">0,0154</mass>
```

## 2.4 Orientation

**Description:** The element <orientation> contains orientation/polarization information about a connector. Polarization information is normally given as part of the connector's part number. The polarization code can represent the angle between the main keyway and the other keyways of the connector.

**Markup element:** <orientation> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <orientation>

**Markup example:**

The following markup example shows the use of element <orientation> by inserting the polarization code of the connector, eg JN1003A1335PA:

```
<orientation>A</orientation>
```

## 2.5 Assembly instructions

**Description:** The element <assyInstruction> is used as a container for the subordinate connector assembly information. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of assembly information. Refer to Chap 3.9.5.2.9.4

## 2.6 Rack

**Description:** The element <rack> contains rack information about rack & panel connectors.

**Markup element:** <rack> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <rack>

**Markup example:**

The following markup example shows the use of element <rack> for the insert A of the rack & panel connector, eg JN1123FP1CGK11:

```
<rack>A</rack>
```

## 2.7 Contact count

**Description:** The element <contactCount> contains the number of contacts of the connector.

**Markup element:** <contactCount> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <contactCount>

**Markup example:**

```
<contactCount>40</contactCount>
```

## 2.8 List of contact descriptions

**Description:** The element <contactDescrGroup> contains a list of contact descriptions.

**Markup element:** <contactDescrGroup> (O)

**Attributes:**

– None

**Child elements:**

– <contactDescr> (C), the contact description

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the list of contact descriptions element <contactDescrGroup>

**Markup example:**

```
<contactDescrGroup>
<contactDescr>...</contactDescr>
<contactDescr>...</contactDescr>
</contactDescrGroup>
```

### 2.8.1 Contact description

**Description:** The element <contactDescr> contains a list of contact descriptions.

**Markup element:** <contactDescr> (C)

**Attributes:**

– None

**Child elements:**

– <contact> (M), the contact identification
– <contactDiameter> (O), the contact diameter
– <finishingInfo> (O), the finishing information for the connection of wires
– <thermoCouplePlus> (O), identifies the positive contact of thermo couples
– <thermoCoupleMinus> (O), identifies the negative contact of thermo couples
– <specialTerminal> (O), the special terminal information
– <coaxialCableFlag> (O), the coaxial information
– <triaxialCableFlag> (O), the tri-axial information
– <terminationModuleGroupingValue> (O), used for contacts that belong to the same module of a termination module assembly
– <blockGroupingValue> (O), used for contacts that belong to the same block of a termination module assembly or the same pole of a switch or a relay
– <shuntGroupingValue> (O), used for contacts that belong to the same shunt/bus of a termination module or the same position of a switch or a relay

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.8.1.1 Contact identification

**Description:** The element <contact> describes the contact identification through its attributes. Refer to Chap 3.9.5.2.9.2.

Normally, the attribute contactFunction is not used in this context. The attributes connectedFlag and wireInstallationDirection must not be used in this context.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the contact attributes. Refer to Chap 3.9.5.2.9.2

2.8.1.2 Contact diameter

**Description:** This element describes the diameter of a contact.

**Markup element:** <contactDiameter> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the connector diameter

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <contactDiameter> and its attribute unitOfMeasure

**Markup example:**

The following example shows the markup of a 1,15 millimeter contact diameter.

```
<contactDiameter unitOfMeasure="mm">1,15</contactDiameter>
```

2.8.1.3 Finishing information

**Description:** The element <finishingInfo> contains the finishing information for the connection of wires to a contact. Refer to Chap 3.9.5.2.9.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <finishingInfo>. Refer to Chap 3.9.5.2.9.2

2.8.1.4 Thermo couple plus

**Description:** The element <thermoCouplePlus> identifies the positive contact of thermo couples.

**Markup element:** <thermoCouplePlus> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <thermoCouplePlus>

**Markup example:**

The following example shows the markup of a contact, which is the positive contact of a thermo couple.

```
<thermoCouplePlus>Y</thermoCouplePlus>
```

2.8.1.5 Thermo couple minus

**Description:** The element <thermoCoupleMinus> identifies the negative contact of thermo couples.

**Markup element:** <thermoCoupleMinus> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <thermoCoupleMinus>

**Markup example:**

The following example shows the markup of a contact, which is the negative contact of a thermo couple.

```
<thermoCoupleMinus>Y</thermoCoupleMinus>
```

2.8.1.6 Special terminal information

**Description:** The element <specialTerminal> identifies special terminals.

**Markup element:** <specialTerminal> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <specialTerminal>

**Markup example:**

The example shows the markup of a contact, which is a special terminal.

```
<specialTerminal>Y</specialTerminal>
```

2.8.1.7 Coaxial information

**Description:** The coax information element <coaxialCableFlag> identifies coaxial contacts.

**Markup element:** <coaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <coaxialCableFlag>

**Markup example:**

The example shows the markup of a coaxial contact.

```
<coaxialCableFlag>Y</coaxialCableFlag>
```

2.8.1.8 Tri-axial information

**Description:** The tri-axial information element <triaxialCableFlag> identifies tri-axial contacts.

**Markup element:** <triaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <triaxialCableFlag>

**Markup example:**

The example shows the markup of a tri-axial contact.

```
<triaxialCableFlag>Y</triaxialCableFlag>
```

2.8.1.9 Termination module grouping information

**Description:** The element <terminationModuleGroupingValue> identifies the terminal modules on a mounting rail. Refer to Chap 3.9.5.2.9.2.

**Markup element:** <`terminationModuleGroupingValue`> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <`terminationModuleGroupingValue`>. Refer to Chap 3.9.5.2.9.2

**Markup example:**

Refer to Para 4.

2.8.1.10 Block grouping information

**Description:** The element <`blockGroupingValue`> contains the block information of terminal modules. Refer to Chap 3.9.5.2.9.2.

**Markup element:** <`blockGroupingValue`> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <`blockGroupingValue`>. Refer to Chap 3.9.5.2.9.2

**Markup example:**

Refer to Para 4.

2.8.1.11 Shunt grouping information

**Description:** The element <`shuntGroupingValue`> is used to divide contacts of terminal modules, which are electrically connected, into groups, the busses. Refer to Chap 3.9.5.2.9.2.

**Markup element:** <`shuntGroupingValue`> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <shuntGroupingValue>. Refer to Chap 3.9.5.2.9.2

**Markup example:**

Refer to Para 4.

## 2.9 Electrical logic

**Description:** In this context, the electrical logic element <electricalLogic> provides an optional container for electrical states and internal connections between contacts for standard parts. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of electrical logic information. Refer to Chap 3.9.5.2.9.4

## 2.10 List of accessories

**Description:** The element <connectorAccessories> contains the part numbers of accessories for the connector.

**Markup element:** <connectorAccessories> (O)

**Attributes:**

– None

**Child elements:**

– <partNumber> (C), the part number of an accessory. Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the list of accessories for a connector

**Markup example:**

The following markup example shows the use of element <connectorAccessories> for the connector JN1003FG22-35PN1

```
<connectorAccessories>
<partNumber>JN1003P22</partNumber>
<partNumber>JN1003C22</partNumber>
<partNumber>JN1003D22</partNumber>
<partNumber>JN1003K22</partNumber>
<partNumber>JN1003L22</partNumber>
<partNumber>JN1003MA22</partNumber>
<partNumber>JN1003MB22</partNumber>
<partNumber>JN1003MF22</partNumber>
<partNumber>JN1003N22</partNumber>
</connectorAccessories>
```

## 2.11 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about a connector, eg a description of how it is made (specification of the connector). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for connectors

## 2.12 Illustration reference

**Description:** The illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the connector. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for connectors

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for a connector. In normal cases, it is not necessary to use connector applicability. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for connector data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.4 and Para 2.2.

**Use of the element <mass>**. The project or the organization must decide and define the use of the element <mass> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.3.

**Use of the element <orientation>**. The project or the organization must decide and define the use of the orientation element <orientation>. If used, this element must be populated consistently. Refer to Para 2.4.

**Use of the element <assyInstruction>**. The project or the organization must decide and define the use of connector assembly information. Refer to Chap 3.9.5.2.9.4 and Para 2.5.

**Use of the element <rack>**. The project or the organization must decide and define the use of element <rack>. If a project or an organization uses the part number of the complete rack & panel connector to describe the different inserts, then the element <rack> must be used to define which insert of the connector is described in this context. A connector element is required for all inserts of the rack & panel connector. If used, the element <rack> must be populated consistently. Refer to Para 2.6.

**Use of the element <contactCount>**. The project or the organization must decide whether to use the element <contactCount> or not. Refer to Para 2.7.

**Use of the element <contactDescrGroup>**. The project or the organization must decide whether to use the list of contact descriptions or not. If used, then the project or the organization must also decide the use and the definition of the following child elements, up to and including the element <shuntGroupingValue>. Refer to Para 2.8.

**Use of the element <contactDiameter>**. The project or the organization must decide the use and the definition of the contact diameter element <contactDiameter>. If used, this element must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.8.1.2.

**Use of the element <finishingInfo>**. The project or the organization must decide the use and the definition of the finishing information element <finishingInfo>. Refer to Para 2.8.1.3.

**Use of the element <thermoCouplePlus>**. The project or the organization must decide the use and the definition of the thermo couple plus element <thermoCouplePlus>. It is recommended to identify thermo couple contacts by populating this element with the value "Y". If the contact is not a thermo couple plus, this element can be populated with the value "N". It is also possible not to use it for non-thermo couple contacts. If used, this element must be populated consistently. Refer to Para 2.8.1.4.

**Use of the element <thermoCoupleMinus>**. The project or the organization must decide the use and the definition of the thermo couple minus element <thermoCoupleMinus>. It is recommended to identify thermo couple contacts by populating this element with the value "Y". If the contact is not a thermo couple minus, this element can be populated with the value "N". It is also possible not to use it for non-thermo couple contacts. If used, this element must be populated consistently. Refer to Para 2.8.1.5.

**Use of the element <specialTerminal>**. The project or the organization must decide the use and the definition of the special terminals element <specialTerminal>. It is recommended to define all special terminals and to identify them by populating this element with the value "Y". If the contact is not a special terminal, this element can be populated with the value "N". It is also possible not to use it for non-special terminals. If used, this element must be populated consistently. Refer to Para 2.8.1.6.

**Use of the element <coaxialCableFlag>**. The project or the organization must decide the use and the definition of the coaxial information element <coaxialCableFlag>. It is recommended to identify coaxial contacts by populating this element with the value "Y". If the contact is not a coaxial contact, this element can be populated with the value "N". It is also possible not to use it then. If used, this element must be populated consistently. Refer to Para 2.8.1.7.

**Use of the element <triaxialCableFlag>**. The project or the organization must decide the use and the definition of the tri-axial information element <triaxialCableFlag>. It is recommended to identify tri-axial contacts by populating this element with the value "Y". If the contact is not a tri-axial contact, this element can be populated with the value "N". It is also possible not to use it then. If used, this element must be populated consistently. Refer to Para 2.8.1.8.

**Use of the element <terminationModuleGroupingValue>**. The project or the organization must decide the use and the definition of the termination module element <terminationModuleGroupingValue>. Normally, the population of this element depends on project or organization specific rules. If possible, this element gets allocated the same value, which is used for coding of the termination module element <terminationModuleGroupingValue> as child element of the electrical potential element <electricalPotential> in the wire connection code. Refer to Chap 3.9.5.2.9.2 and Para 2.8.1.9.

**Use of the element <blockGroupingValue>**. The project or the organization must decide the use and the definition of the block element <blockGroupingValue>. Normally, the population of this element depends on project or organization specific rules. If possible, this element gets allocated the same value, which is used for coding of the block element <blockGroupingValue>as child element of the electrical potential element <electricalPotential> in the wire connection code. Refer to Chap 3.9.5.2.9.2 and Para 2.8.1.10.

**Use of the element <shuntGroupingValue>**. The project or the organization must decide the use and the definition of the shunt element <shuntGroupingValue>. Normally, the population of this element depends on project or organization specific rules and represents the busses of the termination module. If possible, this element gets allocated the same value, which is used for coding of the shunt element <shuntGroupingValue> as child element of the electrical potential element <electricalPotential> in the wire connection code. Refer to Chap 3.9.5.2.9.2 and Para 2.8.1.11.

**Use of the element <electricalLogic>**. The project or the organization must decide whether to use the element <electricalLogic> or not. Refer to Chap 3.9.5.2.9.4 and Para 2.9.

**Use of the element <connectorAccessories>**. The project or the organization must decide and define the use of the list of accessories element <connectorAccessories>. For connectors, more than one accessory of the same kind can be available, eg cable clamps with different angular positions. In this case, the project or the organization must decide whether they add all possible accessories to the connector or not. In the first case, more than one cable clamp appears in the list of accessories, or different connector containers are used for the same connector, listing only one accessory of the same kind. The second method can generate a considerable amount of connector data. Therefore it is recommended to list all available accessories in one data set. Refer to Para 2.10.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.11.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all connectors get allocated a reference to a data module that shows the insert arrangement of the connector. Refer to Para 2.12.

# 4 Examples

The following markup example shows the use of the element <contactDescrGroup> for a terminal junction module with two busses, 1-2 and 3-4, and four contacts of the diameter 1,15 mm.

```
<contactDescrGroup>
<contactDescr>
<contact contactIdent="1"/>
<contactDiameter unitOfMeasure="mm">1,15</contactDiameter>
<thermoCouplePlus>N</thermoCouplePlus>
<thermoCoupleMinus>N</thermoCoupleMinus>
<specialTerminal>N</specialTerminal>
<coaxialCableFlag>N</coaxialCableFlag>
<triaxialCableFlag>N</triaxialCableFlag>
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
<blockGroupingValue>1</blockGroupingValue>
<shuntGroupingValue>1</shuntGroupingValue>
</contactDescr>
<contactDescr>
<contact contactIdent="2"/>
<contactDiameter unitOfMeasure="mm">1,15</contactDiameter>
<thermoCouplePlus>N</thermoCouplePlus>
<thermoCoupleMinus>N</thermoCoupleMinus>
<specialTerminal>N</specialTerminal>
<coaxialCableFlag>N</coaxialCableFlag>
<triaxialCableFlag>N</triaxialCableFlag>
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
<blockGroupingValue>1</blockGroupingValue>
<shuntGroupingValue>1</shuntGroupingValue>
</contactDescr>
<contactDescr>
<contact contactIdent="3"/>
<contactDiameter unitOfMeasure="mm">1,15</contactDiameter>
<thermoCouplePlus>N</thermoCouplePlus>
<thermoCoupleMinus>N</thermoCoupleMinus>
<specialTerminal>N</specialTerminal>
<coaxialCableFlag>N</coaxialCableFlag>
<triaxialCableFlag>N</triaxialCableFlag>
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
<blockGroupingValue>1</blockGroupingValue>
<shuntGroupingValue>2</shuntGroupingValue>
</contactDescr>
<contactDescr>
<contact contactIdent="4"/>
<contactDiameter unitOfMeasure="mm">1,15</contactDiameter>
<thermoCouplePlus>N</thermoCouplePlus>
<thermoCoupleMinus>N</thermoCoupleMinus>
<specialTerminal>N</specialTerminal>
<coaxialCableFlag>N</coaxialCableFlag>
<triaxialCableFlag>N</triaxialCableFlag>
<terminationModuleGroupingValue>1
</terminationModuleGroupingValue>
<blockGroupingValue>1</blockGroupingValue>
<shuntGroupingValue>2</shuntGroupingValue>
</contactDescr>
</contactDescrGroup>
```

# Chapter 3.9.5.2.9.6

## *Wiring data - Standard parts, Distribution part*

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# 1 General

The element <distributionPart> and its child elements are used to capture and represent distribution parts, which are used for the Product, and the related standard parts information.

# 2 Element <distributionPart> and child elements

**Description:** The element <distributionPart> is contained in the list of distribution parts element <distributionPartGroup>. The list of distribution parts is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of distribution parts, like contacts and splices, used in the Product's wiring.

**Markup element:** <distributionPart> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a distribution part by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the distribution part
- <altIdentGroup> (O), the list of alternative identifications
- <contactSize> (O), the contact size
- <material> (O), the material information
- <mass> (O), the mass of the distribution part
- <wireColor> (O), the color information
- <surfaceProtection> (O), the surface protection information
- <contactDiameter> (O), the contact diameter
- <temperature> (O), the temperature information
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for distribution parts
- Use and definition of change attributes for distribution parts

**Markup example:**

```
<wiringData>
<standardPartGroup>
<distributionPartGroup>
<distributionPart>...</distributionPart>
<distributionPart>...</distributionPart>
</distributionPartGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The part number element <partNumber> contains the project or the organization specific part number of a distribution part. This element must be populated in accordance with Chap 3.9.5.1. The part number serves as a link to the equipment. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.4

**Markup example:**

The following markup example shows the use of the element <partNumber> for a splice with part number PAN6466A.

```
<partNumber>PAN6466A</partNumber>
```

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains a list of alternative identifications for distribution parts, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.4

## 2.3 Contact size

**Description:** The element <contactSize> contains size information about a distribution part, normally for a contact.

**Markup element:** <contactSize> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <contactSize>

**Markup example:**

The following markup example shows the use of the element <contactSize> for a contact of the size 12, eg JN1003S12.

```
<contactSize>12</contactSize>
```

## 2.4 Material

**Description:** The element <material> describes the material of which the distribution part is made.

**Markup element:** <material> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <material>

**Markup example:**

The following markup example shows the use of the element <material> for a distribution part made of copper alloy.

```
<material>Copper alloy</material>
```

## 2.5 Mass

**Description:** The element <mass> contains the mass information of a distribution part. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

## 2.6 Color

**Description:** The element <wireColor> contains the color information of a distribution part. This element can be used to indicate the color codes (color bands) of contacts or splices. If used, it must be populated in accordance with Chap 3.9.5.2.9.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <wireColor>

**Markup example:**

The following markup example shows the use of the element <wireColor> for a contact with a three-color band of the colors orange, blue and green.

```
<wireColor>Orange/Blue/Green</wireColor>
```

## 2.7 Protection

**Description:** The element <surfaceProtection> contains the protection information applied to the surface of a distribution part.

**Markup element:** <surfaceProtection> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <surfaceProtection>

**Markup example:**

The following markup example shows the use of the element <surfaceProtection> for a gold plated contact.

```
<surfaceProtection>Gold plated</surfaceProtection>
```

## 2.8 Contact diameter

**Description:** The element <contactDiameter> describes the diameter of a distribution part, normally for contacts. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <contactDiameter> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <contactDiameter> for a contact of the size 12 (outer diameter = 2,41mm).

```
<contactDiameter unitOfMeasure="mm">2,41</contactDiameter>
```

## 2.9 Temperature

**Description:** The element <temperature> describes the minimum and maximum temperature, for which the distribution part is approved. If used, this element must be populated in accordance with Chap 3.9.5.2.9.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <temperature> and its child elements

**Markup example:**

The following markup example shows the use of the element <temperature> for a distribution part, which is approved for temperatures from –55°C to 150°C.

```
<temperature>
<minTemperature unitOfMeasure="degC">-55</minTemperature>
<maxTemperature unitOfMeasure="degC">150</maxTemperature>
</temperature>
```

## 2.10 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information

about a distribution part, eg a description of how it is made (specification of the distribution part). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for distribution parts

## 2.11 Illustration reference

**Description:** The illustration reference element <illustrationRef> contains references to other parts of the systems publications, which show illustrations of the distribution part.

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the distribution part. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for distribution parts

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for a distribution part. In normal cases, it is not necessary to use distribution part applicability. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for distribution parts data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.4 and Para 2.2.

**Use of the element <`contactSize`>**. The project or the organization must decide and define the use of contact size information for distribution parts. If used, this element must be populated consistently. Refer to Para 2.3.

**Use of the element <`material`>**. The project or the organization must decide and define the use of material information for distribution parts. If used, this element must be populated consistently. Refer to Para 2.4.

**Use of the element <`mass`>**. The project or the organization must decide and define the use of this element its attribute `unitOfMeasure`. If used, mass information must be populated consistently. Refer to Chap 3.9.5.2.9.5 and Para 2.5.

**Use of the element <`wireColor`>**. The project or the organization must decide and define the use of color information for distribution parts. If used, this element must be populated consistently. Refer to Chap 3.9.5.2.9.2 and Para 2.6.

**Use of the element <`surfaceProtection`>**. The project or the organization must decide and define the use of the protection element <`surfaceProtection`>. If used, it must be populated consistently. Refer to Para 2.7.

**Use of the element <`contactDiameter`>**. The project or the organization must decide the use and the definition of the contact diameter. If used, the element must be defined precisely (definition, which diameter has to be inserted) and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.8.

**Use of the element <`temperature`>**. The project or the organization must decide the use and the definition of the child elements for the temperature information. If used, they must be populated consistently in accordance with the project or the organization specific rules. Refer to Chap 3.9.5.2.9.3 and Para 2.9.

**Use of the element <`functionalDescrRef`>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.10.

**Use of the element <`illustrationRef`>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all distribution parts have allocated a reference to a data module that shows an illustration of the distribution part. Refer to Para 2.11.

# Chapter 3.9.5.2.9.7

## *Wiring data - Standard parts, Accessory*

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## 1 General

The element <accessory> and its child elements are used to capture and represent accessories, which are used for the Product, and the related standard parts information.

## 2 Element <accessory> and child elements

**Description:** The element <accessory> is contained in the list of accessories element <accessoryGroup>. The list of accessories is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of accessories used in the Product's wiring.

**Markup element:** <accessory> (C)

**Attributes:**

- applicRefId (O), defines the applicability of an accessory by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the accessory
- <altIdentGroup> (O), the list of alternative identifications
- <mass> (O), the mass of the accessory
- <orientation> (O), the orientation information
- <assyInstruction> (O), the assembly instruction information
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for accessories
- Use and definition of change attributes for accessories

**Markup example:**

```
<wiringData>
<standardPartGroup>
<accessoryGroup>
<accessory>...</accessory>
<accessory>...</accessory>
</accessoryGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The element <partNumber> contains the project or the organization specific part number of an accessory. This element must be populated in accordance with Chap 3.9.5.1. The part number is the link of the accessory with its properties to the list of accessories element <connectorAccessories>. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of an accessory, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Mass

**Description:** The element <mass> contains the mass information of an accessory. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

## 2.4 Orientation

**Description:** The element <orientation> contains orientation information of an accessory. Orientation information of accessories is normally part of the accessory part number in coded form. The orientation can represent the angle of a cable clamp. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <orientation>

**Markup example:**

The following markup example shows the use of the element <orientation> to indicate the orientation of a 90° cable clamp.

```
<orientation>90</orientation>
```

## 2.5 Assembly instructions

**Description:** The element <assyInstruction> is used as a container for the subordinate accessory assembly information. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of assembly information. Refer to Chap 3.9.5.2.9.5

## 2.6 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about an accessory, eg a description of how it is made (specification of the accessory). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for accessories

## 2.7 Illustration reference

**Description:** The Illustration reference element <`illustrationRef`> contains references to other parts of the electrical system publications, which show illustrations of the accessory. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <`illustrationRef`> (O)

**Attributes:**

– None

**Child elements:**

– <`refs`> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for accessories

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for an accessory. In normal cases, it is not necessary to use accessory applicability. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for accessory data. Refer to Para 2.

**Use of the element <`partNumber`>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <`altIdentGroup`>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <`mass`>**. The project or the organization must decide and define the use of the element <`mass`> and the attribute `unitOfMeasure`. If used, this element and its attribute must be populated consistently. Refer to Para 2.3.

**Use of the element <`orientation`>**. The project or the organization must decide and define the use of the orientation element <`orientation`>. If used, this element must be populated consistently. Refer to Para 2.4.

**Use of the element <`assyInstruction`>**. The project or the organization must decide and define the use of accessory assembly information. Refer to Chap 3.9.5.2.9.5 and Para 2.5.

**Use of the element <`functionalDescrRef`>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.6.

**Use of the element <`illustrationRef`>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all accessories have allocated a reference to a data module, which shows an illustration of the accessory. Refer to Para 2.7.

# Chapter 3.9.5.2.9.8

## *Wiring data - Standard parts, Solder sleeve*

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## 1 General

The element <solderSleeve> and its child elements are used to capture and represent solder sleeves that are used for the Product, and the related standard parts information.

## 2 Description of element <solderSleeve> and child elements

**Description:** The element <solderSleeve> is contained in the list of solder sleeves element <solderSleeveGroup>. The list of solder sleeves is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of solder sleeves used in the Product's wiring.

**Markup element:** <solderSleeve> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a solder sleeve by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the solder sleeve
- <altIdentGroup> (O), the list of alternative identifications
- <length> (O), the length of the solder sleeve
- <material> (O), the material of the solder sleeve
- <mass> (O), the mass of the solder sleeve
- <sleeveDiameter> (O), the sleeve diameter
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for solder sleeves
- Use and definition of change attributes for solder sleeves

**Markup example:**

```
<wiringData>
<standardPartGroup>
<solderSleeveGroup>
<solderSleeve>...</solderSleeve>
<solderSleeve>...</solderSleeve>
</solderSleeveGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The element <partNumber> contains the project or the organization specific part number of a solder sleeve. This element must be populated in accordance with Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of a solder sleeve, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Length

**Description:** The element <length> contains the length information of a solder sleeve.

**Note**

The attribute wireLengthType provides additional length information for wires. It must not be used to describe the length of solder sleeves.

**Markup element:** <length> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the solder sleeve length
– wireLengthType (O), the type of wire length, must not be used for solder sleeves

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <length> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of element <length> to provide length information for the solder sleeve with part number PAN6468A.

```
<length unitOfMeasure="mm">14,23</length>
```

## 2.4 Material

**Description:** The element <material> describes the material of which a solder sleeve is made.

**Markup element:** <material> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <material>

**Markup example:**

```
<material>Nickel</material>
```

## 2.5 Mass

**Description:** The element <mass> contains the mass information of a solder sleeve. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="g">0,226</mass>
```

## 2.6 Sleeve diameter

**Description:** The element <sleeveDiameter> describes minimum and maximum diameter information for a solder sleeve.

**Markup element:** <sleeveDiameter> (O)

**Attributes:**

– None

**Child elements:**

– <minDiameter> (O), the minimum diameter of a solder sleeve
– <maxDiameter> (O), the maximum diameter of a solder sleeve

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and of the element <sleeveDiameter> for solder sleeves

**Markup example:**

The following markup example shows the use of element <sleeveDiameter> and its child elements to provide entry diameter information for a solder sleeve.

```
<sleeveDiameter>
<minDiameter unitOfMeasure="mm">2,04</minDiameter>
<maxDiameter unitOfMeasure="mm">5,08</maxDiameter>
</sleeveDiameter>
```

### 2.6.1 Minimum sleeve diameter

**Description:** The element <minDiameter> gives the minimum diameter of a solder sleeve.

**Markup element:** <minDiameter> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the solder sleeve diameter

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <minDiameter> and its attribute unitOfMeasure

### 2.6.2 Maximum sleeve diameter

**Description:** The element <maxDiameter> gives the maximum diameter of a solder sleeve.

**Markup element:** <maxDiameter> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the solder sleeve diameter

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <maxDiameter> and its attribute unitOfMeasure

## 2.7 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about a solder sleeve, eg a description of how it is made (specification of the sleeve). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for solder sleeves

## 2.8 Illustration reference

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the solder sleeve. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for solder sleeves

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for a solder sleeve. In normal cases, it is not necessary to use applicability information for solder sleeves. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for solder sleeve data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <length>**. The project or the organization must decide and define the use of the length element <length> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.3.

**Use of the element <material>**. The project or the organization must decide and define the use of material information for solder sleeves. If used, this element must be populated consistently. Refer to Para 2.4.

**Use of the element <mass>**. The project or the organization must decide and define the use of the element <mass> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.5.

**Use of the element <sleeveDiameter>**. The project or the organization must decide the use and the definition of sleeve diameter information. Solder sleeves are normally defined by using several diameters, eg diameters of the sleeve or entry diameters. If used, it must be defined, which diameter is provided. The element <sleeveDiameter> and its child elements, if used, must then be populated in accordance with the defined project or organization specific rules consistently. Refer to Para 2.6.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.7.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all solder sleeves have allocated a reference to a data module, which shows an illustration of the solder sleeve. Refer to Para 2.8.

# Chapter 3.9.5.2.9.9

## *Wiring data - Standard parts, Shrink sleeve*

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# 1 General

The element <shrinkSleeve> and its child elements are used to capture and represent shrink sleeves, which are used for the Product, and the related standard parts information.

# 2 Element <shrinkSleeve> and child elements

**Description:** The element <shrinkSleeve> is contained in the list of shrink sleeves element <shrinkSleeveGroup>. The list of shrink sleeves is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of shrink sleeves used in the Product's wiring.

**Markup element:** <shrinkSleeve> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a shrink sleeve by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the shrink sleeve
- <altIdentGroup> (O), the list of alternative identifications
- <size> (O), the size information of the shrink sleeve
- <mass> (O), the mass of the shrink sleeve
- <wireColor> (O), the color information of the shrink sleeve
- <sleeveDiameter> (O), the sleeve diameter
- <temperature> (O), the temperature information
- <harnessSize> (O), the harness size
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for shrink sleeves
- Use and definition of change attributes for shrink sleeves

**Markup example:**

```
<wiringData>
<standardPartGroup>
<shrinkSleeveGroup>
<shrinkSleeve>...</shrinkSleeve>
<shrinkSleeve>...</shrinkSleeve>
</shrinkSleeveGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The element <partNumber> contains the project or the organization specific part number of a shrink sleeve. This element must be populated in accordance with Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of a shrink sleeve, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Size

**Description:** The element <size> contains the size information of a shrink sleeve.

**Markup element:** <size> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the shrink sleeve size

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <size> and its attribute unitOfMeasure

**Markup example:**

```
<size unitOfMeasure="in">3/16</size>
```

## 2.4 Mass

**Description:** The element <mass> contains the mass information of a shrink sleeve. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="kg/m">0,350</mass>
```

## 2.5 Color

**Description:** The element <wireColor> contains the color information of a shrink sleeve. If used, it must be populated in accordance with Chap 3.9.5.2.9.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <wireColor>

**Markup example:**

```
<wireColor>Transparent</wireColor>
```

## 2.6 Sleeve diameter

**Description:** The element <sleeveDiameter> describes minimum and maximum diameter information for a shrink sleeve. Shrink sleeves are normally defined by using diameter information before and after shrinking.

**Markup element:** <sleeveDiameter> (O)

**Attributes:**

– None

**Child elements:**

– <minDiameter> (O), the minimum diameter of a shrink sleeve. Refer to Chap 3.9.5.2.9.8
– <maxDiameter> (O), the maximum diameter of a shrink sleeve. Refer to Chap 3.9.5.2.9.8

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and of the element <sleeveDiameter> for shrink sleeves

**Markup example:**

The following markup example shows the use of element <sleeveDiameter> for a shrink sleeve. The minimum diameter contains the minimum diameter before shrinking, the maximum diameter contains the maximum diameter after shrinking.

```
<sleeveDiameter>
<minDiameter unitOfMeasure="mm">1,6</minDiameter>
<maxDiameter unitOfMeasure="mm">0,8</maxDiameter>
</sleeveDiameter>
```

## 2.7 Temperature

**Description:** The element <temperature> describes the minimum and maximum temperature, for which the shrink sleeve is approved. If used, this element must be populated in accordance with Chap 3.9.5.2.9.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <temperature> and its child elements

**Markup example:**

The following markup example shows the use of element <temperature> to provide the approved operating temperature information for a shrink sleeve.

```
<temperature>
<minTemperature unitOfMeasure="degC">-55</minTemperature>
<maxTemperature unitOfMeasure="degC">175</maxTemperature>
</temperature>
```

## 2.8 Harness size

**Description:** The element <harnessSize> describes the minimum and the maximum size of the harness, to which a shrink sleeve can be applied.

**Markup element:** <harnessSize> (O)

**Attributes:**

– None

**Child elements:**

– <minHarnessSize> (O), the minimum harness size
– <maxHarnessSize> (O), the maximum harness size

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and of the element <harnessSize> for shrink sleeves

**Markup example:**

The following markup example shows the use of the element <harnessSize> and its child elements to provide harness size information for a shrink sleeve.

```
<harnessSize>
<minHarnessSize unitOfMeasure="mm">0,8</minHarnessSize>
<maxHarnessSize unitOfMeasure="mm">1,2</maxHarnessSize>
</harnessSize>
```

### 2.8.1 Minimum harness size

**Description:** The element <minHarnessSize> gives the minimum harness size.

**Markup element:** <minHarnessSize> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the minimum harness size

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <minHarnessSize> and its attribute unitOfMeasure

### 2.8.2 Maximum harness size

**Description:** The element <maxHarnessSize> gives the maximum harness size.

**Markup element:** <maxHarnessSize> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the maximum harness size

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <maxHarnessSize> and its attribute unitOfMeasure

## 2.9 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about a shrink sleeve, eg a description of how it is made (specification of the sleeve). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for shrink sleeves

## 2.10 Illustration reference

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the shrink sleeve. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for shrink sleeves

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for a shrink sleeve. In normal cases, it is not necessary to use applicability information for shrink sleeves. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for shrink sleeve data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <size>**. The project or the organization must decide and define the use of size information for shrink sleeves. If used, this element and its attribute unitOfMeasure must be populated consistently. Refer to Para 2.3.

**Use of the element <mass>**. The project or the organization must decide and define the use of the element <mass> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.4.

**Use of the element <wireColor>**. The project or the organization must decide and define the use of color information for shrink sleeves. If used, this element must be populated consistently. Refer to Chap 3.9.5.2.9.2 and Para 2.5.

**Use of the element <sleeveDiameter>**. The project or the organization must decide the use and the definition of sleeve diameter information. Shrink sleeves are normally defined by using diameter information before and after shrinking. If used, it must be defined, which diameter is provided. The element <sleeveDiameter> and its child elements must then be populated in accordance with the defined project or organization specific rules consistently. Refer to Para 2.6.

**Use of the element <temperature>**. The project or the organization must decide the use and the definition of the child elements for the temperature information. If used, they must be populated consistently in accordance with the project or the organization specific rules. Refer to Chap 3.9.5.2.9.3 and Para 2.7.

**Use of the element <harnessSize>**. The project or the organization must decide the use and the definition of harness size information for shrink sleeves. The element <harnessSize> and its child elements, if used, must be populated in accordance with the defined project or organization specific rules consistently. Refer to Para 2.8.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.9.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all shrink sleeves have allocated a reference to a data module, which shows an illustration of the shrink sleeve. Refer to Para 2.10.

# Chapter 3.9.5.2.9.10

## *Wiring data - Standard parts, Identification sleeve*

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## 1 General

The element <identSleeve> and its child elements are used to capture and represent identification sleeves, which are used for the Product, and the related standard parts information.

## 2 Element <identSleeve> and child elements

**Description:** The element <identSleeve> is contained in the list of identification sleeves element <identSleeveGroup>. The list of identification sleeves is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of identification sleeves used in the Product's wiring.

**Markup element:** <identSleeve> (C)

**Attributes:**

- applicRefId (O), defines the applicability of an identification sleeve by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the identification sleeve
- <altIdentGroup> (O), the list of alternative identifications
- <length> (O), the length of the identification sleeve
- <material> (O), the material of the identification sleeve
- <mass> (O), the mass of the identification sleeve
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for identification sleeves
- Use and definition of change attributes for identification sleeves

**Markup example:**

```
<wiringData>
<standardPartGroup>
<identSleeveGroup>
<identSleeve>...</identSleeve>
<identSleeve>...</identSleeve>
</identSleeveGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The part number element <partNumber> contains the project or the organization specific part number of an identification sleeve. This element must be populated in accordance with Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of an identification sleeve, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Length

**Description:** The element <length> contains the length information of an identification sleeve. If used, this element must be populated in accordance with Chap 3.9.5.2.9.8.

**Note**

The attribute **wireLengthType** provides additional length information for wires. It must not be used to describe the length of identification sleeves.

**Markup element:** <length> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <length> and its attribute unitOfMeasure. Refer to Chap 3.9.5.2.9.8

## 2.4 Material

**Description:** The element <material> describes the material, of which an identification sleeve is made. If used, this element must be populated in accordance with Chap 3.9.5.2.9.8.

**Markup element:** <material> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <material>. Refer to Chap 3.9.5.2.9.8

**Markup example:**

The following example shows the use of element <material> for an identification sleeve.

```
<material>PVC-Nitrile</material>
```

## 2.5 Mass

**Description:** The element <mass> contains the mass information of an identification sleeve. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="kg">0,0001</mass>
```

## 2.6 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about an identification sleeve, eg a description of how it is made (specification of the sleeve). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for identification sleeves

## 2.7 Illustration reference

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the identification sleeve. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for identification sleeves

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for an identification sleeve. In normal cases, it is not necessary to use applicability information for identification sleeves. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for identification sleeve data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <length>**. The project or the organization must decide and define the use of the length element <length> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Chap 3.9.5.2.9.8 and Para 2.3.

**Use of the element <`material`>**. The project or the organization must decide and define the use of material information for identification sleeves. If used, this element must be populated consistently. Refer to Chap 3.9.5.2.9.8 and Para 2.4.

**Use of the element <`mass`>**. The project or the organization must decide and define the use of the element <`mass`> and the attribute `unitOfMeasure`. If used, this element and its attribute must be populated consistently. Refer to Chap 3.9.5.2.9.5 and Para 2.5.

**Use of the element <`functionalDescrRef`>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.6.

**Use of the element <`illustrationRef`>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all identification sleeves have allocated a reference to a data module, which shows an illustration of the identification sleeve. Refer to Para 2.7.

# Chapter 3.9.5.2.9.11

## *Wiring data - Standard parts, Conduit*

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## 1 General

The element <conduit> and its child elements are used to capture and represent conduits, which are used for the Product, and the related standard parts information.

# 2 Element <conduit> and child elements

**Description:** The element <conduit> is contained in the list of conduits element <conduitGroup>. The list of conduits is a child element of the list of the standard parts element <standardPartGroup>.

It contains information concerning the properties of conduits used in the Product's wiring.

**Markup element:** <conduit> (C)

**Attributes:**

- applicRefId (O), defines the applicability of a conduit by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the conduit
- <altIdentGroup> (O), the list of alternative identifications
- <size> (O), the size of the conduit
- <mass> (O), the mass of the conduit
- <wireColor> (O), the color information
- <wallThickness> (O), the wall thickness of the conduit
- <temperature> (O), the temperature information
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of applicability information for conduits
- Use and definition of change attributes for conduits

**Markup example:**

```
<wiringData>
<standardPartGroup>
<conduitGroup>
<conduit>...</conduit>
<conduit>...</conduit>
</conduitGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The part number element <partNumber> contains the project or the organization specific part number of a conduit. This element must be populated in accordance with Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of a conduit, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Size

**Description:** The element <size> contains the size information of a conduit. If used, this element must be populated in accordance with Chap 3.9.5.2.9.9.

**Markup element:** <size> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <size> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of element <size> for a conduit, using only the outer diameter.

```
<size unitOfMeasure="mm">11,4</size>
```

## 2.4 Mass

**Description:** The element <mass> contains the mass information of a conduit. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="g/m">4,67</mass>
```

## 2.5 Color information

**Description:** The element <wireColor> contains the color information of a conduit. If used, it must be populated in accordance with Chap 3.9.5.2.9.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <wireColor>

**Markup example:**

```
<wireColor>Black</wireColor>
```

## 2.6 Wall thickness

**Description:** The element <wallThickness> contains the information of the wall thickness of a conduit.

**Markup element:** <wallThickness> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the wall thickness

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <wallThickness> and its attribute unitOfMeasure

**Markup example:**

```
<wallThickness unitOfMeasure="mm">0,15</wallThickness>
```

## 2.7 Temperature

**Description:** The element <temperature> describes the minimum and maximum temperature, for which the conduit is approved. If used, this element must be populated in accordance with Chap 3.9.5.2.9.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <temperature> and its child elements

**Markup example:**

```
<temperature>
<minTemperature unitOfMeasure="degC">-55</minTemperature>
<maxTemperature unitOfMeasure="degC">200</maxTemperature>
</temperature>
```

## 2.8 Functional description reference

**Description:** The functional description reference element <functionalDescrRef> contains references to other parts of the electrical system publications for further information about a conduit, eg a description of how it is made (specification of the conduit). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <functionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for conduits

## 2.9 Illustration reference

**Description:** The Illustration reference element <illustrationRef> contains references to other parts of the electrical system publications, which show illustrations of the conduit. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <illustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– <refs> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for conduits

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for a conduit. In normal cases, it is not necessary to use applicability information for conduits. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for conduit data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <size>**. The project or the organization must decide and define the use of size information for conduits. Normally, the inside diameter and the outer diameter is available for a conduit. It is also possible, that the size is identified by a size code. Then the attribute unitOfMeasure must not be used. If the element <size> is used, then it must be populated consistently including its attribute unitOfMeasure. Refer to Para 2.3.

**Use of the element <mass>**. The project or the organization must decide and define the use of the element <mass> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Chap 3.9.5.2.9.5 and Para 2.4.

**Use of the element <wireColor>**. The project or the organization must decide and define the use of color information for conduits. If used, this element must be populated consistently. Refer to Chap 3.9.5.2.9.2 and Para 2.5.

**Use of the element <wallThickness>**. The project or the organization must decide and define the use of the element <wallThickness> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.6.

**Use of the element <temperature>**. The project or the organization must decide the use and the definition of the child elements for the temperature information. If used, they must be

populated consistently in accordance with the project or the organization specific rules. Refer to Chap 3.9.5.2.9.3 and Para 2.7.

**Use of the element <`functionalDescrRef`>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.8.

**Use of the element <`illustrationRef`>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg all conduits have allocated a reference to a data module, which shows an illustration of the conduit. Refer to Para 2.9.

# Chapter 3.9.5.2.9.12

## *Wiring data - Standard parts, Wire material*

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# 1 General

The element <wireMaterial> and its child elements are used to capture and represent wire material, which is used for the Product, and the related standard parts information.

# 2 Element <wireMaterial> and child elements

**Description:** The element <wireMaterial> is contained in the list of wire material element <wireMaterialGroup>. The list of wire material is a child element of the list of standard parts element <standardPartGroup>.

It contains information concerning the properties of wire material used in the Product's wiring.

**Markup element:** <wireMaterial> (C)

**Attributes:**

- applicRefId (O), defines the applicability of the wire material by referencing the element <applic> in the referenced applicability group as described in Chap 3.9.5.3
- changeType (O), changeMark (O) and reasonForUpdateRefIds (O) indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

- <partNumber> (M), the part number of the wire material
- <altIdentGroup> (O), the list of alternative identifications
- <wireCode> (O), the wire code
- <numberOfCores> (O), the number of cores
- <size> (O), the size of the wire material
- <mass> (O), the mass of the wire material
- <wireColor> (O), the color information
- <outerJacketColor> (O), the outer jacket color
- <outerDiameter> (O), the outer diameter
- <resistance> (O), the resistance information
- <voltage> (O), the voltage information
- <amperage> (O), the amperage information
- <temperature> (O), the temperature information
- <screenCount> (O), the number of screens
- <coaxialCableFlag> (O), the coaxial information
- <triaxialCableFlag> (O), the tri-axial information
- <frequencyCharacteristics> (O), the frequency characteristics
- <functionalDescrRef> (O), the functional description reference
- <illustrationRef> (O), the reference to illustrations

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of applicability information for wire material
– Use and definition of change attributes for wire material

**Markup example:**

```
<wiringData>
<standardPartGroup>
<wireMaterialGroup>
<wireMaterial>...</wireMaterial>
<wireMaterial>...</wireMaterial>
</wireMaterialGroup>
</standardPartGroup>
</wiringData>
```

## 2.1 Part number

**Description:** The part number element <partNumber> contains the project or the organization specific part number of the wire material. This element must be populated in accordance with Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of project or organization specific rules for the use of part numbers in this context. Refer to Chap 3.9.5.2.9.5

## 2.2 Alternative identifications

**Description:** The element <altIdentGroup> contains alternative identifications of the wire material, described by manufacturer part numbers and the related manufacturer. Refer to Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of alternative identifications. Refer to Chap 3.9.5.2.9.5

## 2.3 Wire code

**Description:** The wire code element <wireCode> gives information about the type of a wire and its gauge through its child elements. If used, this element must be populated in accordance with Chap 3.9.5.2.9.2.

For one type of wire material more than one wire gauge can be available. In this case, the wires normally get different part numbers, so that for all wire sizes a different wire material element <wireMaterial> is used. It is also possible to use the wire gauge element <wireGauge> multiple times to show the gauge of a wire in different units of measure.

**Markup element:** <wireCode> (O)

**Attributes:**

– None

**Child elements:**

– <wireType> (C), the wire type. Refer to Chap 3.9.5.2.9.2

– <wireGauge> (O), the wire gauge. Refer to Chap 3.9.5.2.9.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the wire code element <wireCode> and its child element <wireGauge>

**Markup example:**

The following markup example shows the use of element <wireCode> for wire material, which gives the wire gauge in metric units.

```
<wireCode>
<wireType>QC</wireType>
<wireGauge wireGaugeType="mt">1,82</wireGauge>
</wireCode>
```

## 2.4 Core

**Description:** The element <numberOfCores> contains the number of cores of the wire material.

**Markup element:** <numberOfCores> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the number of cores element <numberOfCores>

**Markup example:**

The following markup example shows the use of element <numberOfCores> for wire material with three cores.

```
<numberOfCores>3</numberOfCores>
```

## 2.5 Size

**Description:** The element <size> contains the size information of wire material. If used, this element must be populated in accordance with Chap 3.9.5.2.9.9.

The size of the wire material is often part of the part number of the wire material. It can also be given by the element <wireGauge>. In this case, the element <size> must no be used.

**Markup element:** <size> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <size> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <size> for wire material, providing size information in coded form (as it is part of the part number of the wire material, eg JN1008QC030):

```
<size>030</size>
```

## 2.6 Mass

**Description:** The element <mass> contains the mass information of wire material. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <mass> and its attribute unitOfMeasure

**Markup example:**

```
<mass unitOfMeasure="kg/km">58,7</mass>
```

## 2.7 Color information

**Description:** The element <wireColor> contains the color information of wire material. If used, this element must be populated in accordance with Chap 3.9.5.2.9.2.

Due to the fact that it is only for single use, the color of the cores of multi core cables must be given in a single element <wireColor>.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <wireColor>

**Markup example:**

The following example shows the use of the element <wireColor> to provide color information (red, blue, yellow) of the cores of a three-core wire material.

```
<wireColor>R,B,Y</wireColor>
```

## 2.8 Outer jacket color

**Description:** The element <outerJacketColor> contains the color information of the outer jacket of wire material.

**Markup element:** <outerJacketColor> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the outer jacket color information for wire material

**Markup example:**

The following markup example shows the use of the element <outerJacketColor> for wire material with a white outer jacket.

```
<outerJacketColor>W</outerJacketColor>
```

## 2.9 Outer diameter

**Description:** The element <outerDiameter> contains the outer diameter information of wire material.

**Markup element:** <outerDiameter> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the wire material outer diameter

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <outerDiameter> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <outerDiameter> to provide outer diameter information for wire material in mm.

```
<outerDiameter unitOfMeasure="mm">4,85</outerDiameter>
```

## 2.10 Resistance

**Description:** The element <resistance> contains the direct current (DC) resistance information of wire material.

**Markup element:** <resistance> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the disassembly code resistance

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <resistance> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <resistance> for wire material in mΩ per m.

```
<resistance unitOfMeasure="mohm/m">6,8</resistance>
```

## 2.11 Voltage

**Description:** The element <voltage> contains the voltage information of wire material.

**Markup element:** <voltage> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the voltage

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <voltage> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <voltage> to provide voltage information for wire material in Volts.

```
<voltage unitOfMeasure="V">600</voltage>
```

## 2.12 Amperage

**Description:** The element <amperage> contains the amperage information of the wire material.

**Markup element:** <amperage> (O)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the amperage

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <amperage> and its attribute unitOfMeasure

**Markup example:**

The following markup example shows the use of the element <amperage> for wire material in Ampere.

```
<amperage unitOfMeasure="A">10</amperage>
```

## 2.13 Temperature

**Description:** The element <temperature> describes the minimum and maximum temperature, for which the wire material is approved. In many cases, only the maximum working temperature of wire material is available. If used, this element must be populated in accordance with Chap 3.9.5.2.9.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <temperature> and its child elements

**Markup example:**

The following markup example shows the use of the element <temperature> by providing the maximum working temperature of the wire material.

```
<temperature>
<maxTemperature unitOfMeasure="degC">260</maxTemperature>
</temperature>
```

## 2.14 Screen count

**Description:** The element <screenCount> contains the number of screens of the wire material.

**Markup element:** <screenCount> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of screen count information for wire material

**Markup example:**

The following markup example shows the use of the element <screenCount> for wire material with one screen, eg a coaxial cable.

```
<screenCount>1</screenCount>
```

## 2.15 Coaxial information

**Description:** The element <coaxialCableFlag> indicates coaxial wire material. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Markup element:** <coaxialCableFlag> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <coaxialCableFlag>

**Markup example:**

The following markup example shows the use of the element <coaxialCableFlag> for coaxial wire material.

```
<coaxialCableFlag>Y</coaxialCableFlag>
```

The following markup example shows the use of the element <coaxialCableFlag> for non-coaxial wire material.

```
<coaxialCableFlag>N</coaxialCableFlag>
```

## 2.16 Tri-axial information

**Description:** The element <triaxialCableFlag> indicates tri-axial wire material. If used, this element must be populated in accordance with Chap 3.9.5.2.9.5.

**Markup element:** <triaxialCableFlag> (O)

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <triaxialCableFlag>

**Markup example:**

The following markup example shows the use of the element <triaxialCableFlag> for tri-axial wire material.

```
<triaxialCableFlag>Y</triaxialCableFlag>
```

## 2.17 Frequency characteristics

**Description:** The element <frequencyCharacteristics> contains alternating current (AC) frequency characteristics of wire material.

**Markup element:** <frequencyCharacteristics> (O)

**Attributes:**

– None

**Child elements:**

– <impedance> (C), the impedance information
– <frequencyAttenuation> (O), the frequency and attenuation information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use frequency characteristics for wire material

**Markup example:**

The following markup example shows the use of the element <frequencyCharacteristics> for wire material. The impedance of the wire material is 50 Ω, the frequency and the attenuation are provided as given in Table 2.

*Table 2 Frequency characteristics*

| Frequency | Attenuation |
|---|---|
| 20MHz | 14dB/100m |
| 100MHz | 31dB/100m |

```
<frequencyCharacteristics>
<impedance unitOfMeasure="ohm">50</impedance>
<frequencyAttenuation>
<frequency unitOfMeasure="MHz">20</frequency>
<attenuation unitOfMeasure="dB/100m">14</attenuation>
</frequencyAttenuation>
<frequencyAttenuation>
```

```
<frequency unitOfMeasure="MHz">100</frequency>
<attenuation unitOfMeasure="dB/100m">31</attenuation>
</frequencyAttenuation>
</frequencyCharacteristics>
```

### 2.17.1 Impedance

**Description:** The element <impedance> contains the AC impedance of the wire material, normally of a cable.

**Markup element:** <impedance> (C)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the impedance

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the attribute unitOfMeasure

### 2.17.2 Frequency and attenuation

**Description:** The element <frequencyAttenuation> is a repeatable container for frequency and attenuation information of wire material.

**Markup element:** <frequencyAttenuation> (O)

**Attributes:**

– None

**Child elements:**

– <frequency> (C), the frequency information
– <attenuation> (C), the attenuation information

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the element <frequencyAttenuation>

#### 2.17.2.1 Frequency

**Description:** The element <frequency> contains the frequency of wire material in relation to the attenuation.

**Markup element:** <frequency> (C)

**Attributes:**

– unitOfMeasure (O), the unit of measure for the frequency

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the attribute `unitOfMeasure`

2.17.2.2 Attenuation

**Description:** The element <`attenuation`> contains the attenuation information of wire material.

**Markup element:** <`attenuation`> (C)

**Attributes:**

– `unitOfMeasure` (O), the unit of measure for the attenuation

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the attribute `unitOfMeasure`

## 2.18 Functional description reference

**Description:** The functional description reference element <`functionalDescrRef`> contains references to other parts of the electrical system publications for further information about wire material, eg a description of how it is made (specification of the wire material). References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <`functionalDescrRef`> (O)

**Attributes:**

– None

**Child elements:**

– <`refs`> (C), the functional description reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of functional description references for wire material

## 2.19 Illustration reference

**Description:** The Illustration reference element <`illustrationRef`> contains references to other parts of the electrical system publications, which show illustrations of the wire material. References must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <`illustrationRef`> (O)

**Attributes:**

– None

**Child elements:**

– <`refs`> (C), the illustration reference information. Refer to Chap 3.9.5.2.1.2

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of illustration references for wire material

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use and definition of applicability information**. The project or the organization must decide the use and the definition of applicability information for wire material. In normal cases, it is not necessary to use applicability information for wire material. If used, it must be defined precisely and populated consistently in accordance with the project or the organization specific rules. Refer to Para 2.

**Use and definition of change attributes**. The project or the organization must decide the use and the definition of change attributes for wire material data. Refer to Para 2.

**Use of the element <partNumber>**. The project or the organization must define rules for the use of part numbers in this context. Refer to Para 2.1.

**Use of the element <altIdentGroup>**. The project or the organization must decide and define the use of alternative identifications. Refer to Chap 3.9.5.2.9.5 and Para 2.2.

**Use of the element <wireCode>**. The project or the organization must decide and define the use of the element <wireCode>, its child elements and the related attribute wireGaugeType. For one type of wire material more than one wire gauge can be available. In this case, the wires normally get different part numbers, so that for all wire sizes a wire material element <wireMaterial> is used. If not, the project or the organization must decide whether to divide the wire material in several wire material elements or to use the wire gauge element <wireGauge> several times in one wire material element <wireMaterial>. It is also possible to use the wire gauge element <wireGauge> multiple times to show the gauge of the wire in different units of measurement. If used, the elements and attributes must be populated consistently. Refer to Para 2.3.

**Use of the element <numberOfCores>**. The project or the organization must decide the use of the number of cores information for wire material. Refer to Para 2.4.

**Use of the element <size>**. The project or the organization must decide and define the use of size information for wire material. The size of wire material is often part of the part number of the wire material. The project or the organization can decide to provide the size information of the wire material in the element <wireGauge>. In this case, the element <size> must not be used. If the element <size> is used, then it must be populated consistently including its attribute unitOfMeasure. Refer to Para 2.5.

**Use of the element <mass>**. The project or the organization must decide and define the use of the element <mass> and the attribute unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Chap 3.9.5.2.9.5 and Para 2.6.

**Use of the element <wireColor>**. The project or the organization must decide and define the use of color information for wire material. If used, project or organization specific rules must be defined to populate this element consistently. Refer to Chap 3.9.5.2.9.2 and Para 2.7.

**Use of the element <outerjacketColor>**. The project or the organization must decide and define the use of outer jacket color information for wire material. If used, this element and its attribute must be populated consistently. Refer to Para 2.8.

**Use of the element <outerDiameter>**. The project or the organization must decide and define the use of the outer diameter element <outerDiameter> and the attribute

unitOfMeasure. If used, this element and its attribute must be populated consistently. Refer to Para 2.9.

**Use of the element <resistance>**. The project or the organization must decide and define the use of resistance information for wire material. If used, this element and its attribute unitOfMeasure must be populated consistently. Refer to Para 2.10.

**Use of the element <voltage>**. The project or the organization must decide and define the use of voltage information for wire material. If used, this element and its attribute unitOfMeasure must be populated consistently. Refer to Para 2.11.

**Use of the element <amperage>**. The project or the organization must decide and define the use of amperage information for wire material. If used, this element and its attribute unitOfMeasure must be populated consistently. Refer to Para 2.12.

**Use of the element <temperature>**. The project or the organization must decide the use and the definition of the child elements for the temperature information. If used, they must be populated consistently in accordance with the project or the organization specific rules. Refer to Chap 3.9.5.2.9.3 and Para 2.13.

**Use of the element <screenCount>**. The project or the organization must decide and define the use of the screen count element <screenCount>. If used, this element must be populated consistently. Refer to Para 2.14.

**Use of the element <coaxialCableFlag>**. The project or the organization must decide and define the use of coaxial information for wire material. The project or the organization must decide whether to use the element <coaxialCableFlag> for all wire material or only for coaxial wire material. If used, this element must be populated consistently. Refer to Para 2.15.

**Use of the element <triaxialCableFlag>**. The project or the organization must decide and define the use of tri-axial information for wire material. The project or the organization must decide whether to use the element <triaxialCableFlag> for all wire material or only for tri-axial wire material. If used, this element must be populated consistently. Refer to Para 2.16.

**Use of the element <frequencyCharacteristics>**. The project or the organization must decide the use of frequency characteristics for wire material. If used, this element and its child elements and their attributes must be defined and used consistently. Refer to Para 2.17.

**Use of the element <functionalDescrRef>**. The project or the organization must decide the use and the definition of functional description references. If used, references must be given consistently. Refer to Para 2.18.

**Use of the element <illustrationRef>**. The project or the organization must decide the use and the definition of illustration references. If used, references must be given consistently, eg, if applicable, diagrams of cable characteristics are referenced. Refer to Para 2.19.

# Chapter 3.9.5.2.9.13

## *Wiring data - Wiring data description Schema basic rules*

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# 1 General

The wiring data description Schema is used for configuration and declaration of the elements of the wiring data Schema. It is recommended to declare elements of the wiring data Schema, which describe the components used in the Product's wiring, in the wiring data description data module(s) of the project. Elements of the wiring data Schema, which are not used, must not be defined in the wiring data description data module(s) prepared for the project.

It is possible to prepare more than one wiring data description data module. The different data modules can then contain the definitions of the used elements in different languages. It is also possible to generate different wiring data description data modules for different presentation

purposes, which means, the elements provided for maintenance personnel can differ from the elements for final assembly personnel. For data exchange purposes, the wiring data description data module(s) can be used to define the wiring data/elements, which will be exchanged.

The wiring data description can be used in an interactive wiring publication for headlines, brief descriptions or for configuration and controlling the interactive wiring publication according to the specific naming conventions of a project or an organization.

Common elements and attributes must be populated in accordance with Chap 3.9.5.2.1. Recommended wiring specific restrictions are detailed in this chapter.

# 2 Wiring data description Schema basic rules

**Description:** The wiring data description Schema defines the major element <wiringFields>, which contains the child elements for wire data/fields description, harness data/fields description, equipment data/fields description and standard parts data/fields description.

**Markup element:** <wiringFields> (M)

**Attributes:**

– None

**Child elements:**

– <descrWire> (O), the wire data/fields description
– <descrHarness> (O), the harness data/fields description
– <descrElectricalEquip> (O), the electrical equipment data/fields description
– <descrStandardPartGroup> (O), the standard parts data/fields description

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– None identified

**Markup example:**

```
<wiringFields>
<descrWire>...</descrWire>
<descrHarness>...</descrHarness>
<descrElectricalEquip>...</descrElectricalEquip>
<descrStandardPartGroup>...</descrStandardPartGroup>
</wiringFields>
```

## 2.1 Common constructs

**Description:** The description and declaration information for wiring data elements is given by a block of three elements. These are the data/field name, the data/field description and reference information.

### 2.1.1 Data/field name

**Description:** The data/field name element <fieldName> contains the name of the data field, ie the project or the organization specific naming of electrical data.

**Markup element:** <fieldName> (C) or (M), depending on the parent element occurrence

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the data/field name

**Markup example:**

The following markup example shows the use of the element <fieldName> as a child element of <descrPartNumber>.

```
<fieldName>Part number</fieldName>
```

Further examples for the use of <fieldName> are given below in this chapter.

### 2.1.2 Data/field description

**Description:** The data/field description element <descr> contains the description of the data field, ie the project or the organization specific description of electrical data. This element can in addition contain declarations of the described data.

**Markup element:** <descr> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the data/field description element <descr>

**Markup example:**

The following markup example shows the use of the element <descr> as a child element of <descrPartNumber>. It is shown in the context of the list of solder sleeves element <solderSleeveGroup>.

```
<descr>Part number provides the project or the organization
specific part number of the solder sleeve. Manufacturer part
numbers are available in the section 'Alternative
identifications'.</descr>
```

Further examples for the use of <descr> are given below in this chapter.

### 2.1.3 Data/field references

**Description:** The data/field references element <refs> contains references to other parts of the electrical system publications, which give additional information. If used, references must be populated in accordance with Chap 3.9.5.2.1.2.

**Markup element:** <refs> (O)

**Attributes:**

– None

**Child elements:**

– <dmRef> (C), the reference to a data module
– <pmRef> (C), the reference to a publication module
– <externalPubRef> (O), the reference to an external publication

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the data/field references element <refs>

## 2.2 Wire data/field descriptions

**Description:** The element <descrWire> contains all relevant elements to describe the wire data elements of the project.

**Markup element:** <descrWire> (O)

**Attributes:**

– None

**Child elements:**

– <descrCircuitIdent> (O), the circuit code description
– <descrWireNumber> (C), the wire number description
– <descrSectionIdent> (O), the section identification description
– <descrWireType> (O), the wire type description
– <descrWireGauge> (O), the wire gauge description
– <descrPartNumber> (O), the part number description
– <descrHarnessIdent> (O), the harness identification description
– <descrWireSeqNumber> (O), the wire sequential number description
– <descrWireInfoCircuitIdent> (O), the wire information circuit code description
– <descrWireInfoSectionIdent> (O), the wire information section identification description
– <descrEmcCode> (O), the electromagnetic compatibility (EMC) code description
– <descrLength> (O), the length description
– <descrWireColor> (O), the color description
– <descrTwist> (O), the twist description
– <descrCoaxialCableFlag> (O), the coaxial information description
– <descrTriaxialCableFlag> (O), the tri-axial information description
– <descrSignalInfo> (O), the signal description
– <descrReferenceDesignator> (O), the reference designator description
– <descrContact> (O), the contact description
– <descrWireConnectionCode> (O), the wire connection code description
– <descrNetworkAnalysisCode> (O), the network analysis code description
– <descrGroupCode> (O), the group code description
– <descrScreen> (O), the screen information description
– <descrPreparationInfo> (O), the preparation information description
– <descrFinishingInfo> (O), the finishing information description

- <descrResponsiblePartnerCompany> (O), the responsible partner company information description
- <descrRouting> (O), the routing description
- <descrFeedThru> (O), the feed-through information description
- <descrWireRoute> (O), the wire route lane code description
- <descrRestriction> (O), the wire restrictions description
- <descrNextHigherAssy> (O), the next higher assembly information description
- <descrFunctionalDescrRef> (O), the functional description reference description
- <descrIllustrationRef> (O), the illustration reference description

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrWire> and its child elements

**Markup example:**

```
<descrWire><descrWireNumber>...</descrWireNumber></descrWire>
```

### 2.2.1 Circuit code description

**Description:** The element <descrCircuitIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the circuit code element <circuitIdent> under element <wireIdent>. Refer to Para 2.1.

**Markup element:** <descrCircuitIdent> (O)

**Attributes:**

- None

**Child elements:**

- Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrCircuitIdent> and its child elements

**Markup example:**

```
<descrCircuitIdent>
<fieldName>Circuit Code</fieldName>
<descr>Aircraft electrical systems are identified by a primary
alphabetic letter, eg A = Armament. A circuit within a system is
identified by the primary alphabetic letter (system
identification) and a secondary letter (sub system
identification). Both letters together make the circuit code, eg
AG = Gun System.</descr>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="91"
subSystemCode="0" sub-subsystemCode="0" assyCode="12"
disassyCode="03" disassyCodeVariant="A" infoCode="018"
infoCodeVariant="A" itemLocationCode="A"/>
```

```
</dmRefIdent>
</dmRef>
</refs>
</descrCircuitIdent>
```

### 2.2.2 Wire number description

**Description:** The element <descrWireNumber> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire number element <wireNumber>. Refer to Para 2.1.

**Markup element:** <descrWireNumber> (C)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireNumber> and its child elements

### 2.2.3 Section identification description

**Description:** The element <descrSectionIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the section identification element <sectionIdent> under element <wireIdent>. Refer to Para 2.1.

**Markup element:** <descrSectionIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSectionIdent> and its child elements

### 2.2.4 Wire type description

**Description:** The element <descrWireType> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire type element <wireType>. Refer to Para 2.1.

**Markup element:** <descrWireType> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireType> and its child elements

### 2.2.5 Wire gauge description

**Description:** The element <descrWireGauge> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire gauge element <wireGauge>. Refer to Para 2.1.

**Markup element:** <descrWireGauge> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireGauge> and its child elements

### 2.2.6 Part number description

**Description:** The element <descrPartNumber> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the part number element <partNumber>. Refer to Para 2.1.

**Markup element:** <descrPartNumber> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrPartNumber> and its child elements

### 2.2.7 Harness identification description

**Description:** The element <descrHarnessIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the harness identification element <harnessIdent>. Refer to Para 2.1.

**Markup element:** <descrHarnessIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrHarnessIdent> and its child elements

**2.2.8 Wire sequential number description**

**Description:** The element <descrWireSeqNumber> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire sequential number element <wireSeqNumber>. Refer to Para 2.1.

**Markup element:** <descrWireSeqNumber> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireSeqNumber> and its child elements

**2.2.9 Wire information circuit code description**

**Description:** The element <descrWireInfoCircuitIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the circuit code element <circuitIdent> under element <wireInfo>. Refer to Para 2.1.

**Markup element:** <descrWireInfoCircuitIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireInfoCircuitIdent> and its child elements

**2.2.10 Wire information section identification description**

**Description:** The element <descrWireInfoSectionIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire section identification element <sectionIdent> under element <wireInfo>. Refer to Para 2.1.

**Markup element:** <descrWireInfoSectionIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireInfoSectionIdent> and its child elements

### 2.2.11 EMC code description

**Description:** The element <descrEmcCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the EMC code element <emcCode>. Refer to Para 2.1.

**Markup element:** <descrEmcCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrEmcCode> and its child elements

### 2.2.12 Length description

**Description:** The element <descrLength> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the length element <length>. Refer to Para 2.1.

**Markup element:** <descrLength> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrLength> and its child elements

### 2.2.13 Color information description

**Description:** The element <descrWireColor> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the color element <wireColor>. Refer to Para 2.1.

**Markup element:** <descrWireColor> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireColor> and its child elements

### 2.2.14 Twist information description

**Description:** The element <descrTwist> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the twist element <twist>. Refer to Para 2.1.

**Markup element:** <descrTwist> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrTwist> and its child elements

### 2.2.15 Coaxial information description

**Description:** The element <descrCoaxialCableFlag> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the coaxial information element <coaxialCableFlag>. Refer to Para 2.1.

**Markup element:** <descrCoaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrCoaxialCableFlag> and its child elements

### 2.2.16 Tri-axial information description

**Description:** The element <descrTriaxialCableFlag> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the tri-axial information element <triaxialCableFlag>. Refer to Para 2.1.

**Markup element:** <descrTriaxialCableFlag> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrTriaxialCableFlag> and its child elements

### 2.2.17 Signal information description

**Description:** The element <descrSignalInfo> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the signal information element <signalInfo>. Refer to Para 2.1.

**Markup element:** <descrSignalInfo> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSignalInfo> and its child elements

### 2.2.18 Reference designator description

**Description:** The element <descrReferenceDesignator> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the reference designator element <referenceDesignator>. Refer to Para 2.1.

**Markup element:** <descrReferenceDesignator> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrReferenceDesignator> and its child elements

**2.2.19 Contact information description**

**Description:** The element <descrContact> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the contact information element <contact>. Refer to Para 2.1.

**Markup element:** <descrContact> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrContact> and its child elements

**2.2.20 Wire connection code description**

**Description:** The element <descrWireConnectionCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire connection code element <wireConnectionCode>. Refer to Para 2.1.

**Markup element:** <descrWireConnectionCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireConnectionCode> and its child elements

**2.2.21 Network analysis code description**

**Description:** The element <descrNetworkAnalysisCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the network analysis code element <networkAnalysisCode>. Refer to Para 2.1.

**Markup element:** <descrNetworkAnalysisCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrNetworkAnalysisCode> and its child elements

### 2.2.22 Group code description

**Description:** The element <descrGroupCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the group code element <groupCode>. Refer to Para 2.1.

**Markup element:** <descrGroupCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrGroupCode> and its child elements

### 2.2.23 Screen information description

**Description:** The element <descrScreen> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the screen information element <screen>. Refer to Para 2.1.

**Markup element:** <descrScreen> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrScreen> and its child elements

### 2.2.24 Preparation information description

**Description:** The element <descrPreparationInfo> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the preparation information element <preparationInfo>. Refer to Para 2.1.

**Markup element:** <descrPreparationInfo> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrPreparationInfo> and its child elements

### 2.2.25 Finishing information description

**Description:** The element <descrFinishingInfo> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the finishing information element <finishingInfo>. Refer to Para 2.1.

**Markup element:** <descrFinishingInfo> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrFinishingInfo> and its child elements

### 2.2.26 Responsible partner company information description

**Description:** The element <descrResponsiblePartnerCompany> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the responsible partner company information element <responsiblePartnerCompany>. Refer to Para 2.1.

**Markup element:** <descrResponsiblePartnerCompany> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrResponsiblePartnerCompany> and its child elements

### 2.2.27 Routing description

**Description:** The element <descrRouting> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the clipping point identification element <clippingPoint> of the routing information element <routing>. Refer to Para 2.1.

**Markup element:** <descrRouting> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrRouting> and its child elements

### 2.2.28 Feed-through information description

**Description:** The element <descrFeedThru> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the reference designator element <referenceDesignator> and the attribute holeIdent of the feed-through information element <feedThru>. Refer to Para 2.1.

**Markup element:** <descrFeedThru> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrFeedThru> and its child elements

### 2.2.29 Wire route lane code description

**Description:** The element <descrWireRoute> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire route lane code element <wireRoute>. Refer to Para 2.1.

**Markup element:** <descrWireRoute> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireRoute> and its child elements

**2.2.30 Wire restrictions information description**

**Description:** The element <descrRestriction> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wire restrictions information element <restriction>. Refer to Para 2.1.

**Markup element:** <descrRestriction> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrRestriction> and its child elements

**2.2.31 Next higher assembly information description**

**Description:** The element <descrNextHigherAssy> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the next higher assembly information element <nextHigherAssy>. Refer to Para 2.1.

**Markup element:** <descrNextHigherAssy> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrNextHigherAssy> and its child elements

**2.2.32 Functional description reference description**

**Description:** The element <descrFunctionalDescrRef> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the functional description reference element <functionalDescrRef>. Refer to Para 2.1.

**Markup element:** <descrFunctionalDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrFunctionalDescrRef> and its child elements

### 2.2.33 Illustration reference description

**Description:** The element <descrIllustrationRef> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the illustration reference element <illustrationRef>. Refer to Para 2.1.

**Markup element:** <descrIllustrationRef> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrIllustrationRef> and its child elements

## 2.3 Harness data/field descriptions

**Description:** The element <descrHarness> contains all relevant elements to describe the harness data elements of the project.

**Markup element:** <descrHarness> (O)

**Attributes:**

– None

**Child elements:**

– <descrHarnessIdent> (C), the harness identification description. Refer to Para 2.2.7
– <descrPartNumber> (O), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description
– <descrManufacturerCode> (O), the manufacturer code description
– <descrHarnessVariantIdent> (O), the harness variant identification description
– <descrHarnessVariantIssue> (O), the harness variant description
– <descrHarnessName> (O), the harness name description
– <descrEmcCode> (O), the EMC code description. Refer to Para 2.2.11
– <descrMinTemperature> (O), the minimum temperature description
– <descrMaxTemperature> (O), the maximum temperature description
– <descrHarnessEnvironment> (O), the harness environment description
– <descrSleeve> (O), the harness sleeve description
– <descrRouting> (O), the routing description. Refer to Para 2.2.27

- <descrFeedThru> (O), the feed-through information description. Refer to Para 2.2.28
- <descrResponsiblePartnerCompany> (O), the responsible partner company information description. Refer to Para 2.2.26
- <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
- <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrHarness> and its child elements

**Markup example:**

```
<descrHarness>
<descrHarnessIdent>
<fieldName>Loom identification</fieldName>
<descr>All looms that are installed in the aircraft are
identified by a loom identification, eg 3001VB.</descr>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="92"
subSystemCode="0" sub-subsystemCode="0" assyCode="00"
disassyCode="00" disassyCodeVariant="A" infoCode="040"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</descrHarnessIdent>
</descrHarness>
```

### 2.3.1 Alternative part number description

**Description:** The element <descrAltPartNumber> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the part number element <partNumber> within the list of alternative identifications under the element <altIdent>. Refer to Para 2.1.

**Markup element:** <descrAltPartNumber> (O)

**Attributes:**

- None

**Child elements:**

- Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrAltPartNumber> and its child elements

### 2.3.2 Manufacturer code description

**Description:** The element <descrManufacturerCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other

data modules or publications for the manufacturer code element <manufacturerCode> within the list of alternative identifications under the element <altIdent>. Refer to Para 2.1.

**Markup element:** <descrManufacturerCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrManufacturerCode> and its child elements

### 2.3.3 Harness variant identification description

**Description:** The element <descrHarnessVariantIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the harness variant identification element <harnessVariantIdent>. Refer to Para 2.1.

**Markup element:** <descrHarnessVariantIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrHarnessVariantIdent> and its child elements

### 2.3.4 Harness variant issue description

**Description:** The element <descrHarnessVariantIssue> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the harness variant issue element <harnessVariantIssue>. Refer to Para 2.1.

**Markup element:** <descrHarnessVariantIssue> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrHarnessVariantIssue> and its child elements

### 2.3.5 Harness name description

**Description:** The element <descrHarnessName> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the harness name element <harnessName>. Refer to Para 2.1.

**Markup element:** <descrHarnessName> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrHarnessName> and its child elements

### 2.3.6 Minimum temperature description

**Description:** The element <descrMinTemperature> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the minimum temperature element <minTemperature>. Refer to Para 2.1.

**Markup element:** <descrMinTemperature> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMinTemperature> and its child elements

### 2.3.7 Maximum temperature description

**Description:** The element <descrMaxTemperature> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the maximum temperature element <maxTemperature>. Refer to Para 2.1.

**Markup element:** <descrMaxTemperature> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMaxTemperature> and its child elements

### 2.3.8 Harness environment description

**Description:** The element <descrHarnessEnvironment> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the harness environment element <harnessEnvironment>. Refer to Para 2.1.

**Markup element:** <descrHarnessEnvironment> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrHarnessEnvironment> and its child elements

### 2.3.9 Harness sleeve description

**Description:** The element <descrSleeve> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the part number element <partNumber> and the attribute sleeveMaterial of the harness sleeve element <sleeve>. Refer to Para 2.1.

**Markup element:** <descrSleeve> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSleeve> and its child elements

## 2.4 Equipment data/field descriptions

**Description:** The element <descrElectricalEquip> contains all relevant elements to describe the equipment data elements of the project.

**Markup element:** <descrElectricalEquip> (O)

**Attributes:**

– None

**Child elements:**

- <descrReferenceDesignator> (C), the reference designator description. Refer to Para 2.2.18
- <descrPartNumber> (O), the part number description. Refer to Para 2.2.6
- <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
- <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
- <descrInstallationLocation> (O), the installation location information description
- <descrAccessDoorOrPanel> (O), the access door or panel information description
- <descrAssy> (O), the assembly information description
- <descrNextHigherAssy> (O), the next higher assembly information description. Refer to Para 2.2.31
- <descrPositionOnNextHigherAssy> (O), the position on next higher assembly description
- <descrMaxMountingPositions> (O), the maximum number of mounting positions description
- <descrSystemBreakdownCode> (O), the system breakdown code description
- <descrSiblingPlugIdent> (O), the sibling plug identification description
- <descrTransverseLink> (O), the transverse link information description
- <descrConnectionListClass> (O), the connection list class description
- <descrElectricalContact> (O), the electrical connection contact description
- <descrElectricalStateDescr> (O), the electrical state information description
- <descrResponsiblePartnerCompany> (O), the responsible partner company information description. Refer to Para 2.2.26
- <descrEquipName> (O), the equipment name description
- <descrReqQuantity> (O), the quantity information description
- <descrEquipDescrRef> (O), the equipment description reference description
- <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
- <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrElectricalEquip> and its child elements

**Markup example:**

```
<descrElectricalEquip>
<descrReferenceDesignator>
<fieldName>Reference designator</fieldName>
<descr>Each item of equipment within a system / circuit is
identified by its circuit code with a sequential number before
it, eg 1AG. If items of equipment are used by more than one
system, they are identified by the use of a systems letter V.
The systems letter V will have an equipment sequential number
before it. The second letter after the V identifies the type of
equipment used and is identified within the system V. Connectors
are identified by an additional letter. The letter will come
```

```
after the equipment ident, eg 1AGA.</descr>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="91"
subSystemCode="0" sub-subsystemCode="0" assyCode="12"
disassyCode="02" disassyCodeVariant="A" infoCode="018"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</descrReferenceDesignator>
</descrElectricalEquip>
```

### 2.4.1 Installation location information description

**Description:** The element <descrInstallationLocation> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the installation location information element <installationLocation> under element <installationInfo>. Refer to Para 2.1.

**Markup element:** <descrInstallationLocation> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrInstallationLocation> and its child elements

### 2.4.2 Access door or panel information description

**Description:** The element <descrAccessDoorOrPanel> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the access door or panel element <accessDoorOrPanel> under element <installationInfo>. Refer to Para 2.1.

**Markup element:** <descrAccessDoorOrPanel> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAccessDoorOrPanel> and its child elements

### 2.4.3 Assembly information description

**Description:** The element <descrAssy> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the assembly information element <assy> under the assembly instructions element <assyInstruction>. Refer to Para 2.1.

**Markup element:** <descrAssy> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAssy> and its child elements

### 2.4.4 Position on next higher assembly description

**Description:** The element <descrPositionOnNextHigherAssy> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the position on next higher assembly element <positionOnNextHigherAssy> under element <installationInfo>. Refer to Para 2.1.

**Markup element:** <descrPositionOnNextHigherAssy> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrPositionOnNextHigherAssy> and its child elements

### 2.4.5 Maximum number of mounting positions description

**Description:** The element <descrMaxMountingPositions> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the maximum number of mounting positions element <maxMountingPositions>. Refer to Para 2.1.

**Markup element:** <descrMaxMountingPositions> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMaxMountingPositions> and its child elements

### 2.4.6 System breakdown code description

**Description:** The element <descrSystemBreakdownCode> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for system break down code element <systemBreakdownCode>. Refer to Para 2.1.

**Markup element:** <descrSystemBreakdownCode> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSystemBreakdownCode> and its child elements

### 2.4.7 Sibling plug identification description

**Description:** The element <descrSiblingPlugIdent> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the reference designator element <referenceDesignator> under the sibling plug identification element <siblingPlugIdent>. Refer to Para 2.1.

**Markup element:** <descrSiblingPlugIdent> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSiblingPlugIdent> and its child elements

### 2.4.8 Transverse link information description

**Description:** The element <descrTransverseLink> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the contact identification element <contact> under the electrical equipment connection element <electricalEquipConnection> of the transverse link element <transverseLink>. Refer to Para 2.1.

**Markup element:** <descrTransverseLink> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrTransverseLink> and its child elements

### 2.4.9 Connection list class description

**Description:** The element <descrConnectionListClass> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the connection list class element <connectionListClass>. Refer to Para 2.1.

**Markup element:** <descrConnectionListClass> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrConnectionListClass> and its child elements

### 2.4.10 Electrical connection contact description

**Description:** The element <descrElectricalContact> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the electrical connection contact element <contact> under the electrical equipment connection element <electricalEquipConnection>. Refer to Para 2.1.

**Markup element:** <descrElectricalContact> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrElectricalContact> and its child elements

### 2.4.11 Electrical state information description

**Description:** The element <descrElectricalStateDescr> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the electrical state description element <electricalStateDescr> under the electrical equipment state information element <electricalEquipState>. Refer to Para 2.1.

**Markup element:** <descrElectricalStateDescr> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrElectricalStateDescr> and its child elements

### 2.4.12 Electrical equipment name description

**Description:** The element <descrEquipName> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the electrical equipment name element <equipName>. Refer to Para 2.1.

**Markup element:** <descrEquipName> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrEquipName> and its child elements

### 2.4.13 Quantity description

**Description:** The element <descrReqQuantity> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the required quantity information element <reqQuantity>. Refer to Para 2.1.

**Markup element:** <descrReqQuantity> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrReqQuantity> and its child elements

### 2.4.14 Equipment description reference description

**Description:** The element <descrEquipDescrRef> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the equipment description reference element <equipDescrRef>. Refer to Para 2.1.

**Markup element:** <descrEquipDescrRef> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrEquipDescrRef> and its child elements

## 2.5 Standard parts data/field descriptions

**Description:** The element <descrStandardPartGroup> contains child elements, which describe the electrical standard parts data elements.

**Markup element:** <descrStandardPartGroup> (O)

**Attributes:**

– None

**Child elements:**

– <descrConnector> (O), the connector data/field descriptions
– <descrDistributionPart> (O), the distribution part data/field descriptions
– <descrAccessory> (O), the accessory data/field descriptions
– <descrSolderSleeve> (O), the solder sleeve data/field descriptions
– <descrShrinkSleeve> (O), the shrink sleeve data/field descriptions
– <descrIdentSleeve> (O), the identification sleeve data/field descriptions
– <descrConduit> (O), the conduit data/field descriptions
– <descrWireMaterial> (O), the wire material data/field descriptions

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrStandardPartGroup> and its child elements

### 2.5.1 Connector data/field descriptions

**Description:** The element <descrConnector> contains all relevant elements to describe the connector data elements of the project.

**Markup element:** <descrConnector> (O)

**Attributes:**

- None

**Child elements:**

- <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
- <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
- <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
- <descrMass> (O), the mass information description
- <descrOrientation> (O), the orientation information description
- <descrAssy> (O), the assembly information description. Refer to Para 2.4.3
- <descrRack> (O), the rack information description
- <descrContactCount> (O), the contact count description
- <descrContact> (O), the contact information description. Refer to Para 2.2.19
- <descrContactDiameter> (O), the contact diameter description
- <descrFinishingInfo> (O), the finishing information description. Refer to Para 2.2.25
- <descrThermoCouplePlus> (O), the thermo couple plus information description
- <descrThermoCoupleMinus> (O), the thermo couple minus information description
- <descrSpecialTerminal> (O), the special terminal information description
- <descrCoaxialCableFlag> (O), the coaxial information description. Refer to Para 2.2.15
- <descrTriaxialCableFlag> (O), tri-axial information description. Refer to Para 2.2.16
- <descrTerminationModuleGroupingValue> (O), the termination module grouping information description
- <descrBlockGroupingValue> (O), the block grouping information description
- <descrShuntGroupingValue> (O), the shunt grouping information description
- <descrElectricalContact> (O), the electrical connections contact description. Refer to Para 2.4.10
- <descrElectricalStateDescr> (O), the electrical state information description. Refer to Para 2.4.11
- <descrAccessoryPartNumber> (O), the accessory information description
- <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
- <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrConnector> and its child elements

**Markup example:**

The following markup example shows the definition of the elements <partNumber> and <manufacturerCode> of the alternate identification of connector data. No references are applicable.

```
<descrAltPartNumber>
<fieldName>Manufacturer part number</fieldName>
<descr>Manufacturer part number provides manufacturer part
numbers, which show cross reference part numbers to the standard
part number of the connector.</descr>
</descrAltPartNumber>
<descrManufacturerCode>
<fieldName>Manufacturer</fieldName>
<descr>Manufacturer shows the manufacturer of the connector,
described by manufacturer part number.</descr>
</descrManufacturerCode>
```

2.5.1.1 Mass information description

**Description:** The element <descrMass> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the mass information element <mass>. Refer to Para 2.1.

**Markup element:** <descrMass> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMass> and its child elements

2.5.1.2 Orientation information description

**Description:** The element <descrOrientation> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the orientation information element <orientation>. Refer to Para 2.1.

**Markup element:** <descrOrientation> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrOrientation> and its child elements

2.5.1.3 Rack information description

**Description:** The element <descrRack> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the rack information element <rack>. Refer to Para 2.1.

**Markup element:** <descrRack> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrRack> and its child elements

2.5.1.4 Contact count description

**Description:** The element <descrContactCount> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the contact count element <contactCount>. Refer to Para 2.1.

**Markup element:** <descrContactCount> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrContactCount> and its child elements

2.5.1.5 Contact diameter description

**Description:** The element <descrContactDiameter> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the contact diameter element <contactDiameter>. Refer to Para 2.1.

**Markup element:** <descrContactDiameter> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrContactDiameter> and its child elements

2.5.1.6 Thermo couple plus information description

**Description:** The element <descrThermoCouplePlus> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other

data modules or publications for the thermo couple plus information element <thermoCouplePlus>. Refer to Para 2.1.

**Markup element:** <descrThermoCouplePlus> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrThermoCouplePlus> and its child elements

2.5.1.7 Thermo couple minus information description

**Description:** The element <descrThermoCoupleMinus> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the thermo couple minus information element <thermoCoupleMinus>. Refer to Para 2.1.

**Markup element:** <descrThermoCoupleMinus> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrThermoCoupleMinus> and its child elements

2.5.1.8 Special terminal information description

**Description:** The element <descrSpecialTerminal> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the special terminal information element <specialTerminal>. Refer to Para 2.1.

**Markup element:** <descrSpecialTerminal> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSpecialTerminal> and its child elements

2.5.1.9 Termination module grouping information description

**Description:** The element <descrTerminationModuleGroupingValue> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the termination module grouping information element <terminationModuleGroupingValue> under the contact description element <contactDescr>. Refer to Para 2.1.

**Markup element:** <descrTerminationModuleGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrTerminationModuleGroupingValue> and its child elements

2.5.1.10 Block grouping information description

**Description:** The element <descrBlockGroupingValue> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the block grouping information element <blockGroupingValue> under the contact description element <contactDescr>. Refer to Para 2.1.

**Markup element:** <descrBlockGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrBlockGroupingValue> and its child elements

2.5.1.11 Shunt grouping information description

**Description:** The element <descrShuntGroupingValue> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the shunt grouping information element <shuntGroupingValue> under the contact description element <contactDescr>. Refer to Para 2.1.

**Markup element:** <descrShuntGroupingValue> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrShuntGroupingValue> and its child elements

2.5.1.12 Accessory part number description

**Description:** The element <descrAccessoryPartNumber> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the accessory part number element <partNumber> under the list of accessories element <connectorAccessories>. Refer to Para 2.1.

**Markup element:** <descrAccessoryPartNumber> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAccessoryPartNumber> and its child elements

**2.5.2 Distribution part data/field descriptions**

**Description:** The element <descrDistributionPart> contains all relevant elements to describe the distribution part data elements of the project.

**Markup element:** <descrDistributionPart> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrContactSize> (O), the contact size description
– <descrMaterial> (O), the material information description
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrOrientation> (O), the orientation information description. Refer to Para 2.5.1.2

- <descrWireColor> (O), the color information description. Refer to Para 2.2.13
- <descrSurfaceProtection> (O), the surface protection information description
- <descrContactDiameter> (O), the contact diameter description. Refer to Para 2.5.1.5
- <descrMinTemperature> (O), the minimum temperature description. Refer to Para 2.3.6
- <descrMaxTemperature> (O), the maximum temperature description. Refer to Para 2.3.7
- <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
- <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrDistributionPart> and its child elements

**Markup example:**

The following markup example shows the definition of the element <wireColor> of distribution part data. No references are applicable.

```
<descrWireColor>
<fieldName>Color codes</fieldName>
<descr>Color codes provides, if applicable, the colors of the
color bands of contacts, that identify the size of the
contact.</descr>
</descrWireColor>
```

2.5.2.1 Contact size description

**Description:** The element <descrContactSize> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the contact size element <contactSize>. Refer to Para 2.1.

**Markup element:** <descrContactSize> (O)

**Attributes:**

- None

**Child elements:**

- Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use and definition of the element <descrContactSize> and its child elements

2.5.2.2 Material information description

**Description:** The element <descrMaterial> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the material information element <material>. Refer to Para 2.1.

**Markup element:** <descrMaterial> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMaterial> and its child elements

2.5.2.3 Surface protection information description

**Description:** The element <descrSurfaceProtection> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the surface protection information element <surfaceProtection>. Refer to Para 2.1.

**Markup element:** <descrSurfaceProtection> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSurfaceProtection> and its child elements

**2.5.3 Accessory data/field descriptions**

**Description:** The element <descrAccessory> contains all relevant elements to describe the accessory data elements of the project.

**Markup element:** <descrAccessory> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrOrientation> (O), the orientation information description. Refer to Para 2.5.1.2
– <descrAssy> (O), the assembly information description. Refer to Para 2.4.3
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32

– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAccessory> and its child elements

**Markup example:**

The following markup example shows the definition of the element <orientation> of accessory data. No references are applicable.

```
<descrOrientation>
<fieldName>Cable clamp orientation</fieldName>
<descr>Cable clamp orientation provides information of the
angular position of the cable clamp in degrees.</descr>
</descrOrientation>
```

### 2.5.4 Solder sleeve data/field descriptions

**Description:** The element <descrSolderSleeve> contains all relevant elements to describe the solder sleeve data elements of the project.

**Markup element:** <descrSolderSleeve> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrLength> (O), the length description. Refer to Para 2.2.12
– <descrMaterial> (O), the material information description. Refer to Para 2.5.2.2
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrMinDiameter> (O), the minimum diameter description
– <descrMaxDiameter> (O), the maximum diameter description
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSolderSleeve> and its child elements

**Markup example:**

The following markup example shows the definition of the elements <minDiameter> and <maxDiameter> of solder sleeve data.

```
<descrMinDiameter>
<fieldName>Entry diameter 'd' min</fieldName>
```

```
<descr>The entry diameter 'd' min describes the minimum diameter
of the stripped wires in the center of the solder
sleeve.</descr>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="91"
subSystemCode="0" sub-subsystemCode="0" assyCode="33"
disassyCode="08" disassyCodeVariant="A" infoCode="040"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</descrMinDiameter>
<descrMaxDiameter>
<fieldName>Entry diameter 'D' max</fieldName>
<descr>The entry diameter 'D' max describes the maximum diameter
of the unstripped wires at the edge of the solder
sleeve.</descr>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="1B" systemDiffCode="B" systemCode="91"
subSystemCode="0" sub-subsystemCode="0" assyCode="33"
disassyCode="08" disassyCodeVariant="A" infoCode="040"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
</refs>
</descrMaxDiameter>
```

2.5.4.1 Minimum diameter description

**Description:** The element <descrMinDiameter> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the minimum diameter element <minDiameter> under the sleeve diameter element <sleeveDiameter>. Refer to Para 2.1.

**Markup element:** <descrMinDiameter> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMinDiameter> and its child elements

2.5.4.2 Maximum diameter description

**Description:** The element <descrMaxDiameter> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the maximum diameter element <maxDiameter> under the sleeve diameter element <sleeveDiameter>. Refer to Para 2.1.

**Markup element:** <descrMaxDiameter> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMaxDiameter> and its child elements

### 2.5.5 Shrink sleeve data/field descriptions

**Description:** The element <descrShrinkSleeve> contains all relevant elements to describe the shrink sleeve data elements of the project.

**Markup element:** <descrShrinkSleeve> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrSize> (O), the size information description
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrWireColor> (O), the color information description. Refer to Para 2.2.13
– <descrMinDiameter> (O), the minimum diameter description. Refer to Para 2.5.4.1
– <descrMaxDiameter> (O), the minimum diameter description. Refer to Para 2.5.4.2
– <descrMinTemperature> (O), the minimum temperature description. Refer to Para 2.3.6
– <descrMaxTemperature> (O), the maximum temperature description. Refer to Para 2.3.7
– <descrMinHarnessSize> (O), the minimum harness size description
– <descrMaxHarnessSize> (O), the maximum harness size description
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrShrinkSleeve> and its child elements

**Markup example:**

The following example shows the definition of the elements <minTemperature> and <maxTemperature> of shrink sleeve data. No references are applicable.

```
<descrMinTemperature>
<fieldName>Minimum ambient temperature</fieldName>
<descr>The minimum ambient temperature indicates the minimum
temperature, where application of the shrink sleeve is
recommended.</descr>
</descrMinTemperature>
<descrMaxTemperature>
<fieldName>Maximum ambient temperature</fieldName>
<descr>The maximum ambient temperature indicates the maximum
temperature, where application of the shrink sleeve is
recommended.</descr>
</descrMaxTemperature>
```

2.5.5.1 Size information description

**Description:** The element <descrSize> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the size information element <size>. Refer to Para 2.1.

**Markup element:** <descrSize> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrSize> and its child elements

2.5.5.2 Minimum harness size description

**Description:** The element <descrMinHarnessSize> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the minimum harness size element <minHarnessSize> under the harness size element <harnessSize>. Refer to Para 2.1.

**Markup element:** <descrMinHarnessSize> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMinHarnessSize> and its child elements

2.5.5.3 Maximum harness size description

**Description:** The element <descrMaxHarnessSize> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other

data modules or publications for the maximum harness size element <maxHarnessSize> under the harness size element <harnessSize>. Refer to Para 2.1.

**Markup element:** <descrMaxHarnessSize> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrMaxHarnessSize> and its child elements

### 2.5.6 Identification sleeve data/field descriptions

**Description:** The element <descrIdentSleeve> contains all relevant elements to describe the identification sleeve data elements of the project.

**Markup element:** <descrIdentSleeve> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrLength> (O), the length description. Refer to Para 2.2.12
– <descrMaterial> (O), the material information description. Refer to Para 2.5.2.2
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrIdentSleeve> and its child elements

**Markup example:**

The following markup example shows the definition of the element <length> of identification sleeve data. No references are applicable.

```
<descrLength>
<fieldName>Sleeve length</fieldName>
<descr>Sleeve length provides information on the length of the
identification sleeve.</descr>
</descrLength>
```

### 2.5.7 Conduit data/field descriptions

**Description:** The element <descrConduit> contains all relevant elements to describe the conduit data elements of the project.

**Markup element:** <descrConduit> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternative part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrSize> (O), the size information description. Refer to Para 2.5.5.1
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrWireColor> (O), the color information description. Refer to Para 2.2.13
– <descrWallThickness> (O), the wall thickness description
– <descrMinTemperature> (O), the minimum temperature description. Refer to Para 2.3.6
– <descrMaxTemperature> (O), the maximum temperature description. Refer to Para 2.3.7
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrConduit> and its child elements

**Markup example:**

The following markup example shows the definition of the element <wallThickness> of conduit data. No references are applicable.

```
<descrWallThickness>
<fieldName>Wall thickness</fieldName>
<descr>Wall thickness provides the wall thickness information of
the conduit in millimeter.</descr>
</descrWallThickness>
```

#### 2.5.7.1 Wall thickness description

**Description:** The element <descrWallThickness> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the wall thickness element <wallThickness>. Refer to Para 2.1.

**Markup element:** <descrWallThickness> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWallThickness> and its child elements

### 2.5.8 Wire material data/field descriptions

**Description:** The element <descrWireMaterial> contains all relevant elements to describe the conduit data elements of the project.

**Markup element:** <descrWireMaterial> (O)

**Attributes:**

– None

**Child elements:**

– <descrPartNumber> (C), the part number description. Refer to Para 2.2.6
– <descrAltPartNumber> (O), the alternat;ive part number description. Refer to Para 2.3.1
– <descrManufacturerCode> (O), the manufacturer code description. Refer to Para 2.3.2
– <descrWireType> (O), the wire type description. Refer to Para 2.2.4
– <descrWireGauge> (O), the wire gauge description. Refer to Para 2.2.5
– <descrNumberOfCores> (O), the number of cores description
– <descrSize> (O), the size information description. Refer to Para 2.5.5.1
– <descrMass> (O), the mass information description. Refer to Para 2.5.1.1
– <descrWireColor> (O), the color information description. Refer to Para 2.2.13
– <descrOuterJacketColor> (O), the outer jacket color description
– <descrOuterDiameter> (O), the outer diameter description
– <descrResistance> (O), the resistance information description
– <descrVoltage> (O), the voltage information description
– <descrAmperage> (O), the amperage information description
– <descrMinTemperature> (O), the minimum temperature description. Refer to Para 2.3.6
– <descrMaxTemperature> (O), the maximum temperature description. Refer to Para 2.3.7
– <descrScreenCount> (O), the screen count description
– <descrCoaxialCableFlag> (O), the coaxial information description. Refer to Para 2.2.15
– <descrTriaxialCableFlag> (O), tri-axial information description. Refer to Para 2.2.16
– <descrImpedance> (O), the impedance information description
– <descrFrequency> (O), the frequency information description
– <descrAttenuation> (O), the attenuation information description
– <descrFunctionalDescrRef> (O), the functional description reference description. Refer to Para 2.2.32
– <descrIllustrationRef> (O), the illustration reference description. Refer to Para 2.2.33

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrWireMaterial> and its child elements

**Markup example:**

The following markup example shows the definition of the element <wireColor> of wire material data. No references are applicable.

```
<descrWireColor>
<fieldName>Wire color</fieldName>
<descr>Wire color provides information on the color of the wire
sheathing. For multi-core cables the colors of the single wire
sheathings are shown, separated by slashes, eg
red/blue/yellow.</descr>
</descrWireColor>
```

2.5.8.1 Core description

**Description:** The element <descrNumberOfCores> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the number of cores element <numberOfCores>. Refer to Para 2.1.

**Markup element:** <descrNumberOfCores> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrNumberOfCores> and its child elements

2.5.8.2 Outer jacket color description

**Description:** The element <descrOuterJacketColor> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the outer jacket color element <outerJacketColor>. Refer to Para 2.1.

**Markup element:** <descrOuterJacketColor> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrOuterJacketColor> and its child elements

2.5.8.3 Outer diameter description

**Description:** The element <descrOuterDiameter> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the outer diameter element <outerDiameter>. Refer to Para 2.1.

**Markup element:** <descrOuterDiameter> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrOuterDiameter> and its child elements

2.5.8.4 Resistance information description

**Description:** The element <descrResistance> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the resistance information element <resistance>. Refer to Para 2.1.

**Markup element:** <descrResistance> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrResistance> and its child elements

2.5.8.5 Voltage information description

**Description:** The element <descrVoltage> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the voltage information element <voltage>. Refer to Para 2.1.

**Markup element:** <descrVoltage> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrVoltage> and its child elements

2.5.8.6 Amperage information description

**Description:** The element <descrAmperage> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the amperage information element <amperage>. Refer to Para 2.1.

**Markup element:** <descrAmperage> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAmperage> and its child elements

2.5.8.7 Screen count description

**Description:** The element <descrScreenCount> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the screen count element <screenCount>. Refer to Para 2.1.

**Markup element:** <descrScreenCount> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrScreenCount> and its child elements

2.5.8.8 Impedance information description

**Description:** The element <descrImpedance> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the impedance information element <impedance> under the frequency characteristics element <frequencyCharacteristics>. Refer to Para 2.1.

**Markup element:** <descrImpedance> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrImpedance> and its child elements

2.5.8.9 Frequency information description

**Description:** The element <descrFrequency> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the frequency information element <frequency> under the frequency and attenuation element <frequencyAttenuation>. Refer to Para 2.1.

**Markup element:** <descrFrequency> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrFrequency> and its child elements

2.5.8.10 Attenuation information description

**Description:** The element <descrAttenuation> contains child elements, which provide a project or an organization specific name, a brief description and a reference to other data modules or publications for the attenuation information element <attenuation> under the frequency and attenuation element <frequencyAttenuation>. Refer to Para 2.1.

**Markup element:** <descrAttenuation> (O)

**Attributes:**

– None

**Child elements:**

– Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use and definition of the element <descrAttenuation> and its child elements

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the element <wiringFields>**. The project or the organization must decide the use of wiring data description data modules and thus the use of the element <wiringFields>. Refer to Para 2.1.

**Use of the element <fieldName>**. The project or the organization must decide the definition of element <fieldName> for wiring data/field names. Refer to Para 2.1.1.

**Use of the element <descr>**. The project or the organization must decide the use and the definition of the wiring data/field description element <descr>. Refer to Para 2.1.2.

**Use of the element <refs>**. The project or the organization must decide the use of the element <refs> for references to detailed descriptions of the wiring data/fields including their values and meanings. If used, references must be populated in accordance with Chap 3.9.5.2.1.2 and Para 2.1.3.

**Use of the element <descrWire>**. The project or the organization must decide the use and the definition of the element <descrWire> and all its child elements to describe wire data. Refer to Para 2.2.

**Use of the element <descrHarness>**. The project or the organization must decide the use and the definition of the element <descrHarness> and all its child elements to describe harness data. Refer to Para 2.3.

**Use of the element <descrElectricalEquip>**. The project or the organization must decide the use and the definition of the element <descrElectricalEquip> and all its child elements to describe electrical equipment data. Refer to Para 2.4.

**Use of the element <descrStandardPartGroup>**. The project or the organization must decide the use and the definition of the element <descrStandardPartGroup> and all its child elements to describe electrical standard parts data. Refer to Para 2.5.

# Chapter 3.9.5.2.10

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# 1 General

This chapter introduces the process data module. The process data module contains interactive processing structures to provide the capability to sequence other data modules or steps within it based on static or dynamic state information. The process data module can be of any type: procedural, fault, descriptive, etc. Its content can include preliminary and closing requirements. The process data module is useful to achieve capabilities of the Functionality Matrix in categories of (1) diagnostics (particularly dynamic diagnostics, or system simulation), (2) external processes where data is captured in the IETP and transmitted to the external process or vice versa, and (3) navigation and tracking in areas of filtering (only displaying to the user data that applies to him) and dialog-driven interaction. Refer to Chap 6.4.

Sequencing, based on state information, together with management of dynamic and static state information are required capabilities to achieve intelligent, interactive data display. This functionality is fundamental to testing and troubleshooting sequences where the next test is often based on the result of the current test (dynamic state information) or input from the Product interface (via the external application interface). It also allows the presentation of information to the user to be customized to the Product configuration or any system state.

Sequencing is accomplished by a software component called the logic engine. Refer to Para 2.4. This software component is only required for processing process data modules. Its function is basically to determine what to display next.

The process data module contains structures for traversing steps and data modules in a defined order and in if-then-else branches and loops. The process data module will also filter steps and data modules based on the value of state variables, eg [*Model* equal "B" or *Test passed* equal TRUE] which are stored in the state table. (In this chapter, variable names will appear in *italics*, expressions will be in [brackets]) If the required variable values are not in the State table, it will gather information from the user or other sources to populate the state table and then use that information to make branching and filtering decisions. When sequencing data modules, no change to the data module itself is required, and thus data modules can be reused in many sequences.

## 1.1 Interactive presentation functionality

The interactive presentation functionality is enabled thru structures provided in the process data module. The functionality is implemented in the logic engine, a software component that processes the interactive structures. Refer to Para 2.4. Detailed processing instructions are given in Chap 7.6.1.

### 1.1.1 Screen-based information grouping

The process data module is designed for interactive electronic display. Information to be displayed simultaneously on the same screen is grouped on a node. Refer to Para 2.3.1. After viewing a screen of data, the user must provide an acknowledgement to move to the next node in the procedure.

### 1.1.2 State information

The power of the process data module is in its ability to capture, store, and act upon state information – the values of defined variables such as *Model*, *Serial Number*, *Power Source*, or *Continuity Exists*. State information is normally captured via user dialogs and is stored in the state table. When the logic engine requires a variable value to determine what to display next, it searches the state table for this value.

### 1.1.3 Sequencing based on static/dynamic state information

The viewing system must support simple sequencing. This will allow the authoring of a maintenance stream such as: Open door 1, Open circuit breaker B, Functional test B, Close

circuit breaker B, Close door 1 where data items of the maintenance stream are data modules, steps, or a combination of both. The user will be automatically directed from one data item to another when he acknowledges that he has completed the instruction within the current data item. There is also a need to sequence information in a non-linear stream based on system state. For instance, the user needs to see the information within data module A if continuity existed at a designated pin, but the information within data modules B and D if it did not. In another case, the user needs to loop thru a series of rigging steps until a certain gap is less than 1,5 cm.

### 1.1.4 Context filtering based on static/dynamic state information

1.1.4.1 Definition

Context filtering of data means that the user does not select information to view, but is only presented with information that applies to his situation. This filtering is normally tied to the current configuration or state of the Product under maintenance. There is also a need to handle cases where the filtering is not configuration related, eg:

- the data only applies when the unit is deployed in the field rather than being at a maintenance facility
- the data only applies in a certain range of sensor reading values from the equipment

Context filtering is achieved by attaching conditions to pieces of data that describe under what circumstances that data applies. Hence, procedure A might have a condition attached to it making it applicable when the unit under maintenance is an "A" Model with Serial Number greater than 155678. Procedure A will only be seen under those circumstances. In the same manner, procedure B could be applicable when using battery power and procedure C could be applicable when using APU power. In this case, procedures B and C can be authored as "alternatives" of one another. They can be grouped together and when accessed for maintenance, the appropriate one used based on the type of power employed. Most process data module elements have associated "Alt" elements allowing this grouping of data items that serve the same purpose but apply under different conditions. The "Alt" element is a powerful construct that, for example, allows an author to create one procedure that handles different configurations of the Product by employing alternative steps where the configuration differences drive unique data. This concept is discussed in Para 2.3.4.2.

1.1.4.2 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- level of context filtering
- model structure or expression

### 1.1.5 State table management

In order to sequence and context filter data, the system must be capable of collecting and maintaining the system state. This is achieved thru the use of state variables and expressions that use these variables. The system maintains a list of variables and their associated values. This list is called the state table. Any information that will be required to make a filtering, branching, looping decision, or that is needed to pass to an external application must be defined as a variable and stored in the state table. The system obtains values for variables thru user dialogs, external application interfaces, or authored variable assignments. The system uses these variable values to evaluate expressions. The result of an expression evaluation determines which data the user will see.

# 2 Process data module

The process data module uses sequencing and filtering constructs to provide a seamless, logical flow of information to the user. This flow is implemented by the logic engine software component. The user will move thru a sequence of data items based on how the process data module author intended. The user can be asked questions to facilitate if-then-else branching and applicability filtering. The author decides what the user sees and what choices he has. The

user acknowledges that he has completed the instruction within a data item and the logic engine determines the next data item for viewing based on state information. Primary constructs of the process data module are described below.

## 2.1 References

References must be populated in accordance with Chap 3.9.5.2.1.2.

## 2.2 Warnings and Cautions

Warnings and cautions must be authored in accordance with Chap 3.9.3.

## 2.3 Process Flow Constructs

### 2.3.1 Process

**Description:** The element <process> is the top level element containing the process flow constructs.

**Markup element:** <process> (M)

**Attributes:**

- id (O), the identifier of the <process> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <variableDeclarations> (O). Refer to Para 2.3.2.
- <commonInfo> (O). Refer to Chap 3.9.5.2.1.12.
- <preliminaryRqmts> (O). Refer to Chap 3.9.5.2.1.9 and Para 2.3.3.
- <dmSeq> (M). Refer to Para 2.3.4.
- <closeRqmts> (O). Refer to Chap 3.9.5.2.1.9 and Para 2.3.3.

**Business rules decisions:**

- None identified

Markup example**:**

```
<process>
<dmSeq>
...
</dmSeq>
</process>
```

### 2.3.2 Variable declarations

**Description:** Variable declarations define and can initialize one to many variables that are used within the process data module. All variables used in a process data module must be declared within it. As of this writing, all variables are global in scope.

**Markup element:** <variableDeclarations> (O)

**Attributes:**

- id (O), the identifier of the <variableDeclarations> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <variable> (M). Refer to Para 2.3.7.

**Business rules decisions:**

– None identified

Markup example:

```
<variableDeclarations>
<variable valueType="string" variableName="name"/>
<variable valueType="string" variableName="level">
<initialize>
<expression><stringValue>amateur</stringValue></expression>
</initialize>
</variable>
</variableDeclarations>
```

### 2.3.3 Preliminary requirements and Close requirements

**Description:** Process data modules can contain preliminary requirements and close requirements as in the Procedure data module with one difference. In the Process data module, one to many optional element <variablePostSet> can be authored in conjunction with all elements within element <reqCondGroup> except element <noConds>. This feature allows the author to assert a variable value to the state table based on a required condition or closing requirement being satisfied. An example usage is to track doors opened or closed, power applied, etc. Refer to Chap 3.9.5.2.1.9. For viewer behavior, refer to Chap 7.6.1.

**Markup elements:** <preliminaryRqmts> (O), <closeRqmts> (O)

**Attributes:**

<preliminaryRqmts>

– None

<closeRqmts>

– id (O), the identifier of the <process> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Business rules decisions:**

– None identified

**Markup example:** Refer to Chap 3.9.5.2.1.9 for markup examples.

### 2.3.4 Data module sequences

**Description:** A data module sequence determines the order of steps, dialogs, external application calls, data module references, and/or conditional actions within the data module.

**Markup element:** <dmSeq> (M)

The element <dmSeq> contains a one to many choice sequence of elements defined below. The contents of the element <dmSeq> are processed in sequential order by the logic engine. The results of the processing determine whether or not the content of a particular element in the

sequence is displayed or traversed. In the examples at Para 4, all occurrences of the element <dmNode> are subject to the process data module's expanded applicability processing (refer to Para 2.3.4.1.8) which can filter them out. In addition, the element <dmIf>, and/or the element <dmLoop> structures require processing to determine what is displayed.

**Attributes:**

- id (O), the identifier of the <dmSeq> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- independentCheck (O) Refer to Chap 3.9.5.2.3.
- skillLevelCode (O) Refer to Chap 3.9.5.2.3.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <dmNode> (O), repeatable. Refer to Para 2.3.4.1.
- <dmNodeAlt> (O), repeatable. Refer to Para 2.3.4.2.
- <dmIf> (O), repeatable. Refer to. Para 2.3.4.3.
- <dmLoop> (O), repeatable. Refer to Para 2.3.4.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the attribute independentCheck
- use of the attribute skillLevelCode

Markup example**:**

```
<dmSeq>
<dmNode>
<proceduralStep>
<title>Introduction</title>
<para>Because you are an inexperienced user, you will be
presented a brief introduction on how to operate a
bicycle</para>
</proceduralStep>
</dmNode>
<dmNode>
<dmRef xlink:href="DMC_S1000DBIKE_AAA_D00_00__00AA_043A_A">
<dmRefIdent>
<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="00"
infoCode="43A" infoCodeVariant="A" itemLocationCode="A"
modelIdentCode="S1000DBIKE" subSubSystemCode="0"
subSystemCode="D" systemCode="AAA" systemDiffCode="ALL"/>
</dmRefIdent>
</dmRef>
</dmNode>
</dmSeq>
```

2.3.4.1 Data module node

**Description:** A data module node represents technical information that is to be displayed on one screen. This screen can be scrollable.

The content of a <dmNode> consists of either:

- a dmRef,
- a sequence of an unlimited choice of
  - figures, tables, or multimedia objects or
  - element <proceduralStep> or element <proceduralStepAlt> followed by an optional dialog or message using the element <dialog>, the element <dialogAlt>, the element <message>, or the element <messageAlt>
- an <externalApplication>
- a dialog or message
- a data module sequence - do NOT use, will be deleted in the next issue

In a process data module, technical content is "wrapped" in the element <dmNode> structure allowing applicability (refer to Para 2.3.4.1.8), variablePreSets and variablePostSets to be applied to the content.

It is important to remember, the element <dmNode> represents one screen of data.

**Markup element:** <dmNode>

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <dmNode> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <variablePreSet> (O), repeatable. Refer to Para 2.3.4.1.9.
- <dmRef> (O). Refer to Chap 3.9.5.2.1.2.
- <figure> (O). Refer to Para 2.3.4.1.2.
- <foldout> (O). Refer to Para 2.3.4.1.2.
- <table> (O). Refer to Para 2.3.4.1.2.
- <multimedia> (O). Refer to Para 2.3.4.1.2.
- <proceduralStep> (O), repeatable. Refer to Para 2.3.4.1.3.
- <proceduralStepAlt> (O), repeatable. Refer to Para 2.3.4.1.4.
- <dialog> (O). Refer to Para 2.3.4.1.6.
- <dialogAlt> (O). Refer to Para 2.3.4.1.7.
- <message> (O). Refer to Para 2.3.5.5.
- <messageAlt> (O). Refer to Para 2.3.5.5.
- <externalApplication> (O). Refer to Para 2.3.4.1.5.
- <variablePostSet> (O), repeatable. Refer to Para 2.3.4.1.12.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmNode>
<proceduralStep>
<title>Prerequisities</title>
<para>Please make sure you are familiar with the functional
description of a bicycle.</para>
```

```
</proceduralStep>
</dmNode>
```

2.3.4.1.1 *Data module reference*

**Description:** References are implemented in accordance with Chap 3.9.5.2.1.2. When an element <dmNode> contains an element <dmRef>, the data module referenced is displayed depending upon the values of <dmRef> child element <behavior> attribute linkActuate and attribute linkShow.

**Markup element:** <behavior> (O)

**Attributes:**

- linkShow (O). This attribute can have one of the following values:
  - "newPane" will open another window for the referenced data allowing the user to view the reference alongside the current data.
  - "embedInContext" will display the linked data inline at the point where the dmRef occurred. This is useful when you have data that can be used verbatim in several data modules and maintained in a separate data module to itself.
  - "replaceAndReturnToSource" will replace the current screen of data with the dmRef data and then return the user to the origin of the dmRef when he presses Next to continue. This is normal reference handling where the user views the reference and then returns to the original procedure.
  - "replaceAndNoReturn" will replace the current screen of data with the dmRef data and not provide a Next option. "replaceAndNoReturn" conceptually breaks the connection with the referencing data. It is useful in a troubleshooting situation when the fault has been isolated, the user is referenced to a remedy, and there is no reason for him to return to the troubleshooting procedure.
- linkActuate (O). This attribute can have one of the following values:
  - "onLoad" will cause the referenced data to be automatically displayed with no action by the user – a mandatory reference so to speak.
  - "onRequest" requires the user to click or otherwise indicate he wishes to view the referenced data at this time.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmRef>
<dmRefIdent>
<dmCode assyCode="0000" disassyCode="00"
disassyCodeVariant="000" infoCode="000" infoCodeVariant="0"
itemLocationCode="A" modelIdentCode="AA" subSubSystemCode="0"
subSystemCode="0" systemCode="01" systemDiffCode="AAA"/>
</dmRefIdent>
<behavior linkShow="replaceAndReturnToSource"
linkActuate="onRequest"/>
</dmRef>
```

2.3.4.1.2 *Figure, table, foldout or multimedia*

**Description:** Figures, tables, foldouts, or multimedia are implemented in accordance with Chap 3.9.5.2.1.7, Chap 3.9.5.2.1.6, Chap 3.9.5.2.1.7 and Chap 3.9.2.4 respectively. Figures, tables, foldouts or multimedia can be put on an element <dmNode> by themselves or with

other step information. There is also, of course, the option to put these items within the content of a procedural step if they are directly related to that step.

**Markup elements:** <figure>, <table>, <foldout>, <multimedia> (O)

*2.3.4.1.3 Procedural step*

**Description:** The element <proceduralStep> is implemented as in the procedural data module in accordance with Chap 3.9.5.2.3. An addition to the step model in the process data module is the ability to include the element <variableRef> within the element <para>. The use of the element <variableRef> will include the variable value from the process data module state table in the paragraph text. Uses of this capability might be to display to the end user a test result received from an external application or the result of a calculation performed by the logic engine needed to perform a task.

The element <proceduralStep> also provides for subordinate steps, by nesting the element <proceduralStep> and the element <proceduralStepAlt> described in Para 2.3.4.1.4. The step structure allows for sub-steps creating a hierarchical structure. This structure would be evident on the screen in an IETP. If more than one step of the same level occurs in the content, it will be evident on screen that the steps are at the same level of hierarchy. When the element <proceduralStep> is the content of a dmNode, all elements <proceduralStep> and content will be displayed as one screen of information.

Within a dmNode, after the element <proceduralStep> content, one of the following options can be inserted: element <dialog>, element <dialogAlt>, element <message>, or element <messageAlt>. This allows an author to generate a screen of data with a user question or message at the end. It must be at the end of the screen content because the OK and Cancel buttons on a dialog are used for navigation to another screen. Expected viewer behavior is that Next and Previous functions on the screen will be disabled yielding to the OK and Cancel buttons on the dialog. OK will advance to the next screen. Cancel will move back to the previous screen. For dialog content, refer to Para 2.3.4.1.6. For viewer handling of a node with steps and a dialog, refer to Chap 7.6.1.

**Note**

Authors must be careful using references with behavior replaceAndNoReturn on a node with step content and a dialog. Any user taking a replaceAndNoReturn link will never interact with the dialog following the step content.

**Markup element:** <proceduralStep>

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- warningRefs (O), the warning reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- cautionRefs (O), the caution reference to the warnings and cautions collection. Refer to Chap 3.9.3.
- keepWithNext (O), the indication whether a step should be presented together with the next step, if possible. Refer to Chap 3.9.5.2.3.
- itemCharacteristic (O), used to indicate characteristics of the item that is the subject of a given procedural step. Refer to Chap 3.9.5.2.3.
- skillLevelCode (O), the skill level required for the complete procedure. Refer to Chap 3.9.5.1. This attribute can have the following values:
  - "sk01" thru "sk99". Refer to Chap 3.9.6.1.
- independentCheck (O), the complete procedure must be checked by a supervisor with a given qualification. Refer to Chap 3.9.5.2.3.

- id (O), the identifier of the <dmNode> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O). Refer to Chap 3.9.5.2.1.5 for general rules on titles.
- <warning> (O). Refer to Chap 3.9.3 for general rules on warnings.
- <caution> (O). Refer to Chap 3.9.3 for general rules on cautions.
- <note> (O). Refer to Chap 3.9.3.
- <para> (O). Refer to Chap 3.9.5.2.1.10.
- <figure> (O). Refer to Chap 3.9.5.2.1.7.
- <multimedia> (O). Refer to Chap 3.9.2.4.
- <foldout> (O). Refer to Chap 3.9.5.2.1.7.
- <table> (O). Refer to Chap 3.9.5.2.1.6.
- <caption> (O). Refer to Chap 3.9.5.2.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmNode>
<proceduralStep>
<title>Practical part</title>
<para>Take the bicycle from the garage.</para>
</proceduralStep>
<proceduralStep>
<para>Clean the bicycle from the dust.</para>
</proceduralStep>
<proceduralStep>
<para>Sit on the bike.</para>
</proceduralStep>
<proceduralStep>
<para>...and (RIDE)!</para>
</proceduralStep>
</dmNode>
```

*2.3.4.1.4 Procedural step alternate*

**Description:** The element <proceduralStepAlt> provides the capability to group in one structure several potential steps of data for display. Only one or none will be displayed depending on the applicability assigned to the element <proceduralStep> within the element <proceduralStepAlt>. Refer to Para 2.3.4.2.

**Markup element:** <proceduralStepAlt> (O)

**Attributes:**

- id (O), the identifier of the <proceduralStepAlt> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- altName (O), a name for the alt group.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

<proceduralStep> (M), repeatable. Refer to Para 2.3.4.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmNode>
<proceduralStepAlt>
<proceduralStep applicRefId="applic1">
...
</proceduralStep>
<proceduralStep applicRefId="applic2">
...
</proceduralStep>
</proceduralStepAlt>
</dmNode>
```

*2.3.4.1.5 External application*

**Description:** The element <externalApplication> is a mechanism for launching an external application in the midst of a process data module. This application might be a wiring data viewer, a calculator, a diagnostic test, etc. Refer to Para 2.3.8 for expanded coverage of this element.

**Markup element:** <externalApplication>

**Attributes:**

- id (O), the identifier of the <externalApplication> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- application (M), the entity reference to the external application.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <paraBasic> (M). Refer to Para 2.3.8.1.
- <send> (O). Refer to Para 2.3.8.2.
- <receiveValue> (O). Refer to Para 2.3.8.3.
- <receiveByPosition> (O). Refer to Para 2.3.8.5.
- <receiveByName> (O). Refer to Para 2.3.8.4.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– the method of tagging variables

**Markup example:**

```
<dmNode>
<externalApplication application="MMS">
<paraBasic>Update the Maintenance Management System
(MMS)</paraBasic>
<send>
<sendName>code</sendName>
<variableRef variableName="ECU.fault-code"/>
</send>
</externalApplication>
</dmNode>
```

*2.3.4.1.6 Dialog*

**Description:** The element <dialog> allows the logic engine to interact with the user. It provides a means to obtain variable values from the user by asking him a question. Refer to Para 2.3.5 for expanded coverage of this element.

**Markup element:** <dialog>

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <dialog> element. Refer to Chap 3.9.5.2.1.2.
– submitCaption (O), indicates caption used for the submit function push button. This attribute can have one of the following values:
  - "ok01" (D), sets the caption as "OK"
  - "ok02" sets the caption as "SUBMIT"
  - "ok03" sets the caption as "YES"
  - "ok04" sets the caption as "CONTINUE"
  - "ok05" sets the caption as "EXIT"
  - "ok06" thru "ok50" reserved for future S1000D use
  - "ok51" thru "ok99" sets the caption with project specific captions
– cancelCaption (O), indicates caption used for the cancel function push button
  - "ca01" (D), sets the caption as "CANCEL"
  - "ca02" sets the caption as "ABORT"
  - "ca03" sets the caption as "NO"
  - "ca04" sets the caption as "END"
  - "ca05" sets the caption as "QUIT"
  - "ca06" thru "ca50" reserved for future S1000D use
  - "ca51" thru "ca99" sets the caption with project specific captions
– resetCaption (O), indicates caption used for the optional reset function push button
  - "re01" - Sets the caption as "RESET"
  - "re02" - Sets the caption as "CLEAR"
  - "re03" thru "re50" - Reserved for future S1000D use
  - "re51" thru "re99" - Sets the caption with project specific captions.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <title> (O), dialog title bar text.
- Select at least one of the following
  - <userEntry> (O). Refer to Para 2.3.5.3.
  - <menu> (O). Refer to Para 2.3.5.2.
  - <pushButton> (O). Refer to Para 2.3.5.4.
  - <message> (O), <messageAlt> (O) Refer to Para 2.3.5.5.
  - <dialogGroup> (O). Refer to Para 2.3.5.7.
- <helpInfo> (O), provides additional information relative to the dialog.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- dialogs associated with variables.
- menu vs userEntry dialogs.
- dialog button captions.
- dialog defaults.
- dialog text consistency.

**Markup example:**

```
<dialog>
<userEntry>
<prompt>
<paraBasic>Enter your name</paraBasic>
</prompt>
<variableRef variableName="name"/>
</userEntry>
</dialog>
```

*2.3.4.1.7 Dialog alternate*

**Description:** The element <dialogAlt> groups configuration or situation unique dialogs for display to the user. Only one or none will be displayed depending on the applicability assigned to each element <dialog> within the element <dialogAlt>. Refer to Para 2.3.4.2.

**Markup element:** <dialogAlt>

**Attributes:**

- id (O), the identifier of the <dialogAlt> element. Refer to Chap 3.9.5.2.1.2.
- altName (O), a name for the alt group
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <dialog> (M), repeatable. Refer to Para 2.3.4.1.6.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to element <proceduralStepAlt>, Para 2.3.4.1.4 for like and similar markup.

```
<dialogAlt>
<dialog applicRefId="applic3">
<userEntry dataEntryFieldLength="3">
<prompt>
<paraBasic>Enter your age</paraBasic>
</prompt>
<variableRef variableName="age"/></userEntry>
</dialog>
</dialogAlt>
```

*2.3.4.1.8 Applicability*

The attribute `applicRefId` references an applicability structure which determines whether or not the element it is an attribute of is displayed. Applicability is available on dmNode subelements such as element <`dmRef`>, element <`proceduralStep`>, element <`dialog`>, element <`menuChoice`> and others. The applicability element <`applic`> and attribute `applicRefId` are described at Chap 3.9.5.3.

How applicability is authored in a process data module largely depends on the logic engine employed in the viewer.

(1) If the goal is totally automated context filtering of the data and the logic engine cannot automatically filter based on standard applicability, all of the filtering conditions, configuration ([*`Model`* equal "F4J"]) and other ([*`Test Passed`* equal TRUE]), must be authored in the element <`expression`>.

(2) If the goal is automated context filtering of the data, and the logic engine will do that using the standard S1000D applicability structure, the standard structure can be authored as in any other data module type. If an expression is authored also, such as [Test Passed equal TRUE], it will be "anded" with the standard applicability structure.

*2.3.4.1.9 Variable pre set*

**Description:** The element <`variablePreSet`> assigns a value to a variable before the element <`dmNode`> is traversed. The element <`variablePreSet`> contains the element <`assertion`>. An assertion contains the element <`variableRef`> and the element <`expression`>. The element <`variableRef`> has the attribute `variableName`, which is the name of the variable to receive the expression resulting value. When a `variablePreSet` is encountered in the data, the logic engine evaluates the expression and assigns the resulting value to the variable named in the element <`variableRef`>. For example, a `variablePreSet` could be used on a `dmNode` with an external application call to assign values to one or more of the parameter variables to be passed to the application.

**Markup element:** <`variablePreSet`>

**Attributes:**

– `id` (O), the identifier of the <`variablePreSet`> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <`assertion`> (M) assigns a value to a variable. Refer to Para 2.3.4.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<variablePreSet>
<assertion>
```

```
<variableRef variableName="tourMistakes"/>
<expression>
<integerValue>0</integerValue>
</expression>
</assertion>
</variablePreSet>
```

2.3.4.1.10 *Assertion*

**Description:** The element <assertion> assigns a value to a variable.

**Markup element:** <assertion>

**Attributes:**

– id (O), the identifier of the <assertion> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <variableRef> (M). Refer to Para 2.3.4.1.11.
– <expression> (M). Refer to Para 2.3.6.

When an assertion is evaluated, the resulting value of the expression element is assigned to the variable referenced by element <variableRef>.

**Business rules decisions:**

– None identified

**Markup example:**

```
<assertion>
<variableRef variableName="level"/>
<expression>
<stringValue>experienced</stringValue>
</expression>
</assertion>
```

2.3.4.1.11 *Variable reference*

**Description**: Element <variableRef> points to a variable.

**Markup element:** <variableRef>

**Attributes:**

– variableName (M), name of variable identified by element <variableRef>

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<variableRef variableName="level"/>
```

2.3.4.1.12 *Variable post set*

**Description:** The element <variablePostSet> mirrors the element <variablePreSet>. It contains an assertion and assigns a value to a variable after the element <dmNode> has been traversed. For example, a variablePostSet could be

used on a step to apply power to assert to the state table that power has been applied for future reference by the logic engine.

**Markup element:** <variablePostSet>

**Attributes:**

– id (O), the identifier of the <variablePostSet> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <assertion> (M) Refer to Para 2.3.4.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<variablePostSet>
<assertion>
<variableRef variableName="powerApplied"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
</variablePostSet>
```

2.3.4.2 Alternative data module node

**Description:** An alternative (or conditional) node is a group of objects one or none of which will be applicable and thus displayed in a given situation.

The following discussion of the element <dmNodeAlt> applies to any alternative element, eg element <proceduralStepAlt>, element <dialogAlt>, element <messageAlt>, etc.

The element <dmNodeAlt> (a group of node alternatives) provides the ability to group occurrences of the element <dmNode> together which apply in different contextual situations. Only one node or none of the group will be displayed. For example, three versions of a "disconnect connector" step can exist in the element <dmNodeAlt> due to equipment configuration differences. For any configuration, only one version of the step applies. The logic engine will evaluate the applicability expression for all occurrences of the element <dmNode> within the element <dmNodeAlt>. Only the first node whose applicability expression evaluates to TRUE will be displayed. There need not be an occurrence of the element <dmNode> within the element <dmNodeAlt> that is applicable for every possible situation. In such cases, the logic engine simply moves on to the next element <dmNode>. Every node in an alternative node must have applicability. Applicability on the alternative elements are optional in the content section of the schema, however for alternative processing applicability is required on the alternative elements. Applicability on the nodes of an alternative group should be mutually exclusive.

Although the schema does not require alternative dmNodes to have mutually exclusive applicability (or the attribute applicRefId at all), it is important to understand the danger of overlapping applicability on alternative nodes. At most one will pass thru the logic engine to be displayed to the user, and if more than one applies, the user will miss something. A node with no applicability will always apply. There can be reasons to author overlapping applicability within an alternative element, but it is not recommended.

**Markup element:** <dmNodeAlt> (O)

**Attributes:**

- id (O), the identifier of the <dmNodeAlt> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- altName (O), name for alternate group
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <dmNode> (M) repeatable. Refer to Para 2.3.4.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of alternatives

**Markup example:**

```
<dmNodeAlt>
<dmNode applicRefId="wrongAnswer">
<proceduralStep>
<title>Wrong answer!</title>
<para>You will be given the introduction once again.</para>
<para>Number of mistakes: <variableRef
variableName="tourMistakes"/></para>
</proceduralStep>
</dmNode>
<dmNode applicRefId="rightAnswer">
<proceduralStep>
<title>Correct!</title>
<para>You can now continue with the practical part of this
manual.</para>
</proceduralStep>
</dmNode>
</dmNodeAlt>
```

2.3.4.3 Data module branch

**Description:** A branch sends the user down separate data paths based on state information such as configuration information or how the user has answered questions. Branches can be nested.

The element <dmIf> uses the same logic as the "if-then-else" statement in a programming language. An element <dmIf> contains an expression that the logic engine evaluates to determine whether the element <dmThenSeq> or the element <dmElseSeq> is to be traversed.

The element <dmThenSeq> defines the data module sequence (described by the element <dmSeq>) to be traversed if the element <dmIf> expression evaluates to TRUE. Element <dmThenSeq> is required.

The element <dmElseSeq> defines a data module sequence (described by the element <dmSeq>) to be traversed if the element <dmIf> expression evaluates to FALSE. Element <dmElseSeq> is optional.

**Markup element:** <dmIf> (O)

**Attributes:**

- id (O), the identifier of the <dmIf> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <expression> (M). Refer to Para 2.3.6.
- <dmThenSeq> (M). Refer to Para 2.3.4.
- <dmElseSeq> (O). Refer to Para 2.3.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<dmIf>
<expression>
<expression>
<booleanFunction booleanAction="not"/>
<expression>
<variableRef variableName="level"/>
</expression>
</expression>
<booleanOperator booleanOperation="equal"/>
<expression>
<stringValue>experienced</stringValue>
</expression>
</expression>
<dmThenSeq>
<dmNode>
<dialog>
<message>
<prompt>
<paraBasic>Inexperienced users may not access this
data.</paraBasic>
</prompt>
</message>
</dialog>
</dmNode>
</dmThenSeq>
</dmIf>
```

2.3.4.4 Data module loops

**Description:** A loop repeats a sequence of information as long as the loop condition (based on state information) is true.

The element <dmLoop> provides a capability similar to programming language loops. The element provides the syntax for creating WHILE (eg WHILE a gap measurement < 1,5) or FOR NEXT (eg FOR NEXT 5 times) loops, whichever applies to the situation. The element <dmLoop> contains an expression that is the WHILE condition for the loop and the element <dmSeq> (the content of the loop). The user will traverse the data module sequence as long as the expression evaluates to TRUE. Optionally a loop can contain a loop entrance assertion (described by the element <variablePreSet>) and a loop end assertion (described by the

element <assertion>) enabling counters to be implemented. The loop entrance assertion is made when (and only when) the user first enters the loop (eg [*Counter* = 0]). The loop end assertion (eg [*Counter* = *Counter* + 1]) is made each time the user reaches the end of the loop sequence described by the element <dmSeq>.

**Markup element:** <dmLoop>

**Attributes:**

- id (O), the identifier of the <dmLoop> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <variablePreSet> (O) Refer to Para 2.3.4.1.9.
- <expression> (M) Refer to Para 2.3.6.
- <dmSeq> (M). Refer to Para 2.3.4.
- <assertion> (O). Refer to Para 2.3.4.1.10.

**Business Rules Decisions:**

Business rules decisions include, but are not limited to, the following:

- use of loops

**Markup example:**

```
<dmLoop>
<expression>
<expression>
<variableRef variableName="tourFinished"/>
</expression>
<numberOperator numberOperation="equal"/>
<expression>
<booleanValue><falseValue/></booleanValue>
</expression>
</expression>
<dmSeq>
<dmNode>
<proceduralStep>
<title>Introduction</title>
<para>Because you are an inexperienced user, you will be
presented a brief introduction on how to operate a
bicycle.</para>
</proceduralStep>
<proceduralStep>
<para>Click <emphasis>next</emphasis>.</para>
</proceduralStep>
</dmNode>
<dmNode>
<proceduralStep>
<para>Before you can, you will be given a simple question to
test whether you read the instructions carefully.</para>
</proceduralStep>
</dmNode>
```

```
<dmNode>
<dialog>
<menu choiceSelection="single" choiceType="select">
<prompt>
<paraBasic>The rear brake is operated by</paraBasic>
</prompt>
<menuChoice>
<prompt>
<paraBasic>Left brake lever</paraBasic>
</prompt>
<assertion>
<variableRef variableName="tourCorrectAnswer"/>
<expression>
<booleanValue><falseValue/></booleanValue>
</expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt>
<paraBasic>Right brake lever</paraBasic>
</prompt>
<assertion>
<variableRef variableName="tourCorrectAnswer"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
<assertion>
<variableRef variableName="tourFinished"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
</menuChoice>
</menu>
</dialog>
</dmNode>
</dmSeq>
</dmLoop>
```

### 2.3.5 Collection of user information

The primary method of populating the state table for use in context filtering, branching, or looping is asking the user for information thru a dialog.

#### 2.3.5.1 Definition

The element <dialog> enables the process data module to collect information from the user (eg "Has component B been installed?, "Did continuity exist?") and assign values to variables. Dialogs can be presented in four dialog types as a:

- menu, using the element <menu>
- "fill-in-the-blank", using the element <userEntry>
- push button, using the element <pushButton>
- message, using the element <message>.

Examples of all four types are in Para 4. The four dialog types can have multiple occurrences. Multiple dialog types can be grouped and arranged horizontally, using the element <dialogGroup>. When the user responds to a dialog and selects the navigation submit function, the logic engine updates the state table based on the response. Dialog elements can

contain applicability and be contained in alternative elements to allow different dialogs to be displayed depending on the Product configuration or other state variables. Dialog elements can contain enabling or disabling conditions for data entry fields dependent on user input.

A dialog is one method of assigning a value to a variable. To facilitate this, a dialog can be associated with a variable in the markup. This association is not required, but it is recommended if a dialog is the primary source of the variable's value. The logic engine will automatically display a variable's associated dialog if it needs a value for expression evaluation and none exists in the state table. If there is no associated dialog and no value for a variable in the state table, an error will be generated. Authors must ensure that all variables have values (thru `variablePreSets` or `variablePostSets`) or means to obtain values (dialogs) prior to their use in expressions.

Dialogs can be explicitly authored in the element <`dmNode`>. This is useful if there is a variable with no associated dialog and the variable value needs to be populated. Explicit dialogs can also be used to force a question to the user to update the value of a dynamic variable already in the state table. For example, if you are looping based on a temperature that will change as the user progresses thru the loop sequence (loop WHILE condition: [*`Temperature`* `greaterThan` 5000]), you need to query for the updated temperature at the end of the loop sequence with an explicit dialog and update the value so that the user can eventually exit the loop. The logic engine will not automatically display a variable's dialog when evaluating the loop WHILE condition if there is already a value in the state table.

2.3.5.2 User menus

**Description:** Menus are the most popular way of getting information from a user. The process data module dialog menu has some powerful features.

**Markup element:** <`menu`> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`menu`> element. Refer to Chap 3.9.5.2.1.2.
- `choiceSelection` (O), which indicates whether single or multiple choices can be selected.
  - "`single`" (D) - Only a single choice from the list must be selected, usually presented as a radio button.
  - "`multiple`" - A single choice or several choices from the list can be selected, usually presented as a checkbox. At least one choice must be selected. All choices selected are processed.

  If the multiple choices describe the same variable, the variable should be of attribute `valueType` "`set-string`", "`set-real`" or "`set-integer`". A set variable can be multi-valued where other types of variables can not. For example, an author can inquire of the end user "Which warning tones were heard?" and provide choices: "Stall", "Engine fire", "APU Fire", "Unsafe landing". When the user selects one or more of these choices, the values would be added to set-string variable *`Warning tones`*.
- `choiceType` (M) indicates how the menu choices are displayed
  - "`select`" - The menu choices are displayed as selection (radio or checkbox)
  - "`pulldown`" - The menu choices are displayed as a scrollable list.
- `menuChoiceFlow` (O)indicates how the menu choices are displayed
  - "`list`" (D) - The menu choices are listed vertically.
  - "`inline`" - The menu choices are listed horizontally.
- `mandatory` (O), indicates if a menu choice must be selected before dialog submittal
  - "`1`" (D) - At least one menu choice must be selected.

- "0" - No menu choice must be selected.

**Child elements:**

– <enabledState> (O) an expression which indicates if the menu is active or inactive. Refer to Para 2.3.5.2.3.
– <prompt> (O) question for the user. Refer to Para 2.3.5.2.1.
– <menuChoice> (M) repeatable. Refer to Para 2.3.5.2.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– optional or mandatory entries.

**Markup example:**

```
<menu choiceSelection="single" choiceType="select">
<prompt>
<paraBasic>Did you ever ride a bicycle?</paraBasic>
</prompt>
<menuChoice>
<prompt>
<paraBasic>Yes</paraBasic>
</prompt>
<assertion>
<variableRef variableName="level"/>
<expression>
<stringValue>experienced</stringValue>
</expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt>
<paraBasic>No</paraBasic>
</prompt>
<noAssertions/>
</menuChoice>
</menu>
```

2.3.5.2.1 *User prompts*

**Description:** The element <prompt> contains text that is the question or information for the user. Refer to Chap 3.9.5.2.1.10.

**Markup element:** <prompt>

**Attributes:**

– id (O), the identifier of the <prompt> element. Refer to Chap 3.9.5.2.1.2.
– textDisplayPosition (O), which indicates the text display placement in relationship to the data entry or selection. If the attribute is not used, the IETP implies the text is positioned above for a user menu question, left for a userEntry question, and right for menu choice text.
  - "top" - The prompt is positioned above the data entry information
  - "bottom" - The prompt is positioned below the data entry information
  - "right" - The prompt is positioned right of the data entry information
  - "left" - The prompt is positioned left of the data entry information.

**Child elements:**

- <paraBasic> (O). Refer to Chap 3.9.5.2.1.10.
- <emphasis> (O). Refer to Chap 3.9.5.2.1.10.
- <symbol> (O). Refer to Chap 3.9.5.2.1.10.
- <subScript> (O). Refer to Chap 3.9.5.2.1.10.
- <superScript> (O). Refer to Chap 3.9.5.2.1.10.
- <variableRef> (O) allows a variable value to be contained in the prompt text. Refer to Chap 3.9.5.2.1.10 and Para 2.3.4.1.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<prompt>
<paraBasic>Did you ever ride a bicycle?</paraBasic>
</prompt>
```

*2.3.5.2.2* *User choices*

**Description:** The element <menuChoice> represents one possible answer to the prompt question. The text of the answer is marked up by element <prompt>.

**Markup element:** <menuChoice>

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <menuChoice> element. Refer to Chap 3.9.5.2.1.2.
- menuChoiceDefaultFlag (O), which indicates if this choice is to appear pre-selected in the dialog.
  - "1" - The choice is pre-selected.
  - "0" (D) - The choice is not pre-selected.

**Child elements:**

- <enabledState> (O). Refer to Para 2.3.5.2.3.
- <prompt> (M). Refer to Para 2.3.5.2.1.
- <externalApplication> (O). Refer to Para 2.3.4.1.5.
- <dialog> (O) Refer to Para 2.3.4.1.6.
- <pushButton> (O) repeatable. Refer to Para 2.3.5.4.
- <assertion> (O) Refer to Para 2.3.4.1.10.
- <noAssertions> (O), used when no state table variables are changed.

The element <menuChoice> must contain either one or more element <assertion> or an element <noAssertions>. If the user selects the choice and assertion(s) exist, the assertion(s) will be made to the state table after dialog submittal. If element <noAssertions> exists, the state table is not updated. The purpose of a dialog is to assign the value of a state variable so that the logic engine can use that value in a later expression evaluation. Normally element <menuChoice> will have one assertion assigning a value to a state variable.

The element <menuChoice> can contain applicability to allow menu dialogs to be customized for different Product configurations.

The element <menuChoice> can contain an enable/disable expression (element <enabledState>) indicating if the menu choice is active or inactive to allow menu dialogs to be customized.

The element <menuChoice> can contain an associated action as either an external application (the element <externalApplication>)or a secondary dialog (the element <dialog>). The associated action can be used to provide additional information (sound, image, execute diagnostic test, etc) to assist with the dialog selection. The action is executed by selecting the menu choice. Element <menuChoice> can contain a third choice - one to many push buttons (the element <pushButton>). Pushbuttons can be used to execute dialogs and external applications as well. Regardless of how the action is executed, after the action is completed, control returns to the dialog.

The element <menuChoice> has the attribute menuChoiceDefaultFlag, which indicates if this choice is to appear pre-selected in the dialog.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– optional or mandatory entries

**Markup example:**

```
<menuChoice>
<prompt>
<paraBasic>Yes</paraBasic>
</prompt>
<assertion>
<variableRef variableName="level"/>
<expression>
<stringValue>experienced</stringValue>
</expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt>
<paraBasic>No</paraBasic>
</prompt>
<noAssertions/>
</menuChoice>
```

*2.3.5.2.3 User enabling/disabling entry*

**Description:** The element <enabledState> contains an expression that evaluates state variables to determine if data entry field input is permitted or inhibited (usually the data entry is visible, but dimmed or grayed out).

The element <enabledState> is evaluated when data input is entered within the dialog and before the dialog is submitted. Typically, this is used when a user selects a menu choice that requires additional data entry information, while other menu choices do not require the additional data entry.

An example is a dialog containing both a menu and a user entry dialog. The menu has two choices: integer (assertion is [*datatype* = "integer"]) and real (assertion is [*datatype* = "real"]). The user entry dialog requests a real precision value (enable expression is [*datatype* equal "real"]). If the integer choice is selected from the menu, the user entry is disabled, if the real choice is selected, the user entry is enabled.

**Markup element:** <enabledState>

**Attributes:**

– None

**Child Elements:**

– <expression> (M) Refer to Para 2.3.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<dialog submitCaption="ok01" cancelCaption="ca01">
<dialogGroup>
<title>Driving Condition</title>
<menu choiceType="select" choiceSelection="single">
<menuChoice>
<prompt><paraBasic>Day</paraBasic></prompt>
<assertion>
<variableRef variableName="condition"/>
<expression><stringValue>day</stringValue></expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt><paraBasic>Night</paraBasic></prompt>
<assertion>
<variableRef variableName="condition"/>
<expression><stringValue>night</stringValue></expression>
</assertion>
</menuChoice>
</menu>
</dialogGroup>
<dialogGroup dialogSeparator="1">
<title>Bike Checklist</title>
<menu choiceType="select" choiceSelection="multiple">
<menuChoice>
<prompt><paraBasic>Wearing Helmet</paraBasic></prompt>
<assertion>
<variableRef variableName="helmet"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
</menuChoice>
<menuChoice>
<enabledState>
<expression>
<expression><variableRef variableName="condition"/></expression>
<booleanOperator booleanOperation="equal"/>
<expression><stringValue>night</stringValue></expression>
</expression>
</enabledState>
<prompt><paraBasic>Headlight On</paraBasic></prompt>
<assertion>
<variableRef variableName="headlight"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
```

```
</menuChoice>
<menuChoice>
<prompt><paraBasic>Correct Air Pressure in
Tire</paraBasic></prompt>
<assertion>
<variableRef variableName="air pressure"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt><paraBasic>Mirror is Adjusted</paraBasic></prompt>
<assertion>
<variableRef variableName="mirror"/>
<expression>
<booleanValue><trueValue/></booleanValue>
</expression>
</assertion>
</menuChoice>
</menu>
</dialogGroup>
</dialog>
```

2.3.5.3 User dialog entry

**Description:** A user entry dialog receives data input by the user.

**Markup element:** <`userEntry`>

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`listItem`> element. Refer to Chap 3.9.5.2.1.2.
- `mandatory` (O), indicates if an entry must be provided before dialog submittal
  - "`1`" (D) – User must provide entry.
  - "`0`" – No entry is required.
- `dataEntryFieldLength` (O), entry field length in characters.

**Child elements:**

- <`enabledState`> (O). Refer to Para 2.3.5.2.3.
- <`prompt`> (M). Refer to Para 2.3.5.2.1.
- <`variableRef`> (M). Refer to Para 2.3.4.1.11.
- <`default`> (O). Refer to Para 2.3.5.3.1.
- <`validate`> (O). Refer to Para 2.3.5.3.2.
- <`pushButton`> (O). Refer to Para 2.3.5.4.

The element <`userEntry`> contains the element <`prompt`> and the element <`variableRef`> to receive the value entered by the user.

The element <`userEntry`> can contain the element <`default`> containing a default value for the user entry.

The element <`userEntry`> can contain applicability to allow user entry dialogs to be customized for different product configurations.

The element <`userEntry`> can contain an enable/disable expression indicating if the user entry is active or inactive to allow the dialog to be customized.

The element <userEntry> can contain a data entry validation expression for both numerical and non-numerical data.

– The attribute dataEntryFieldLength indicates the user entry field length in characters. When entered data is longer than the field, the data is scrolled to allow the additional information. The default length is 20.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– optional or mandatory entries
– userEntry validates error messages

**Markup example:**

```
<userEntry>
<prompt>
<paraBasic>Enter your name</paraBasic>
</prompt>
<variableRef variableName="name"/>
</userEntry>
```

2.3.5.3.1 *Default user entry*

**Description:** The user entry can have a default value that pre-populates the user entry field with the value.

**Markup element:** <default>

**Attributes:**

– None

**Child elements:**

– <expression> (M). Refer to Para 2.3.6.

The default value is assigned by using the optional element <default> that contains the element <expression>. The evaluated expression result is the default value used in the user entry field. The expression can contain:

– A fixed value (entered as a data type (integer, real, or string))
– A state variable reference (including the user entry state variable reference)
– An expression evaluated result from state variable references and/or fixed values (*Pressure* + 20,0)

**Business rules decisions:**

– None identified

**Markup example:**

```
<userEntry>
<prompt>
<paraBasic>Enter your name</paraBasic>
</prompt>
<variableRef variableName="name"/>
<default>
<expression><stringValue>Jane Doe</stringValue>
</expression>
</default>
</userEntry>
```

*2.3.5.3.2 Validate user entry*

**Description:** The element <validate> is used for validating the user entry thru an expression evaluation (refer to Para 2.4.4) of the input information.

**The validation authenticates both numerical and non-numerical input.**

– Validating numerical user entry inputs

The numerical validation expression determines if the input value is in a specified number range. The expression uses standard numerical comparison operators (ie, equal, greaterThan, lessThanOrEqual) and connects the numerical comparisons with a Boolean connector (ie, or, and, exclusiveOr).

An example is to validate that a pressure is entered in the range from 0 to 90 p.s.i. A state variable *Pressure* is used and the validation expression is expressed as [[*Pressure* >= 0] and [*Pressure* <= 90]]. A user entry that is < 0 or > 90 would indicate an invalid value.

– Validating non-numerical (character string) user entry inputs

The non-numerical validation expression can use various expression operators to determine user entry length, included or excluded within a "set-string", or correct alpha or numerical text is entered in the correct sequence.

An example is to validate that five (5) characters are entered for a CAGE code. A state variable *CAGEC* is used and the validation expression is expressed as [sizeOf (*CAGEC*) = 5]. A user entry that is less or more than 5 characters would indicate an invalid value.

**Markup element:** <validate>

**Attributes:**

– errorMessage (O), text displayed to the user if validation fails.

**Child elements:**

– <expression> (M). Refer to Para 2.3.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<validate errorMessage="Age must be within 4 to 100">
<expression>
<expression>
<expression>
<variableRef variableName="age"/>
</expression>
<numberOperator numberOperation="greaterThanOrEqual"/>
<expression>
<integerValue>4</integerValue>
</expression>
</expression>
<booleanOperator booleanOperation="and"/>
<expression>
<expression>
<variableRef variableName="age"/>
</expression>
<numberOperator numberOperation="lessThanOrEqual"/>
<expression>
```

```
<integerValue>100</integerValue>
</expression>
</expression>
</expression>
</validate>
```

2.3.5.4 Push button

**Description:** The element <pushButton> provides a means to supply information for the data field entry(s) thru an external application (eg, diagnostic test, sound, and video) or secondary dialog (eg, advanced features).

**Markup element:** <pushButton>

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child Elements:**

- <enabledState> (O). Refer to Para 2.3.5.2.3.
- <prompt> (M). Refer to Para 2.3.5.2.1.
- <externalApplication> (O). Refer to Para 2.3.4.1.5.
- <dialog> (O). Refer to Para 2.3.4.1.6.

The element <pushButton> must contain the element <prompt> and either the element <externalApplication> or the element <dialog>. The element <prompt> provides the button caption.

The element <pushButton> can contain an enable/disable expression indicating whether the push button is active or inactive to allow the dialog to be customized.

**Business rules decisions:**

- None identified

**Markup example:**

```
<pushButton>
<prompt>
<paraBasic>View video</paraBasic>
</prompt>
<externalApplication application="videoApp">
<paraBasic>S1000D and Me</paraBasic>
</externalApplication>
</pushButton>
```

2.3.5.5 User message

**Description:** The element <message> provides information from the IETP to the user or additional instructions or details about a parent dialog.

**Markup element:** <message>

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <message> element. Refer to Chap 3.9.5.2.1.2.
- submitCaption (O), indicates caption used for the submit function push button. This attribute can have one of the following values:
  - "ok01" (D) – sets the caption as "OK"

- "ok02" – sets the caption as "SUBMIT"
- "ok03" – sets the caption as "YES"
- "ok04" – sets the caption as "CONTINUE"
- "ok05" – sets the caption as "EXIT"
- "ok06" thru "ok50" – reserved for future S1000D use
- "ok51" thru "ok99" – sets the caption with project specific captions

**Child elements:**

– <title> (O), dialog title bar text.
– <prompt> (M) repeatable. Refer to Para 2.3.5.2.1.

The element <message> can contain applicability, the element <title> and must contain one or more of the element <prompt> to be displayed to the user.

**Business rules decisions:**

– None identified

**Markup example:**

```
<message>
<prompt>
<paraBasic>Age must be within 4 to 100</paraBasic>
</prompt>
<prompt>
<paraBasic>All fields are mandatory</paraBasic>
</prompt>
</message>
```

2.3.5.6 Alternate message

**Description:** The element <messageAlt> contains alternative messages one or none of which are applicable in a given situation and will be displayed to the user. Refer to Para 2.3.4.2.

**Markup element:** <messageAlt> (O), repeatable

**Attributes:**

– id (O), the identifier of the <messageAlt> element. Refer to Chap 3.9.5.2.1.2.
– altName (O), name for alt group
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <message> (C), repeatable. Refer to Para 2.3.5.5.

**Business rules decisions:**

– None identified

**Markup Example:**

```
<messageAlt>
<message>
<prompt>
<paraBasic>Age out of range</paraBasic>
</prompt>
```

```
</message>
</messageAlt>
```

2.3.5.7 Dialog layout

**Description:** The element <dialogGroup> allows the positioning of multiple dialog elements in within one dialog either vertically or horizontally.

When multiple dialog types (menu, user entry, message, push button, and message) are used in a single dialog, the author can describe simple formatting instructions to the IETP to provide a logical flow to the dialog. The following elements and attributes can affect dialog layout:

- The element <prompt> attribute position specifies the prompt position as above, bottom, left or right of the dialog component.
- The element <menu> attribute menuChoiceFlow describes the user menu choice direction as vertical or horizontal.
- The element <userEntry> attribute dataEntryFieldLength describes the data entry field width in characters.
- When using multiple dialog types, the dialog types can be grouped to change the flow direction using the element <dialogGroup>. The element <dialogGroup> arranges the dialog types contained within the element from vertical alignment to horizontal alignment. Nested dialog groups change the flow direction from either vertical alignment to horizontal alignment or horizontal alignment to vertical alignment. The elements with the element <dialog> normally have a vertical alignment (top to bottom), however the dialog type elements within the element <dialogGroup> would change the alignment to horizontal (left to right) (Refer to Fig 1). The element <dialogGroup> has the attribute dialogSeparator which indicates that the group dialog has a separator marking (ie, horizontal bar, boxed).

**Markup element**: <dialogGroup> (O) repeatable.

**Attributes:**

- id (O), the identifier of the <dialogGroup> element. Refer to Chap 3.9.5.2.1.2.
- dialogSeparator (O), provides a separator marking
  - "1" – Separator marking.
  - "0" (D) – No separator marking.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- Same as element <dialog> without element <helpInfo>. Refer to Para 2.3.4.1.6.

**Business rules decisions:**

- None identified

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*Fig 1 Example single and nested dialog group alignment*

**Markup example:**

```
<dialog>
<dialogGroup>
<userEntry>
<prompt><paraBasic>Enter your name</paraBasic></prompt>
<variableRef variableName="name"/>
</userEntry>
<menu choiceSelection="single" choiceType="select">
<prompt><paraBasic>Did you ever ride a
bicycle?</paraBasic></prompt>
<menuChoice>
<prompt><paraBasic>Yes</paraBasic></prompt>
<assertion>
<variableRef variableName="level"/>
<expression><stringValue>experienced</stringValue></expression>
</assertion>
</menuChoice>
<menuChoice>
<prompt><paraBasic>No</paraBasic></prompt>
<noAssertions/>
</menuChoice>
</menu>
</dialogGroup>
<dialogGroup dialogSeparator="1">
<message>
<prompt><paraBasic>You must be an experienced user to access
this data.</paraBasic></prompt>
</message>
</dialogGroup>
</dialog>
```

### 2.3.6 Expressions

**Description:** Expressions are combinations of variables and operators. The logic engine evaluates expressions primarily in order to determine what is displayed to the user as in applicability ([`Model` = "T"]) and branching ([If `Error Condition` = "4"]) and loop (WHILE

[*Counter* < "5" ]) conditions. Expressions are also used to assign a value to a variable ([*Ave* = *Sum* / 3]). Refer to Chap 7.6.1 entitled "Expression evaluation" for detailed information.

The element <expression> defines something to be evaluated by the logic engine. Expressions are used to assign values to variables in assertions, eg the value of the expression [*Counter* plus 1] might be assigned to variable *Counter*. They are also used in applicability, branches, and other constructs to determine what is displayed to the user. In element <applic>, for example, if the expression [*Item deployed* equal TRUE] evaluates to TRUE, the data item containing the applicability is displayed and vice versa. Expressions are authored by combining variables (or other expressions) and values with binary or unary operators. In their simplest form, an expression can be just a variable or a value.

**Markup element:** <expression>

**Attributes:**

- id (O), the identifier of the <expression> element. Refer to Chap 3.9.5.2.1.2.
- humanReadableForm (O), textual form of the expression to be used in printing.

**Child Elements:**

- <booleanOperator> (O). Refer to Chap 7.6.1.
- <numberOperator> (O). Refer to Chap 7.6.1.
- <setOperator> (O). Refer to Chap 7.6.1.
- <stringOperator> (O). Refer to Chap 7.6.1.
- <booleanFunction> (O). Refer to Chap 7.6.1.
- <numberFunction> (O). Refer to Chap 7.6.1.
- <setFunction> (O). Refer to Chap 7.6.1.
- <stringFunction> (O). Refer to Chap 7.6.1.
- <subStringFunction> (O). Refer to Chap 7.6.1.
- <booleanValue> (O). Refer to Chap 7.6.1.
- <stringValue> (O). Refer to Chap 7.6.1.
- <realValue> (O). Refer to Chap 7.6.1.
- <integerValue> (O). Refer to Chap 7.6.1.
- <setValue> (O). Refer to Chap 7.6.1.
- <noValue> (O). Refer to Chap 7.6.1.
- <variableRef> (O). Refer to Para 2.3.4.1.11.
- <expression>

**Business rules decisions:**

- None identified

**Markup example:**

```
<expression>
<stringValue>experienced</stringValue>
</expression>

<expression>
<integerValue>0</integerValue>
</expression>

<expression>
<expression>
<variableRef variableName="tourFinished"/>
</expression>
```

```
<numberOperator numberOperation="equal"/>
<expression>
<booleanValue><falseValue/></booleanValue>
</expression>
</expression>
```

### 2.3.7 Variables

**Description**: Variables define pieces of information required by the logic engine to context filter, branch, etc within a process data module.

**Markup element**: <variable>

**Attributes:**

- variableName (M), a short name for the variable. The attribute variableName is not normally seen by the end user.
- variableDescr (O), a human readable description of the variable. Often the variable name is not descriptive enough. The description is not normally seen by the end user.
- productConfigurationFlag (O), a flag indicating if this variable describes the configuration of the Product. For example, *Model* and *Serial number* would be configuration variables. In an implementation where the IETP can extract configuration information from a configuration management system, the productConfigurationFlag flag would identify which variable values the IETP might query for.
- valueType (O)
  - "boolean" — Boolean values are TRUE or FALSE
  - "string" — String values are alphanumeric
  - "integer" (D) — Integer values are numeric and contain no decimal point
  - "real" — Real values are numeric and contain a decimal point
  - "set-string", "set-real", or "set-integer" — Set variable represents an unordered list of like values: string, real, or integer.
- valuePrecision (O), the precision of real type data.
- variableScope (O), scope of the variable
  - "global" (D) — scope is for the entire user session. "Global" is the only scope currently supported.

**Child elements:**

- <dialog> (O). Refer to Para 2.3.4.1.6.
- <dialogAlt> (O). Refer to Para 2.3.4.1.7.
- <initialize> (O). Refer to Para 2.3.7.1.

The element <variable> can have different values at different times in the same way as a programming variable. Variables and their values are stored in the state table and the values are used when evaluating expressions. In Para 2.3.6, *Counter* and *Item deployed* are variables. The element <variable> contains an optional dialog that can be used by the logic engine to obtain the value for the variable if no value has been asserted. It also contains an optional element <initialize> that is used to set an initial value for the variable using element <expression>.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- variable naming and typing

**Markup example:**

```
<variable valueType="string" variableName="name"></variable>
<variable valueType="string" variableName="level">
<initialize>
<expression><stringValue>amateur</stringValue></expression>
</initialize>
</variable>
```

2.3.7.1 Initialize

**Description**: The element <initialize> is used to set an initial value for the variable using element <expression>.

**Markup element**: <initialize>

**Attributes:**

– None

**Child elements:**

– <expression> (O). Refer to Para 2.3.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<initialize>
<expression>
<stringValue>amateur</stringValue>
</expression>
</initialize>
```

**2.3.8 External application interface**

The element <externalApplication> provides the capability to launch an external program from the IETP. Parameter data can be passed to the program and values can be received back from the program. Parameter data can be passed to the application in the form of variable values or strings. Data received from an external application must be assigned to a previously defined variable of the appropriate type. External application calls can only appear in element <dmNode>.

2.3.8.1 Element <paraBasic>

**Description:** Element <paraBasic> contains a description of the external application or other information that will be displayed to the user.

**Markup element:** <paraBasic>

**Attributes:**

– None

**Child Elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<paraBasic>Update the Maintenance Management System
(MMS)</paraBasic>
```

2.3.8.2 Element <send>

**Description:** Element <send> defines parameters to send to the called application.

**Markup element:** <send>

**Attributes:**

- id (O), the identifier of the <send> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <sendName> (O), the parameter name used by the external application.
- Choice of either.
- <variableRef> (M). Refer to Para 2.3.4.1.11.
- <stringValue> (M), the send value is a fixed value.

Element <send> contains an optional element <sendName> and element <variableRef> or element <stringValue>. Send parameters can be either variable values or strings. Element <sendName> defines the parameter name used by the external application. When used in conjunction with element <variableRef> or element <stringValue> it clearly defines each sending parameter.

**Business rules decisions:**

- None identified

**Markup example:**

```
<externalApplication application="MMS">
<paraBasic>Update the Maintenance Management System
(MMS)</paraBasic>
<send>
<sendName>code</sendName>
<variableRef variableName="ECU.fault-code"/>
</send>
</externalApplication>
```

2.3.8.3 Receive value

**Description:** Element <receiveValue> contains element <variableRef> which is the variable to be assigned the value received from the external application. When the returned values exceed the number of receiveValue definitions, the remaining receiveValue information is discarded.

**Markup element:** <receiveValue>

**Attributes:**

- id (O), the identifier of the <receiveValue> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <variableRef> (M), the state table variable to receive the returned value. Refer to Para 2.3.4.1.11.

**Business rules decisions:**

- None identified

**Markup example:**

```
<externalApplication application="MMS">
<paraBasic>Receive Maintainer Name</paraBasic>
<receiveValue>
<variableRef variableName="Maintainer"/>
</receiveValue>
</externalApplication>
```

2.3.8.4 Receive by name

**Description:** Element <receiveByName> is used when the external application returns data in name/value pairs.

**Markup element:** <receiveByName>

**Attributes:**

- id (O), the identifier of the <receiveByName> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <returnedValueName> (M), a parameter name returned from the external application.
- <variableRef> (M), the state table variable to receive the returned value.

Element <receiveByName> contains element <returnedValueName> that is the name of the returned value, and element <variableRef> defining the variable to be updated with the returned value. When the external application returns a returned value name not defined by the element <returnedValueName>, that name/value pair is discarded.

**Business rules decisions:**

- None identified

**Markup example:**

```
<externalApplication application="MMS">
<paraBasic>Receive test results</paraBasic>
<receiveByName>
<returnedValueName>testresult</returnedValueName>
```

```
<variableRef variableName="Result Test 5"/>
</receiveByName>
</externalApplication>
```

2.3.8.5 Receive by position

**Description:** Element <receiveByPosition> is used when the external application returns data in a stream of delimited values by position.

**Markup element:** <receiveByPosition>

**Attributes:**

- id (O), the identifier of the <listItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <returnedValuePosition> (M), the parameter position in the returned external application list.
- <variableRef> (M), the state table variable to receive the returned value. Refer to Para 2.3.4.1.11.

Element <receiveByPosition> contains element <returnedValuePosition>, the position of a returned value starting with 1, and element <variableRef> defining the variable to be updated with the returned value. When a returned value position is not defined, the information in that position is discarded.

**Business rules decisions:**

- None identified

**Markup example:**

```
<externalApplication application="MMS">
<paraBasic>Receive test scores</paraBasic>
<receiveByPosition>
<returnedValuePosition>1</returnedValuePosition>
<variableRef variableName="Score Test 1"/>
</receiveByPosition>
<receiveByPosition>
<returnedValuePosition>5</returnedValuePosition>
<variableRef variableName="Score Test 2"/>
</receiveByPosition>
</externalApplication>
```

## 2.4 Logic engine

The logic engine is a software component that executes the process data module (Refer to Chap 4.11 for the specification and Chap 7.6.1 for the requirements). It implements the behavior associated with process data module Schema elements. The primary job of the logic engine is to determine what to display next. In order to do that, it must traverse process data module elements, maintain a state table, display dialogs and evaluate expressions.

### 2.4.1 Traversal of process data module elements

The logic engine works through occurrences of the element <dmSeq> that are defined in a process data module. It processes each of element <dmNode>, element <dmIf>, and element <dmLoop> in order until there are none left to process.

For the element <dmNode>, the logic engine must evaluate applicability expressions for filtering, update the state table with variablePreSet assertions, provide content to be displayed to the user and again update the state table with variablePostSet assertions.

For the element <dmIf>, the logic engine must evaluate the condition and based on the result of the evaluation, process the element <dmThenSeq> or the element <dmElseSeq>.

For the element <dmLoop>, the logic engine must update the state table with the loop entrance assertion, evaluate the WHILE condition and, based on the result, process the element <dmSeq> contained in the element <dmLoop> or bypass it. At the end of the data module sequence, the logic engine updates the state table with the loop end assertion, re-evaluates the WHILE condition and either processes the data module sequence again or exits the loop.

### 2.4.2 Maintain state variables

In order to perform context filtering and sequencing, the logic engine must populate, store, retrieve, update, and delete state information in the state table.

The logic engine populates the state table by accepting assertions from elements of the process data module (<variablePreSets>, <variablePostSets>, <dialogs>, <externalApplications>, <assertions>). The state table is simply a collection of variables and their values.

The logic engine utilizes the state information from the state table to evaluate expressions used in applicability, data module branches, and data module loops. In order to perform expression evaluations the logic engine must retrieve the required data from the state table. If the required data is not present there, the logic engine must acquire the data using dialogs which can be associated to the variable during the variable declaration. In the case that a variable is used in an expression and has no value in the state table and no associated dialog, ie there is no way to obtain a value, the logic engine will throw an error condition and stop processing. This is considered a fatal error (refer to Chap 7.6.1).

### 2.4.3 Present dialogs

A dialog is an authored construct presented to the end user, using the element <dialog>, to find the value of a variable. Dialogs can be menu type, using the element <menu> or "fill-in-the-blank" type, using the element <userEntry>. The logic engine must display dialogs when:

- dialogs are explicitly authored in the element <dmNode>
- the logic engine requires a value for a variable to evaluate an expression and the state table holds no value for it. In this case, the logic engine displays the dialog associated with the variable in question.

### 2.4.4 Evaluate expressions

Expression evaluation allows the logic engine to determine the applicability of a data module without it being "hard-coded" in the metadata. Using data from the state table, the logic engine must be able to determine the truth of expressions such as [*Fault message* equal "Restart"], [*Continuity exists* = TRUE], and [*Gap* < 1,5]. Expressions can be associated with applicability, if conditions, or loop WHILE conditions.

In certain circumstances, the logic engine will populate the state table with values from evaluating expressions. For example, in FOR loops the logic engine can evaluate expressions such as [*Counter* = *Counter* + 1] and update variable *Counter* accordingly.

Expressions can be complex, such as: [[*Model* = "*A*"] and [[*Block* = "3"] or [*Block* = "4"]] or [*Change_2 installed* = TRUE]].

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Level of context filtering**. The project or the organization must decide the level at which to apply applicability for context filtering purposes. It is possible to author one data module that can support all configurations of the product. There are tradeoffs to consider between maintaining (and duplicating data in) more than one data module versus maintaining only one (but more complicated) data module with many provisions for configuration differences. Refer to Para 1.1.4.

**Model structure or expression**. The project or the organization must decide whether to use the applicability Model structure for configuration items and applicability expressions for dynamic variables only or use the applicability expressions for both configuration items and dynamic variables. The level of filtering desired, the filtering capability of the viewer, and the portability of the data must be taken into consideration. Refer to Para 1.1.4.

**Use of the attribute `checkQualification`**. The element <`dmSeq`> can contain a check using the attribute `checkQualification`. This is used to indicate that the whole sequence must be checked by a supervisor with a given qualification. The project or the organization must decide on its use. Refer to Para 2.3.4.

**Use of the attribute `skillLevelCode`**. The element <`dmSeq` > can contain an indication of the skill level required for the whole sequence using the attribute `skillLevelCode`. The project or the organization must decide when the skill level is to be used. Refer to Para 2.3.4.

**Method of tagging variable**. If more than one person, company, or program will be creating an external application call to the same application, the project or the organization should strongly consider using some method of tagging the variables being passed using element <`receiveByName`> or element <`receiveByPosition`>. This will preclude two calls receiving variables in a different order and one of the calls getting wrong results. Refer to Para 2.3.4.1.5.

**Dialogs associated with variables**. The project or the organization must decide if they will provide dialogs for variables in the variable declaration markup or author explicit dialogs whenever a variable in an expression might not have a value. Refer to Para 2.3.4.1.6.

**Menu vs. userEntry dialogs**. The project or the organization must decide when to use menu vs. fill-in type dialogs. Refer to Para 2.3.4.1.6.

**Dialog button captions.** The project or the organization must decide the button caption attributes that are used and determine the situation for the usage. Refer to Para 2.3.4.1.6.

**Dialog defaults**. The project or the organization must decide whether or not to use default choices in menus and/or default values in `userEntry` dialogs. Refer to Para 2.3.4.1.6.

**Dialog text consistency**. It is recommended that the project or the organization provide guidance on dialog look and feel. This includes, but is not limited to, using upper, lower, or sentence case prompts and menu choices. Refer to Para 2.3.4.1.6.

**Use of alternatives**. The project or the organization must decide whether to use this construct or not. Referencing an element <`proceduralStepAlt`> containing three elements <`proceduralStep`> is functionally the same as referencing the three elements <`proceduralStep`> individually. A possible benefit is in authoring where, if these three

elements are always or often referenced together, it is easier to reference them as a group. Refer to Para 2.3.4.2.

**Use of loops**. The project or the organization must decide where and when to use the loop construct. Loops are an effective way of sending a maintainer thru a sequence of steps a specified number of times or until some measurement is achieved. However, there can be an annoyance factor for the user in stepping thru the same information over and over. In addition, there is no way to exit a counter loop before the specified number of loops has been accomplished and no way to exit a measurement loop without providing an acceptable value for the loop variable. Loops add an element of authoring complexity, particularly when nested within other loops and branches. Refer to Para 2.3.4.4.

**Optional or mandatory entries**. The project or the organization must decide which entries in the dialog require responses and which have optional responses. Refer to Para 2.3.5.2, Para 2.3.5.2.2, and Para 2.3.5.3.

**userEntry validates error messages**. The project or the organization must decide if error messages are generated by the validation condition or author entered messages. Refer to Para 2.3.5.3.

**Variable naming and typing**. The project or the organization must provide authoring guidance about variable naming and typing. It is recommended that variable names are organized such that their function is easily recognizable. Guidance on typing will prevent similar variables from being differently typed, eg Boolean vs string. Refer to Para 2.3.7.

# 4 Examples

## 4.1 Example process diagrams

The following illustrate sample process data modules as executed by a logic engine. A step by step description of processing follows each diagram.

Fig 2 and Fig 3 are authoring views of a process data module. The step by step description that follows each figure explains how the logic engine processes the authored data. Fig 4 is the end user view of Fig 3 – the result of logic engine processing. It shows the screens the user will see and the contents of the state table that determine what the user sees.

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*Fig 2 Process diagram – Example sequencing data modules*

In Fig 2 above, the logic engine would:

- Step a (refer to (a) on diagram):
  Set up the state table for variables declared in the process element. Declare variable *Engine installed on system* to be type Boolean and variable *Engine temp* to be type real. With no initialize attribute, both variables will have value "noValue". This example illustrates variables without associated dialogs.
- Step b:
  The first element in the process data module sequence is the element <dmNode> containing a reference to the data module entitled "Prep for engine adjustment". Before displaying this data module, its applicability must be processed. If indeed the data module is to be displayed, the logic engine will provide it for display and stop. The user will press "Next" to proceed.
- Step c:
  The next dmNode contains a dialog. This dialog was explicitly authored in this location to obtain a value for variable *Engine Installed on System* in order for the logic engine to process the following dmNodeAlt. The user will select a menuChoice. When the user hits OK on the dialog, the associated assertions will be made to the state table and the logic engine will move to the next element in the process.
- Step d:
  The next element is a dmNodeAlt. The element <dmNodeAlt> contains two dmNodes containing dmRefs. Each dmNode also contains an expression to be evaluated about variable *Engine installed on system*. The logic engine will examine its state table to find a value for the variable and evaluate the first dmNode (e) expression.
- Step e:
  If this dmNode's expression evaluates to TRUE, the data module entitled "Start and run engine on system" will be displayed. Processing will stop until the user presses "Next". At that point, the logic engine will move past the dmNodeAlt to the next element in the process. If the expression does not evaluate to TRUE, the logic engine will evaluate the expression on the next dmNode in the dmNodeAlt (f).
- Step f:
  If this dmNode's expression evaluates to TRUE, the data module entitled "Start and run engine in shop" will be seen. Processing will stop until the user presses "Next". If the expression evaluates to FALSE, the logic engine will display nothing and move to the next element in the process.
- Step g:
  This dmNode contains a dialog explicitly authored at this place in order to populate the state table with a value for variable *Engine Temp*, which the logic engine will need to process the following loop. The user will provide a value for the variable which will be asserted to the state table.
- Step h:
  When "OK" is pressed, the logic engine will move to the element <dmLoop>. The loop condition [*Engine temp* greaterThan 500 degrees] will be evaluated using the *Engine temp* value just obtained from the preceding dialog.
- Step i:
  If the condition evaluates to TRUE, the adjustment data module will be displayed. Processing will then stop until the user presses "Next". If the condition evaluates to FALSE, the loop will not be traversed and the user will exit the process.
- Step j:
  When the user presses "Next", another *Engine temp* dialog will be displayed. The user's input will be recorded in the state table. At this point, the logic engine returns to step h and once again evaluates the loop condition. When the loop condition fails to be TRUE, the user

will exit the dmLoop and the process data module ends. The user will be informed that he has reached the end of task.

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*Fig 3 Process diagram – Example dmNodeAlt, external Application*

The procedure in Fig 3 would be processed as follows:

- Step a:
  Set up the variables to be used in the process. Three variables are defined. The variable *Continuity Exists* is defined as Boolean and initialized to "noValue". A dialog is provided for this variable. The variable *Model* is defined as a string variable. It is not initialized which allows it to maintain the value currently in the state table. If there is none, it will be initialized to "noValue". A dialog is provided for variable *Model*. The variable *Refdes* is defined as a string variable. It is initialized to "noValue" to discard the current value if one exists. The value of *Refdes* is always provided by the author. No dialog is required.
- Step b:
  This is a Step hierarchy on the first element <dmNode>. The logic engine would resolve applicability on the dmNode and the step content. Then the step content would be displayed on one screen such that the step hierarchy is clear to the viewer. After viewing, the user will press "Next" to proceed.
- Step c:
  The logic engine will attempt to evaluate the expression [*Continuity Exists* equal TRUE]. There is no value for variable *Continuity Exists* in the state table, so the logic engine will display its associated dialog in order to obtain a value from the user. If the expression evaluates to TRUE, the logic engine will begin processing (d), the dmNodeAlt. If the expression evaluates to FALSE, the logic engine will process dmNode (e).
- Step d:
  The two dmNodes in the alternative group have mutually exclusive applicability. The logic engine will evaluate the applicability expression on the dmNodeAlt members until one is found with a TRUE expression. If and when this occurs, the logic engine will provide the dmNode's dmRef for display. After viewing, the user will press "Next" to continue. If no dmNode in the dmNodeAlt passes applicability processing, the logic engine will process the next element in the sequence, or, if there is none, end the Process.
- Step e:
  The step content will be displayed on the screen. The user will press "Next" to continue and the variablePostSet will be asserted to the state table.
- Step f:
  This externalApplication calls a wiring diagram tool. The author passes the reference designator (*Refdes*) of the connector under consideration to the wiring tool. The wiring tool takes control at this point and does whatever it is designed to do. Meanwhile, the logic engine processes the next element in the sequence. The user can close the external application whenever he/she wishes and continue in the IETP.

# End User View & State Table

**State Table after variable declarations:**
*Model* = B
*Continuity Exists* = novalue
*Refdes* = novalue

**Screen 1 – Step content**

Open door 12
Disconnect connector 52P-F04J.
Check for continuity between pins 2 and 12.

*User presses Next*

**Screen 2 - Dialog**

Does Continuity Exist?
☐ Yes
☐ No
OK Cancel

*User answers Yes and presses OK*

**State Table after Dialog:**
*Model* = B
*Continuity Exists* = TRUE
*Refdes* = novalue

**Screen 3 – Referenced data scrolls as required in original window**

DM Replace Component A
Model B
Materials Required: …
Person: …
1. Open door 13
2. Remove Component A
3. …

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*Fig 4 Process diagram – End user view of Figure 3*

## 4.2 Example user menus

### 4.2.1 User menu with single selection markup

The example markup below and example IETP dialog (Refer to Fig 5) is for a single selection menu dialog. In the example, the user is required to select one menu choice as determined in the element <menu> attribute choiceSelection value "single" and attribute mandatory value "1" (true) (line 3, in the markup example below). The example menu has three (3) menu choices. Each choice asserts the same state variable (*CheckCondition*), but assigns a different value (the first choice asserts "tire" (lines 7-12), second choice asserts "brake" (lines 16-21), and third choice asserts "light" (lines 36-41)).

The first menu choice (lines 5-13) is pre-selected (defaulted) by the attribute menuChoiceDefaultFlag value "1" (True).

The third menu choice has the element <enabledState> (lines 24-34). The logic engine evaluates the expression and determines if the choice is active (evaluates to TRUE) or disabled (evaluates to FALSE) (the enable expression is [*Environment* equal "night"]). In this example the state variable *Environment* was previously asserted to "day". The third choice is disabled (grayed out) since the element <enabledState> for the menu choice evaluates to FALSE.

User menu with single selection markup example:

| Line | Markup |
|---|---|
| 1 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 2 | `<title>Bicycle checkout</title>` |
| 3 | `<menu choiceType="select" menuChoiceFlow="list" choiceSelection="single" mandatory="1">` |
| 4 | `<prompt><paraBasic>Select the item to checkout:</paraBasic></prompt>` |
| 5 | `<menuChoice menuChoiceDefaultFlag="1">` |
| 6 | `<prompt><paraBasic>Tires</paraBasic></prompt>` |
| 7 | `<assertion>` |
| 8 | `<variableRef variableName="CheckCondition"/>` |
| 9 | `<expression>` |
| 10 | `<stringValue>tire</stringValue>` |
| 11 | `</expression>` |
| 12 | `</assertion>` |
| 13 | `</menuChoice>` |
| 14 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 15 | `<prompt><paraBasic>Brakes</paraBasic></prompt>` |
| 16 | `<assertion>` |
| 17 | `<variableRef variableName="CheckCondition"/>` |
| 18 | `<expression>` |
| 19 | `<stringValue>brake</stringValue>` |

| Line | Markup |
|---|---|
| 20 | `</expression>` |
| 21 | `</assertion>` |
| 22 | `</menuChoice>` |
| 23 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 24 | `<enabledState>` |
| 25 | `<expression>` |
| 26 | `<expression>` |
| 27 | `<variableRef variableName="Environment"/>` |
| 28 | `</expression>` |
| 29 | `<stringOperator stringOperation="equal"/>` |
| 30 | `<expression>` |
| 31 | `<stringValue>night</stringValue>` |
| 32 | `</expression>` |
| 33 | `</expression>` |
| 34 | `</enabledState>` |
| 35 | `<prompt><paraBasic>Headlight</paraBasic></prompt>` |
| 36 | `<assertion>` |
| 37 | `<variableRef variableName="CheckCondition"/>` |
| 38 | `<expression>` |
| 39 | `<stringValue>light</stringValue>` |
| 40 | `</expression>` |
| 41 | `</assertion>` |
| 42 | `</menuChoice>` |
| 43 | `</menu>` |
| 44 | `</dialog>` |

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*Fig 5 Example multiple choice dialog menu*

### 4.2.2 User menu with push button external application launch

The example markup below and example IETP dialog (Refer to Fig 6) is for a menu dialog object using associated push buttons to launch an external application. In the example each menu choice has prompted text (element <prompt>) (lines 6, 22, 38, in the markup example below), a push button to launch an external application (element <pushButton>) (lines 7-13, 23-29, 39-45) and an assertion indicating the menu choice selected (element <assertion>) (lines 14-19, 30-35, 46-51). When a push button is selected the external application is launched and executed. After the external application is completed and closed, control returns to the dialog.

User menu with push button markup example:

| Line | Markup |
|---|---|
| 1 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 2 | `<title>Brake troubleshooting</title>` |
| 3 | `<menu choiceType="select" menuChoiceFlow="list" choiceSelection="single" mandatory="1">` |
| 4 | `<prompt><paraBasic>Select sound brakes are making:</paraBasic></prompt>` |
| 5 | `<menuChoice menuChoiceDefaultFlag="1">` |
| 6 | `<prompt><paraBasic>Squeaking</paraBasic></prompt>` |
| 7 | `<pushButton>` |
| 8 | `<prompt><paraBasic>Sample</paraBasic></prompt>` |
| 9 | `<externalApplication application="sound">` |
| 10 | `<paraBasic>Play audio sounds</paraBasic>` |
| 11 | `<send><stringValue>squeak.wav</stringValue></send>` |
| 12 | `</externalApplication>` |
| 13 | `</pushButton>` |
| 14 | `<assertion>` |

| Line | Markup |
|---|---|
| 15 | <variableRef variableName="BrakeSound"/> |
| 16 | <expression> |
| 17 | <stringValue>squeak</stringValue> |
| 18 | </expression> |
| 19 | </assertion> |
| 20 | </menuChoice> |
| 21 | <menuChoice menuChoiceDefaultFlag="0"> |
| 22 | <prompt><paraBasic>Clanking</paraBasic></prompt> |
| 23 | <pushButton> |
| 24 | <prompt><paraBasic>Sample</paraBasic></prompt> |
| 25 | <externalApplication application="sound"> |
| 26 | <paraBasic>Play audio sounds</paraBasic> |
| 27 | <send><stringValue>clank.wav</stringValue></send> |
| 28 | </externalApplication> |
| 29 | </pushButton> |
| 30 | <assertion> |
| 31 | <variableRef variableName="BrakeSound"/> |
| 32 | <expression> |
| 33 | <stringValue>clank</stringValue> |
| 34 | </expression> |
| 35 | </assertion> |
| 36 | </menuChoice> |
| 37 | <menuChoice menuChoiceDefaultFlag="0"> |
| 38 | <prompt><paraBasic>Scraping</paraBasic></prompt> |
| 39 | <pushButton> |
| 40 | <prompt><paraBasic>Sample</paraBasic></prompt> |
| 41 | <externalApplication application="sound"> |
| 42 | <paraBasic>Play audio sounds</paraBasic> |
| 43 | <send><stringValue>scrap.wav</stringValue></send> |
| 44 | </externalApplication> |
| 45 | </pushButton> |
| 46 | <assertion> |

| Line | Markup |
|---|---|
| 47 | `<variableRef variableName="BrakeSound"/>` |
| 48 | `<expression>` |
| 49 | `<stringValue>scrap</stringValue>` |
| 50 | `</expression>` |
| 51 | `</assertion>` |
| 52 | `</menuChoice>` |
| 53 | `</menu>` |
| 54 | `</dialog>` |

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*Fig 6 Example dialog user menu with push button session*

### 4.2.3 User menu with external application launched from menu choice

The example markup below and example IETP dialog (Refer to Fig 7) is for a menu dialog object with associated external application that is launched when selected. In the example each menu choice has prompted text (element <`prompt`>) (lines 6, 19, 33, in the markup example below), an external application (element <`externalApplication`>) (lines 7-10, 20-23, 34-37), and an assertion indicating the menu choice selected (element <`assertion`>) (lines 11-16, 24-29, 38-43). When a menu choice is selected the external application is immediately launched and executed. After the external application is completed and closed, control returns to the dialog.

User menu with external application markup example:

| Line | Markup |
|---|---|
| 1 | <dialog submitCaption="ok01" cancelCaption="ca01"> |
| 2 | <title>Brake troubleshooting</title> |
| 3 | <menu choiceType="select" menuChoiceFlow="list" choiceSelection="single" mandatory="1"> |
| 4 | <prompt><paraBasic>Select sound brakes are making:</paraBasic></prompt> |
| 5 | <menuChoice menuChoiceDefaultFlag="1"> |
| 6 | <prompt><paraBasic>Squeaking</paraBasic></prompt> |
| 7 | <externalApplication application="sound"> |
| 8 | <paraBasic>Play audio sounds</paraBasic> |
| 9 | <send><stringValue>squeak.wav</stringValue></send> |
| 10 | </externalApplication> |
| 11 | <assertion> |
| 12 | <variableRef variableName="BrakeSound"/> |
| 13 | <expression> |
| 14 | <stringValue>squeak</stringValue> |
| 15 | </expression> |
| 16 | </assertion> |
| 17 | </menuChoice> |
| 18 | <menuChoice menuChoiceDefaultFlag="0"> |
| 19 | <prompt><paraBasic>Clanking</paraBasic></prompt> |
| 20 | <externalApplication application="sound"> |
| 21 | <paraBasic>Play audio sounds</paraBasic> |
| 22 | <send><stringValue>clank.wav</stringValue></send> |
| 23 | </externalApplication> |
| 24 | <assertion> |
| 25 | <variableRef variableName="BrakeSound"/> |
| 26 | <expression> |
| 27 | <stringValue>clank</stringValue> |
| 28 | </expression> |
| 29 | </assertion> |
| 30 | </menuChoice> |
| 31 | <menuChoice menuChoiceDefaultFlag="0"> |

| Line | Markup |
|---|---|
| 32 | `<prompt><paraBasic>Scraping</paraBasic></prompt>` |
| 33 | `<externalApplication application="sound">` |
| 34 | `<paraBasic>Play audio sounds</paraBasic>` |
| 35 | `<send><stringValue>scrap.wav</stringValue></send>` |
| 36 | `</externalApplication>` |
| 37 | `<assertion>` |
| 38 | `<variableRef variableName="BrakeSound"/>` |
| 39 | `<expression>` |
| 40 | `<stringValue>scrap</stringValue>` |
| 41 | `</expression>` |
| 42 | `</assertion>` |
| 43 | `</menuChoice>` |
| 44 | `</menu>` |
| 45 | `</dialog>` |

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*Fig 7 Example dialog user menu with external application session*

### 4.2.4 User dialog entry example

The example markup below and example IETP dialog (Refer to Fig 8) is for a user entry dialog object using an entry validation and an assigned default entry value. The example depicts a dialog with a prompt and user entry data field.

The element <prompt> appears left of the user entry (no attribute textDisplayPosition is defined, therefore the inferred user entry prompt position is "left") (line 4, in the markup example below).

The user entry data will be asserted to the state variable named *Pressure* as defined by the element <variableRef> attribute variableName (line 5).

The default value is derived from the state variable *Pressure* (asserted prior to the integer value "45") and is assigned using the element <default> (lines 6-10) that evaluates the associated expression (the logic engine returns the stored value, "45", from the state table variable *Pressure*). The element <validate> defines that the allowable integer range is 30 thru 90 (lines 11-33). The element <validate> attribute errorMessage contains an error message to be shown when the evaluated expression (30 ≤ *Pressure* ≤ 90) is false.

Push button markup example:

| Line | Markup |
|---|---|
| 1 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 2 | `<title>Bicycle checkout</title>` |
| 3 | `<userEntry mandatory="1" dataEntryFieldLength="1">` |
| 4 | `<prompt><paraBasic>Tire pressure (PSI)</paraBasic></prompt>` |
| 5 | `<variableRef variableName="Pressure"/>` |
| 6 | `<default>` |
| 7 | `<expression>` |
| 8 | `<variableRef variableName="Pressure"/>` |
| 9 | `</expression>` |
| 10 | `</default>` |
| 11 | `<validate errorMessage="Tire pressure (PSI) must be 30 to 90">` |
| 12 | `<expression>` |
| 13 | `<expression>` |
| 14 | `<expression>` |
| 15 | `<integerValue>30</integerValue>` |
| 16 | `</expression>` |
| 17 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 18 | `<expression>` |
| 19 | `<variableRef variableName="Pressure"/>` |
| 20 | `</expression>` |
| 21 | `</expression>` |

| Line | Markup |
|---|---|
| 22 | `<booleanOperator booleanOperation="and"/>` |
| 23 | `<expression>` |
| 24 | `<expression>` |
| 25 | `<variableRef variableName="Pressure"/>` |
| 26 | `</expression>` |
| 27 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 28 | `<expression>` |
| 29 | `<integerValue>90</integerValue>` |
| 30 | `</expression>` |
| 31 | `</expression>` |
| 32 | `</expression>` |
| 33 | `</validate>` |
| 34 | `</userEntry>` |
| 35 | `</dialog>` |

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*Fig 8 Example validate dialog entry session*

### 4.2.5 Pushbutton example

The example markup below and example IETP dialog (Refer to Fig 9) is for a push button dialog object. In the example the user needs to locate where to find the tire label information. When selected, the push button "Locate Tire Label" (lines 35-41, in the markup example below) launches an external application that displays an illustration about the tire label components. After closing the illustration, control returns to the dialog.

Push button markup example:

| Line | Markup |
|---|---|
| 1 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 2 | `<title>Bicycle checkout</title>` |
| 3 | `<userEntry mandatory="1" dataEntryFieldLength="1">` |
| 4 | `<prompt><paraBasic>Tire pressure (PSI)</paraBasic></prompt>` |
| 5 | `<variableRef variableName="Pressure"/>` |
| 6 | `<default>` |
| 7 | `<expression>` |

| Line | Markup |
|---|---|
| 8 | `<variableRef variableName="Pressure"/>` |
| 9 | `</expression>` |
| 10 | `</default>` |
| 11 | `<validate errorMessage="Tire pressure (PSI) must be 30 to 90">` |
| 12 | `<expression>` |
| 13 | `<expression>` |
| 14 | `<expression>` |
| 15 | `<integerValue>30</integerValue>` |
| 16 | `</expression>` |
| 17 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 18 | `<expression>` |
| 19 | `<variableRef variableName="Pressure"/>` |
| 20 | `</expression>` |
| 21 | `</expression>` |
| 22 | `<booleanOperator booleanOperation="and"/>` |
| 23 | `<expression>` |
| 24 | `<expression>` |
| 25 | `<variableRef variableName="Pressure"/>` |
| 26 | `</expression>` |
| 27 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 28 | `<expression>` |
| 29 | `<integerValue>90</integerValue>` |
| 30 | `</expression>` |
| 31 | `</expression>` |
| 32 | `</expression>` |
| 33 | `</validate>` |
| 34 | `</userEntry>` |
| 35 | `<pushButton>` |
| 36 | `<prompt><paraBasic>Locate Tire Label</paraBasic></prompt>` |
| 37 | `<externalApplication application="illustrate">` |
| 38 | `<paraBasic>Display CGM graphic</paraBasic>` |
| 39 | `<send><stringValue>tirelocate.cgm</stringValue></send>` |

| Line | Markup |
|---|---|
| 40 | `</externalApplication>` |
| 41 | `</pushButton>` |
| 42 | `</dialog>` |

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*Fig 9 Example dialog push button session*

### 4.2.6 User message example

The example markup below and example IETP dialog (Refer to Fig 10) is for a message dialog object as a response from the IETP. In the example the user selects the bicycle component(s) for service information and submits the information to the IETP. The IETP processes service dates requests, stores the information in state variables *TireDue* and *GearDue*. Results are displayed in a dialog message (obtaining the information from state variables *TireDue* and *GearDue*).

User message markup example:

| Line | Markup |
|---|---|
| 1 | `<message submitCaption="ok01">` |
| 2 | `<title>Bicycle service due dates</title>` |
| 3 | `<prompt>` |

| Line | Markup |
|---|---|
| 4 | `<paraBasic>Tire is due </paraBasic>` |
| 5 | `<variableRef variableName="TireDue"/>` |
| 6 | `</prompt>` |
| 7 | `<prompt>` |
| 8 | `<paraBasic>Gear changer is due </paraBasic>` |
| 9 | `<variableRef variableName="GearDue"/>` |
| 10 | `</prompt>` |
| 11 | `</message>` |

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*Fig 10 Example dialog user message session*

### 4.2.7 Complex dialog layout example

4.2.7.1 Complex dialog layout example

The example markup below and example IETP dialog (Refer to Fig 11) is a combination of the three (3) dialog types (menu, user entry, and message) using dialog grouping to display the information in a more logical layout.

The first dialog group (element <`dialogGroup`> lines 3-89, in the markup example below) contains information on bicycle tire size. The dialog group has a common title "Tire size" (line 4). The dialog types (element <`menu`> (lines 5-42) and element <`userEntry`> (lines 43-88)) are aligned horizontally (side-by-side). The group determines the tire size by:

– Measurement methods, of which the tire has four: ISO (ETRTO) (metric) (element <`menuChoice`> lines 6-14), Fractional (U.S.) (element <`menuChoice`> lines 15-23),

Decimal (U.S.) (element <menuChoice> lines 24-32), and French (metric) (element <menuChoice> lines 33-41) that are displayed in a dialog pull down (element <menu> attribute choiceType is "pulldown" line 5) menu.

– Tire size, of which there are three:
  - **ISO (ETRTO)** requires one (1) user entry (element <userEntry> attribute mandatory is "1" (lines 43-46)) and disables the remaining two user entries (element <enable> expression [*TireSizeMethod* notEqual "iso"] (lines 47-61) and second element <enable> expression [[*TireSizeMethod* equal "fractional"] OR [*TireSizeMethod* equal "decimal"]] (lines 62-88))
  - **French** requires two (2) user entries (element <userEntry> attribute mandatory is "1" (lines 43-46 and 47-61)) and disables the remaining one user entry (element <enable> expression [[*TireSizeMethod* equal "fractional"] OR [*TireSizeMethod* equal "decimal"]] (lines 62-88))
  - **Fractional** and **Decimal** require two (2) user entries (element <userEntry> attribute mandatory is "1" (lines 43-46 and 47-61)) and third user entry is optional (element <userEntry> attribute mandatory is "0" (lines 62-88)).

The second dialog group (element <dialogGroup> (lines 90-126)) contains information on the bicycle tire style. A separator divides to the two groups by setting the attribute dialogSeparator to "1" (line 90). The dialog group has a common title "Tire style" (line 91). The dialog types (element <menu> (lines 92-120) and element <message> (lines 121-125)) are aligned horizontally (side-by-side) and the group determines the tire style by:

– Tire style, of which there are three: Touring (lines 93-101), Racing (lines 102-110), and/or All Terrain (lines 111-119). Some tires are designed for one, two or all tire styles requiring a dialog multiple selection menu.
– A message (element <message> (lines 121-125)) to the user indicating that some bicycle tire style combinations may not be possible.

Complex dialog markup example:

| Line | Markup |
|---|---|
| 1 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 2 | `<title>Ordering tire</title>` |
| 3 | `<dialogGroup dialogSeparator="0">` |
| 4 | `<title>Tire size</title>` |
| 5 | `<menu choiceType="pulldown" menuChoiceFlow="list" choiceSelection="single" mandatory="1">` |
| 6 | `<menuChoice menuChoiceDefaultFlag="1">` |
| 7 | `<prompt><paraBasic>ISO (ETRTO)</paraBasic></prompt>` |
| 8 | `<assertion>` |
| 9 | `<variableRef variableName="TireSizeMethod"/>` |
| 10 | `<expression>` |
| 11 | `<stringValue>iso</stringValue>` |
| 12 | `</expression>` |

| Line | Markup |
|---|---|
| 13 | `</assertion>` |
| 14 | `</menuChoice>` |
| 15 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 16 | `<prompt><paraBasic>Fractional</paraBasic></prompt>` |
| 17 | `<assertion>` |
| 18 | `<variableRef variableName="TireSizeMethod"/>` |
| 19 | `<expression>` |
| 20 | `<stringValue>fractional</stringValue>` |
| 21 | `</expression>` |
| 22 | `</assertion>` |
| 23 | `</menuChoice>` |
| 24 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 25 | `<prompt><paraBasic>Decimal</paraBasic></prompt>` |
| 26 | `<assertion>` |
| 27 | `<variableRef variableName="TireSizeMethod"/>` |
| 28 | `<expression>` |
| 29 | `<stringValue>decimal</stringValue>` |
| 30 | `</expression>` |
| 31 | `</assertion>` |
| 32 | `</menuChoice>` |
| 33 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 34 | `<prompt><paraBasic>French</paraBasic></prompt>` |
| 35 | `<assertion>` |
| 36 | `<variableRef variableName="TireSizeMethod"/>` |
| 37 | `<expression>` |
| 38 | `<stringValue>french</stringValue>` |
| 39 | `</expression>` |
| 40 | `</assertion>` |
| 41 | `</menuChoice>` |
| 42 | `</menu>` |
| 43 | `<userEntry mandatory="1" dataEntryFieldLength="6">` |
| 44 | `<prompt><paraBasic></paraBasic></prompt>` |

| Line | Markup |
|---|---|
| 45 | `<variableRef variableName="size1"/>` |
| 46 | `</userEntry>` |
| 47 | `<userEntry mandatory="1" dataEntryFieldLength="6">` |
| 48 | `<enabledState>` |
| 49 | `<expression>` |
| 50 | `<expression>` |
| 51 | `<variableRef variableName="TireSizeMethod"/>` |
| 52 | `</expression>` |
| 53 | `<stringOperator stringOperation="notEqual"/>` |
| 54 | `<expression>` |
| 55 | `<stringValue>iso</stringValue>` |
| 56 | `</expression>` |
| 57 | `</expression>` |
| 58 | `</enabledState>` |
| 59 | `<prompt><paraBasic></paraBasic></prompt>` |
| 60 | `<variableRef variableName="size2"/>` |
| 61 | `</userEntry>` |
| 62 | `<userEntry mandatory="0" dataEntryFieldLength="6">` |
| 63 | `<enabledState>` |
| 64 | `<expression>` |
| 65 | `<expression>` |
| 66 | `<expression>` |
| 67 | `<variableRef variableName="TireSizeMethod"/>` |
| 68 | `</expression>` |
| 69 | `<stringOperator stringOperation="equal"/>` |
| 70 | `<expression>` |
| 71 | `<stringValue>fractional</stringValue>` |
| 72 | `</expression>` |
| 73 | `</expression>` |
| 74 | `<booleanOperator booleanOperation="or"/>` |
| 75 | `<expression>` |
| 76 | `<expression>` |

| Line | Markup |
|---|---|
| 77 | `<variableRef variableName="TireSizeMethod"/>` |
| 78 | `</expression>` |
| 79 | `<stringOperator stringOperation="equal"/>` |
| 80 | `<expression>` |
| 81 | `<stringValue>decimal</stringValue>` |
| 82 | `</expression>` |
| 83 | `</expression>` |
| 84 | `</expression>` |
| 85 | `</enabledState>` |
| 86 | `<prompt><paraBasic></paraBasic></prompt>` |
| 87 | `<variableRef variableName="size3"/>` |
| 88 | `</userEntry>` |
| 89 | `</dialogGroup>` |
| 90 | `<dialogGroup dialogSeparator="1">` |
| 91 | `<title>Tire style</title>` |
| 92 | `<menu choiceType="select" menuChoiceFlow="list" choiceSelection="multiple" mandatory="1">` |
| 93 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 94 | `<prompt><paraBasic>Touring</paraBasic></prompt>` |
| 95 | `<assertion>` |
| 96 | `<variableRef variableName="TireStyle"/>` |
| 97 | `<expression>` |
| 98 | `<stringValue>tour</stringValue>` |
| 99 | `</expression>` |
| 100 | `</assertion>` |
| 101 | `</menuChoice>` |
| 102 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 103 | `<prompt><paraBasic>Racing</paraBasic></prompt>` |
| 104 | `<assertion>` |
| 105 | `<variableRef variableName="TireStyle"/>` |
| 106 | `<expression>` |
| 107 | `<stringValue>race</stringValue>` |

| Line | Markup |
|---|---|
| 108 | `</expression>` |
| 109 | `</assertion>` |
| 110 | `</menuChoice>` |
| 111 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 112 | `<prompt><paraBasic>All Terrain</paraBasic></prompt>` |
| 113 | `<assertion>` |
| 114 | `<variableRef variableName="TireStyle"/>` |
| 115 | `<expression>` |
| 116 | `<stringValue>allterrain</stringValue>` |
| 117 | `</expression>` |
| 118 | `</assertion>` |
| 119 | `</menuChoice>` |
| 120 | `</menu>` |
| 121 | `<message>` |
| 122 | `<prompt>` |
| 123 | `<paraBasic>Selecting some multiple tire styles may not be possible.</paraBasic>` |
| 124 | `</prompt>` |
| 125 | `</message>` |
| 126 | `</dialogGroup>` |
| 127 | `</dialog>` |

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*Fig 11 Example complex dialog layout*

## 4.3 Example process data module

The example markup below and example IETP dialog (Refer to Fig 12 through Fig 20) represent an entire process data module, which includes external application, dialog box, procedural steps, and alternative choice.

The first part is the data module identification and status (element <identAndStatusSection> lines 2-31, in the markup example below) containing the data module number code and various status types' information. Most information is left out except for the applicability conditions within the data module (element <inlineApplicGroup> lines 10-27). The information contained in this element defines the applicability conditions used thruout the data module. The first applicability (lines 11-18) is when the user selects a correct answer and the second applicability (lines 19-26) is when the user selects a wrong answer. The system will filter the information when a reference from the alternative choice is requested.

The data module variables are declared in lines 34-41 and initialized to a value, as applicable.

The first node (screen of information) is in lines 43-50 and shown in Fig 12. The node begins a procedure to familiarize the user with the bike and provide a data module reference to the introduction.

The second node is in lines 51-84 and shown in Fig 13. The node is a dialog asking for information about the user. The dialog will verify (lines 61-63) the user's age is between 4-100. Fig 14 shows that when an invalid age is entered the error message (attribute errorMessage) is displayed. Additionally, the dialog determines if the user has ridden a bike previously (lines 65-75) through a menu selection. The information entered determines the nodes shown to the user (refer to Fig 15). Lines 77-82 is a reminder to the user about the dialog requirements.

Lines 85-162 evaluate John Smith's bike riding experience with the element <dmIf>. If John has not ridden a bike before, he will need some training before operating the bike. Otherwise, he will proceed directly to operating procedures (lines 163-177 and shown in Fig 20).

Unfortunately, John is inexperienced and requires additional information and training about the bike. John is required to pass a test before he can continue to operate the bike. John will repeat (lines 88-160) the loop dmseq nodes until he passes the test (line 95). The system keeps track of the number of attempts John takes to pass the test,. In the variable declarations, the counting variable *tourMistakes* is initialized to "0" (lines 89-94).

The next node (lines 97-105 and Fig 16) informs John that additional training is needed, since he is inexperienced. The following node (lines 106-108) is linked to a description data module to familiarize John with the bike. The node was personalized by using the variable *name* in the procedural step (line 100).

After completing the description data module, John is shown the next node (lines 109-114 and Fig 17) informing him that he will be tested on knowledge obtained. John can re-read the description data module by clicking the **BACK** button or clicking the **NEXT** button to take the test.

The test node (lines 115-143) is a menu dialog asking John which lever is the rear brake. If John selects the left brake lever (which is incorrect) the variable *tourCorrectAnswer* is asserted to FALSE and the variable *tourMistakes* is incremented (lines 121-128). If John selects the right brake lever (which is correct) the variable *tourCorrectAnswer* is asserted to TRUE and variable *tourFinished* is asserted to TRUE (lines 131-139).

After the test questions have been answered, the next node is determined by applicability of test answer (lines 144-158). The first alternative node (lines 145-151) references the applicability "wrongAnswer" (located at lines 19-26) that evaluates the variable *tourCorrectAnswer*

= FALSE. The second alternative node (lines 152-157) references the applicability "`rightAnswer`" (locate at lines 11-18) that evaluates the variable *`tourCorrectAnswer`* = TRUE.

Since John selected the left brake lever (he did not read carefully) the first alternative node is shown (refer to Fig 18) and displays the number of mistakes made by John by using the element <`variableRef`> and the variable *`tourMistakes`* (line 149). Too bad for John, he now must repeat the previous nodes to continue,since the criteria to remain in the loop is the variable *`tourFinished`* = FALSE (line 95). John will repeat nodes in Fig 16, and Fig 17. This time John read carefully and passed the test (Fig 19), and the asserted variable *`tourFinished`* is set to TRUE allowing him to exit the loop.

John has passed the test and is shown the last node (lines 163-177 and Fig 20), the procedure showing how to operate the bike.

| Line | Markup |
|---|---|
| 1 | `<dmodule>` |
| 2 | `<identAndStatusSection>` |
| 3 | `<dmAddress>...</dmAddress>` |
| 4 | `<dmStatus>` |
| 5 | `<security securityClassification="01"/>` |
| 6 | `<responsiblePartnerCompany>...</responsiblePartnerCompany>` |
| 7 | `<originator>...</originator>` |
| 8 | `<applicCrossRefTableRef>...</applicCrossRefTableRef>...` |
| 9 | `<applic>...</applic>` |
| 10 | `<referencedApplicGroup>` |
| 11 | `<applic id="rightAnswer">` |
| 12 | `<displayText><simplePara>Inexperienced rider has the right answer.</simplePara></displayText>` |
| 13 | `<expression>` |
| 14 | `<expression><variableRef variableName="tourCorrectAnswer"/></expression>` |
| 15 | `<booleanOperator booleanOperation="equal"/>` |
| 16 | `<expression><booleanValue><trueValue/></booleanValue></expression>` |
| 17 | `</expression>` |
| 18 | `</applic>` |
| 19 | `<applic id="wrongAnswer">` |
| 20 | `<displayText><simplePara>Inexperienced rider has the wrong answer.</simplePara></displayText>` |
| 21 | `<expression>` |

| Line | Markup |
|---|---|
| 22 | <expression><variableRef variableName="tourCorrectAnswer"/></expression> |
| 23 | <booleanOperator booleanOperation="equal"/> |
| 24 | <expression><booleanValue><falseValue/></booleanValue></expression> |
| 25 | </expression> |
| 26 | </applic> |
| 27 | </referencedApplicGroup> |
| 28 | <brexDmRef>...</brexDmRef> |
| 29 | <qualityAssurance>...</qualityAssurance> |
| 30 | </dmStatus> |
| 31 | </identAndStatusSection> |
| 32 | <content> |
| 33 | <process> |
| 34 | <variableDeclarations> |
| 35 | <variable valueType="string" variableName="name"/> |
| 36 | <variable valueType="integer" variableName="age"/> |
| 37 | <variable valueType="string" variableName="level"> |
| | <initialize> |
| | <expression> |
| | <stringValue>amateur</stringValue> |
| | </expression> |
| | </initialize> |
| | </variable> |
| 38 | <variable valueType="boolean" variableName="tourCorrectAnswer"> |
| | <initialize> |
| | <expression><booleanValue><falseValue/></booleanValue></expression> |
| | </initialize> |
| | </variable> |

| Line | Markup |
|---|---|
| 39 | `<variable valueType="boolean" variableName="tourFinished">` |
| | `<initialize>` |
| | `<expression>` |
| | `<booleanValue><falseValue/></booleanValue>` |
| | `</expression>` |
| | `</initialize>` |
| | `</variable>` |
| 40 | `<variable valueType="integer" variableName="tourMistakes"/>` |
| 41 | `</variableDeclarations>` |
| 42 | `<dmSeq>` |
| 43 | `<dmNode>` |
| 44 | `<proceduralStep>` |
| 45 | `<title>Prerequisities</title>` |
| 46 | `<para>Please make sure you are familiar with the functional description of a bicycle:` |
| 47 | `<dmRef xlink:href="DMC_S1000DBIKE_AAA_D00_00_00_00AA_042A_A" xlink:title="Functional description of a bicycle">` |
| | `<dmRefIdent>` |
| | `<dmCode assyCode="00" disassyCode="00" disassyCodeVariant="00" infoCode="42A" infoCodeVariant="A" itemLocationCode="A" modelIdentCode="S1000DBIKE" subSubSystemCode="0" subSystemCode="D" systemCode="AAA" systemDiffCode="ALL"/>` |
| | `</dmRefIdent>` |
| | `</dmRef>` |
| 48 | `</para>` |
| 49 | `</proceduralStep>` |
| 50 | `</dmNode>` |
| 51 | `<dmNode>` |
| 52 | `<dialog>` |
| 53 | `<dialogGroup>` |
| 54 | `<userEntry>` |
| 55 | `<prompt><paraBasic>Enter your name</paraBasic></prompt>` |

| Line | Markup |
|---|---|
| 56 | `<variableRef variableName="name"/>` |
| 57 | `</userEntry>` |
| 58 | `<userEntry dataEntryFieldLength="3">` |
| 59 | `<prompt><paraBasic>Enter your age</paraBasic></prompt>` |
| 60 | `<variableRef variableName="age"/>` |
| 61 | `<validate errorMessage="Age must be within 4 to 100">` |
| 62 | `<expression>` |
| | `<expression>` |
| | `<expression><variableRef variableName="age"/></expression>` |
| | `<numberOperator numberOperation="greaterThanOrEqual"/>` |
| | `<expression><integerValue>4</integerValue></expression>` |
| | `</expression>` |
| | `<booleanOperator booleanOperation="and"/>` |
| | `<expression>` |
| | `<expression><variableRef variableName="age"/></expression>` |
| | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| | `<expression><integerValue>100</integerValue></expression>` |
| | `</expression>` |
| | `</expression>` |
| 63 | `</validate>` |
| 64 | `</userEntry>` |
| 65 | `<menu choiceSelection="single" choiceType="select">` |
| 66 | `<prompt><paraBasic>Did you ever ride a bicycle?</paraBasic></prompt>` |
| 67 | `<menuChoice>` |
| 68 | `<prompt><paraBasic>Yes</paraBasic></prompt>` |
| 69 | `<assertion>` |
| | `<variableRef variableName="level"/>` |
| | `<expression><stringValue>experienced</stringValue></expression>` |
| | `</assertion>` |
| 70 | `</menuChoice>` |

| Line | Markup |
|---|---|
| 71 | `<menuChoice>` |
| 72 | `<prompt><paraBasic>No</paraBasic></prompt>` |
| 73 | `<noAssertions/>` |
| 74 | `</menuChoice>` |
| 75 | `</menu>` |
| 76 | `</dialogGroup>` |
| 77 | `<dialogGroup dialogSeparator="1">` |
| 78 | `<message>` |
| 79 | `<prompt><paraBasic>Age must be within 4 to 100</paraBasic></prompt>` |
| 80 | `<prompt><paraBasic>All fields are mandatory</paraBasic></prompt>` |
| 81 | `</message>` |
| 82 | `</dialogGroup>` |
| 83 | `</dialog>` |
| 84 | `</dmNode>` |
| 85 | `<dmIf>` |
| 86 | `<expression>` |
| | `<booleanFunction booleanAction="not"/>` |
| | `<expression>` |
| | `<expression><variableRef variableName="level"/></expression>` |
| | `<numberOperator numberOperation="equal"/>` |
| | `<expression><stringValue>experienced</stringValue></expression>` |
| | `</expression>` |
| | `</expression>` |
| 87 | `<dmThenSeq>` |
| 88 | `<dmLoop>` |
| 89 | `<variablePreSet>` |
| 90 | `<assertion>` |
| 91 | `<variableRef variableName="tourMistakes"/>` |
| 92 | `<expression><integerValue>0</integerValue></expression>` |
| 93 | `</assertion>` |
| 94 | `</variablePreSet>` |

| Line | Markup |
|---|---|
| 95 | <expression> |
| | <expression><variableRef variableName="tourFinished"/></expression> |
| | <numberOperator numberOperation="equal"/> |
| | <expression><booleanValue><falseValue/></booleanValue></expression> |
| | </expression> |
| 96 | <dmSeq> |
| 97 | <dmNode> |
| 98 | <proceduralStep> |
| 99 | <title>Introduction</title> |
| 100 | <para>Dear <variableRef variableName="name"/>, because you are an inexperienced user, you will be presented a brief introduction on how to operate a bicycle.</para> |
| 101 | </proceduralStep> |
| 102 | <proceduralStep> |
| 103 | <para>Click <emphasis>next</emphasis>.</para> |
| 104 | </proceduralStep> |
| 105 | </dmNode> |
| 106 | <dmNode> |
| 107 | <dmRef xlink:href="DMC_S1000DBIKE_AAA_D00_00_00_00AA_043A_A"> |
| | <dmRefIdent> |
| | <dmCode assyCode="00" disassyCode="00" disassyCodeVariant="00" infoCode="43A" infoCodeVariant="A" itemLocationCode="A" modelIdentCode="S1000DBIKE" subSubSystemCode="0" subSystemCode="D" systemCode="AAA" systemDiffCode="ALL"/> |
| | </dmRefIdent> |
| | </dmRef> |
| 108 | </dmNode> |
| 109 | <dmNode> |
| 110 | <proceduralStep> |
| 111 | <title>Did you really read the instructions?</title> |
| 112 | <para>Before you can proceed to the practical section of this manual, you will be given a simple question to test whether you read the instructions carefully.</para> |

| Line | Markup |
|---|---|
| 113 | `</proceduralStep>` |
| 114 | `</dmNode>` |
| 115 | `<dmNode>` |
| 116 | `<dialog>` |
| 117 | `<menu choiceSelection="single" choiceType="select">` |
| 118 | `<prompt><paraBasic>The rear brake is operated by</paraBasic></prompt>` |
| 119 | `<menuChoice>` |
| 120 | `<prompt><paraBasic>Left brake lever</paraBasic></prompt>` |
| 121 | `<assertion>` |
| 122 | `<variableRef variableName="tourCorrectAnswer"/>` |
| 123 | `<expression><booleanValue><falseValue/></booleanValue></expression>` |
| 124 | `</assertion>` |
| 125 | `<assertion>` |
| 126 | `<variableRef variableName="tourMistakes"/>` |
| 127 | `<expression>` |
| | `<expression><variableRef variableName="tourMistakes"/></expression>` |
| | `<numberOperator numberOperation="plus"/>` |
| | `<expression><integerValue>1</integerValue></expression>` |
| | `</expression>` |
| 128 | `</assertion>` |
| 129 | `</menuChoice>` |
| 130 | `<menuChoice>` |
| 131 | `<prompt><paraBasic>Right brake lever</paraBasic></prompt>` |
| 132 | `<assertion>` |
| 133 | `<variableRef variableName="tourCorrectAnswer"/>` |
| 134 | `<expression><booleanValue><trueValue/></booleanValue></expression>` |
| 135 | `</assertion>` |
| 136 | `<assertion>` |
| 137 | `<variableRef variableName="tourFinished"/>` |
| 138 | `<expression><booleanValue><trueValue/></booleanValue></expression>` |

| Line | Markup |
|---|---|
| 139 | `</assertion>` |
| 140 | `</menuChoice>` |
| 141 | `</menu>` |
| 142 | `</dialog>` |
| 143 | `</dmNode>` |
| 144 | `<dmNodeAlt>` |
| 145 | `<dmNode applicRefId="wrongAnswer">` |
| 146 | `<proceduralStep>` |
| 147 | `<title>Wrong answer!</title>` |
| 148 | `<para>You will be given the introduction once again.</para>` |
| 149 | `<para>Number of mistakes: <variableRef variableName="tourMistakes"/></para>` |
| 150 | `</proceduralStep>` |
| 151 | `</dmNode>` |
| 152 | `<dmNode applicRefId="rightAnswer">` |
| 153 | `<proceduralStep>` |
| 154 | `<title>Correct!</title>` |
| 155 | `<para>You can now continue with the practical part of this manual.</para>` |
| 156 | `</proceduralStep>` |
| 157 | `</dmNode>` |
| 158 | `</dmNodeAlt>` |
| 159 | `</dmSeq>` |
| 160 | `</dmLoop>` |
| 161 | `</dmThenSeq>` |
| 162 | `</dmIf>` |
| 163 | `<dmNode>` |
| 164 | `<proceduralStep>` |
| 165 | `<title>Practical part</title>` |
| 166 | `<para>Take the bicycle from the garage.</para>` |
| 167 | `</proceduralStep>` |
| 168 | `<proceduralStep>` |
| 169 | `<para>Clean the bicycle.</para>` |

| Line | Markup |
|---|---|
| 170 | `</proceduralStep>` |
| 171 | `<proceduralStep>` |
| 172 | `<para>Sit on the bike.</para>` |
| 173 | `</proceduralStep>` |
| 174 | `<proceduralStep>` |
| 175 | `<para>...and RIDE!</para>` |
| 176 | `</proceduralStep>` |
| 177 | `</dmNode>` |
| 178 | `</dmSeq>` |
| 179 | `</process>` |
| 180 | `</content>` |
| 181 | `</dmodule>` |

**Prerequisities**

1. Please make sure you are familiar with the functional description of a bicycle: Functional description of a bicycle

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*Fig 12 Example process data module node 1*

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*Fig 13 Example process data module node 2*

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*Fig 14 Example process data module node 2 with invalid entry*

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*Fig 15 Example process data module node 2 with valid entries*

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*Fig 16 Example process data module node 3*

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*Fig 17 Example process data module node 5*

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*Fig 18 Example process data module node 6 with wrong answer and node 7*

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*Fig 19 Example process data module node 6 with right answer and node 7*

**Practical part**

1. **Take the bicycle from the garage.**
2. **Clean the bicycle from the dust.**
3. **Sit on the bike.**
4. **...and RIDE!**

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*Fig 20 Example process data module node 8*

# Chapter 3.9.5.2.11

## *Content section - Technical information repository*

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| Chap 3.9.5.2.11.10 | Technical information repository - Functional and/or physical areas |
| Chap 3.9.5.2.11.11 | Technical information repository - Controls and indicators |
| Chap 4.13.2 | Optimizing and reuse - Technical information repository data module |

# 1 General

The content section of a technical information repository data module must be structured in accordance with one of the following information types:

- Functional items. Refer to Chap 3.9.5.2.11.1.
- Circuit breakers. Refer to Chap 3.9.5.2.11.2.
- Parts. Refer to Chap 3.9.5.2.11.3.
- Zones. Refer to Chap 3.9.5.2.11.4.
- Access points. Refer to Chap 3.9.5.2.11.5.
- Organizations. Refer to Chap 3.9.5.2.11.6.
- Supplies, properties. Refer to Chap 3.9.5.2.11.7.
- Supplies, requirements. Refer to Chap 3.9.5.2.11.8.
- Tools. Refer to Chap 3.9.5.2.11.9.
- Functional and/or Physical areas. Refer to Chap 3.9.5.2.11.10.
- Controls and Indicators. Refer to Chap 3.9.5.2.11.11.

Among these information types, the general mechanism of those technical repository data modules is described in Chap 4.13.2.

# 2 Technical repository data module content

## 2.1 Content

**Description:** This element is used to contain the technical information repository data module core content.

**Markup element:** <`content`> (M)

**Attributes:**

- `id` (O), the identifier of the <`content`> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.
- <`techRepository`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the technical information repositories or not.

**Markup example:**

```
<content>
<techRepository>...</techRepository>
</content>
```

### 2.1.1 Technical repository

**Description:** This element is used to contain one type of technical information repository to be chosen among the list of technical information repository types.

**Markup element:** <`techRepository`> (M)

**Attributes:**

- `id` (O), the identifier of the <`techRepository`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

One and only one of the following elements has to be used:

– `<functionalItemRepository>` (O). Refer to Chap 3.9.5.2.11.1.
– `<circuitBreakerRepository>` (O). Refer to Chap 3.9.5.2.11.2.
– `<partRepository>` (O). Refer to Chap 3.9.5.2.11.3.
– `<zoneRepository>` (O). Refer to Chap 3.9.5.2.11.4.
– `<accessPoint>` (O). Refer to Chap 3.9.5.2.11.5.
– `<toolRepository>` (O). Refer to Chap 3.9.5.2.11.6.
– `<enterpriseRepository>` (O). Refer to Chap 3.9.5.2.11.7.
– `<supplyRepository>` (O). Refer to Chap 3.9.5.2.11.8.
– `<supplyRqmtRepository>` (O). Refer to Chap 3.9.5.2.11.9.
– `<functionalPhysicalAreaRepository>` (O). Refer to Chap 3.9.5.2.11.10.
– `<controlIndicatorRepository>` (O). Refer to Chap 3.9.5.2.11.11.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Technical information repository types to be used or not.

**Markup example:**

```
<techRepository>
<functionalItemRepository>...</functionalItemRepository>
</techRepository>
```

# 3 Business rules decisions

Business rules decisions include but are not limited to the following:

**Use of technical information repository**. Use of the technical information repository data module is optional. As its use changes the concept of self-contained data modules, the project or the organization must first decide whether to use it or not. Refer to Para 2.

**Technical information repository data module types to be used**. The project or the organization must decide which technical information repository data module types are to be used. Refer to Para 2.

# 4 Examples

```
– <content>
  <techRepository>
– <functionalItemRepository>...</functionalItemRepository>
– </techRepository>
  </content>
```

# Chapter 3.9.5.2.11.1

## *Technical information repository - Functional items*

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| Chap 4.13.3 | Optimizing and reuse - Container data module |

## 1 General

The technical information repository data module is used to capture and represent functional items and their properties.

The functional item can be used to uniquely identify an item performing a function in a given system at a given position, using the element <`functionalItemRef`>. Refer to Chap 3.9.5.1 for detail explanation.

# 2 Functional item technical repository data module content

## 2.1 Functional item repository

**Description:** This element is used to provide a list of functional items and their associated properties.

**Markup element:** <functionalItemRepository> (M)

**Attributes:**

- `id` (O), the identifier of the <`functionalItemRepository`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`functionalItemSpec`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the functional item technical repository data module or not.
- Use of a single or multiple functional item repository data modules.

**Markup example:**

```
<functionalItemRepository>
<functionalItemSpec>...</functionalItemSpec>
</functionalItemRepository>
```

### 2.1.1 Functional item specification

**Description:** This element represents one functional item. It contains its associated properties.

The functional item has a container alternate structure. Indeed, some of its properties are generic in that they do not differ from one product instance to another. Some other properties depend on the product configuration. Generic properties are directly defined under the functional item (container level), and other properties are defined under the alternate functional items. For some properties appearing both at container and alternate levels, the following rule must be applied: if the property is fulfilled in the alternate element, it supersedes the generic value stored in the container element.

Following container/alternate principles, data modules only refer to containers. Retrieval of the accurate alternate is achieved using applicability annotations.

Refer to Chap 4.13.3 for detail explanation of the container concept.

**Markup element:** <`functionalItemSpec`> (M)

**Attributes:**

- `id` (O), the identifier of the <`functionalItemSpec`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`functionalItemIdent`> (M). Refer to Para 2.1.1.1.
- <`name`> (M). Refer to Para 2.1.1.2.
- <`functionalPhysicalAreaRef`> (O). Refer to Chap 3.9.5.2.11.10.
- <`functionaItemRefGroup`> (O). Refer to Para 2.1.1.3.
- <`functionalItemAlt`> (M). Refer to Para 2.1.1.4.
- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<functionalItemSpec>
<functionalItemIdent functionalItemNumber="..."
functionalItemType="..."/>

<name>...</name>

<functionalItemAlt>...</functionalItemAlt>
</functionalItemSpec>
```

2.1.1.1 Functional item identifier

**Description:** Contrary to the attribute `id`, this element identifies semantically the functional item as a result of its attributes. The codification of functional item identifier is up to the project or the organization.

**Markup element:** <`functionalItemIdent`> (M)

**Attributes:**

- `id` (O), the identifier of the <`functionalItemIdent`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `functionalItemNumber` (M), the functional item number as assigned by the functional item designer. Refer to Chap 3.9.5.1.
- `functionalItemType` (M), the type of the functional item. Refer to Chap 3.9.5.1.
- `manufacturerCodeValue` (O), the CAGE code of the functional item designer. As there is no standardized rule to assign a functional item number, the CAGE code of the functional item designer ensures the uniqueness of a functional item number.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- definition of the functional item types

– definition of the functional item number codification

**Markup example:**

```
<functionalItemIdent functionalItemNumber="8-DG-1"
functionalItemType="exact" manufacturerCodeValue="FAPE3"/>
```

2.1.1.2 Functional item name

**Description:** This element contains the textual functional definition of the functional item.

In some particular cases, the functional name can differ for some product instances. If it is different, the name must be provided also at the functional item alternate level. This name supersedes the one provided at container level.

**Markup element:** <name> (M)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– definition of the functional item name

**Markup example:**

```
<name> Left window-sliding</name>
```

2.1.1.3 References to other functional items

**Description:** This element provides relationships and the types of relationships with other functional items (eg sub-functional items or software functional items related to a hardware functional item).

Depending on the relationships, it can depend on the product instances or not. As a result, this element can be found at both container and alternate levels.

**Markup element:** <functionalItemRefGroup> (O)

**Attributes:**

– id (O), the identifier of the <functionalItemRefGroup> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– functionalItemRefType (M), the type of the relationship between the two functional items.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <functionalItemRef> (M). Refer to Chap 3.9.5.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– definition of the functional item relationship types

**Markup example:**

```
<functionalItemRefGroup functionalItemRefType="software">
<functionalItemRef .../>
</functionalItemRefGroup>
```

2.1.1.4 Alternate functional item

**Description:** This element contains the properties of the functional item that depend on the Product configuration. Thus this element contains applicability.

Configuration consistency between the various alternate functional items must be ensured. This means that, for a given product configuration and under given operational conditions, only one alternate functional item is applicable at one time for a container functional item.

**Markup element:** <functionalItemAlt> (M)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <functionalItemAlt> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– altNumber (O), the alternate number to identify the alternate
– normativeComponentFlag (O), a flag to specify whether the functional item is a normative component or not. This attribute can have one of the following values:
  - "1" (yes) for normative component
  - "0" (no) for non-normative component
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <name> (O). Refer to Para 2.1.1.2.
– <location> (O). Refer to Para 2.1.1.4.1.
– <accessFrom> (O). Refer to Para 2.1.1.4.2.
– <functionalPhysicalAreaRef> (O). Refer to Chap 3.9.5.2.11.10.
– <reqQuantity> (O), the required quantity. Refer to Chap 3.9.5.2.1.10.
– <functionalItemRefGroup> (O). Refer to Para 2.1.1.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of an alternate number

**Markup example:**

```
<functionalItemAlt applicRefId="applic-001">
...
</functionalItemAlt>
```

2.1.1.4.1 *Functional item location*

**Description:** This element is used to specify in which zone and/or optionally on which electric panel with coordinates if necessary, the functional item is located.

**Markup element:** <`location`> (O)

**Attributes:**

- `id` (O), the identifier of the <`location`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`zoneRef`> (O). Refer to Chap 3.9.5.2.1.10.
- <`accessPointRef`> (O). Refer to Chap 3.9.5.2.1.10.
- <`quantity`> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<location>
<zoneRef .../>
</location>
```

2.1.1.4.2 *Accesses to the functional item*

**Description:** This element allows specifying the zone(s) and/or access point(s) from which the functional item can be reached .

**Markup element:** <`accessFrom`> (O)

**Attributes:**

- `id` (O), the identifier of the <`accessFrom`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`zoneRef`> (O). Refer to Chap 3.9.5.2.1.10.
- <`accessPointRef`> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessFrom>
<accessPointRef .../>
</accessFrom>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the functional item technical information repository data modules.** The project or the organization must decide if the functional item technical information repository must be used or not. Refer to Para 2.

**Use of several functional item technical information repository data modules.** The project or the organization must decide whether there is one single functional item technical information repository data module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the functional item name.** The project or the organization must decide on the format of the functional item name and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.2.

**Definition of the functional item relationship types.** The project or the organization must define the types of relationships to be implemented between functional items (eg sub-functional items, software functional items related to a hardware functional item) and how to populate the attribute `functionalItemRefType`. Refer to Para 2.1.1.3.

**Use of an alternate number.** The project or the organization must decide on the use of an alternate number or not. If used, the project or the organization must determine how to populate the attribute `altNumber` and must ensure it is consistently applied. Refer to Para 2.1.1.4.

# 4 Examples

The following example illustrates a functional item which is configuration dependant. As the zone can differ from one product range to the other, two alternate functional items have been defined.

```
<techRepository>
<functionalItemRepository>
<functionalItemSpec>
<functionalItemIdent functionalItemNumber="40-MJ-49"
functionalItemType="exact"/>
<name>P/BSW-MANUA) INFLATION,(DOOR U3R</name>
<functionalPhysicalAreaRef systemCode="52" subSystemCode="7"
subSubSystemCode="1" assyCode="28"/>
<functionalItemAlt altNumber="00001" applicRefId="appl-001"
normativeComponentFlag="1">
<location><zoneRef zoneNumber="292"/></location>
</functionalItemAlt>
<functionalItemAlt altNumber="00002" applicRefId="appl-002">
<location><zoneRef zoneNumber="293"/></location>
</functionalItemAlt>
</functionalItemSpec>
</functionalItemRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.2

## *Technical information repository - Circuit breakers*

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## 1 General

The technical information repository data module is used to capture and represent circuit breakers and their associated properties.

The circuit breaker can be used to uniquely identify a device used to break properly an electrical circuit or to inactivate an electrical function, using the element <`circuitBreakerRef`>. Refer to Chap 3.9.5.2.1.10 for detail explanation.

# 2 Circuit breaker technical repository data module content

## 2.1 Circuit breaker repository

**Description:** This element is used to provide a list of circuit breakers and their associated properties.

**Markup element:** <circuitBreakerRepository> (M)

**Attributes:**

- `id` (O), the identifier of the <`circuitBreakerRepository`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`circuitBreakerSpec`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the circuit breaker technical repository data module or not
- use of a single or multiple circuit breaker repository data modules

**Markup example:**

```
<circuitBreakerRepository>
<circuitBreakerSpec>...</circuitBreakerSpec>
</circuitBreakerRepository>
```

### 2.1.1 Circuit breaker specification

**Description:** This element represents one circuit breaker. It contains its associated properties.

The circuit breaker has a container alternate structure. Indeed, some of its properties are generic in that they do not differ from one product instance to another. Some other properties depend on the product configuration. Generic properties are directly defined under the circuit breaker (container level), other properties are defined under the alternate circuit breakers.

For some properties appearing both at container and alternate levels, the following rule must be applied: if the property is fulfilled in the alternate element, it supersedes the generic value stored in the container element.

Following container/alternate principles, data modules only refer to containers. Retrieval of the accurate alternate is achieved using applicability annotations.

Refer to Chap 4.13.3 for detail explanation of the container concept.

**Markup element:** <`circuitBreakerSpec`> (M)

**Attributes:**

- `id` (O), the identifier of the <`circuitBreakerSpec`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <circuitBreakerIdent> (M). Refer to Para 2.1.1.1.
- <name> (M). Refer to Para 2.1.1.2.
- <functionalPhysicalAreaRef> (O) - populate in accordance with Chap 3.9.5.2.11.10.
- <circuitBreakerAlt> (M). Refer to Para 2.1.1.3.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<circuitBreakerSpec>
<circuitBreakerIdent circuitBreakerNumber="..."/>

<name>...</name>

<circuitBreakerAlt>...</circuitBreakerAlt>
</circuitBreakerSpec>
```

2.1.1.1 Circuit breaker identifier

**Description:** Contrary to the attribute id, this element identifies semantically the functional item as a result of its attributes.

**Markup element:** <circuitBreakerIdent> (M)

**Attributes:**

- id (O), the identifier of the <circuitBreakerIdent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- circuitBreakerNumber (M), the circuit breaker number. Refer to Chap 3.9.5.2.1.10.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<circuitBreakerIdent circuitBreakerNumber="9LW"/>
```

2.1.1.2 Circuit breaker name

**Description:** This element contains the textual functional definition of the circuit breaker.

In some particular cases, this name can differ for some product instances. If it is different, the name must be provided also at circuit breaker alternate level. This name supersedes the one provided at container level.

**Markup element:** <`name`> (M)

**Attributes:**

– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the circuit breaker name.

**Markup example:**

```
<name>FMC-FAN PWR SPLY</name>
```

2.1.1.3 Alternate circuit breaker

**Description:** This element contains the properties of the circuit breaker that depend on the Product configuration. Thus this element contains applicability.

Configuration consistency between the various alternate circuit breakers must be ensured. This means that for a given product configuration and under given operational conditions, only one alternate circuit breaker is applicable at one time for a container circuit breaker.

**Markup element:** <`circuitBreakerAlt`> (M)

**Attributes:**

– `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
– `id` (O), the identifier of the <`circuitBreakerAlt`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `altNumber` (O), the alternate number.
– `monitoredFlag` (O), a flag to specify whether the circuit breaker is monitored or not. This attribute can have one of the following values:
  - "`1`" (yes) for monitored circuit breakers
  - "`0`" (no) for non-monitored circuit breakers
– `collaredCircuitBreakerFlag` (O), a flag to specify whether the circuit breaker is fixed with a collar or not. This attribute can have one of the following values:
  - "`1`" (yes) for collared circuit breakers
  - "`0`" (no) for non-collared circuit breakers
– `provisionedFlag` (O), a flag to specify whether the circuit breaker is a provisioned one or not. This attribute can have one of the following values:
  - "`1`" (yes) for provisioned circuit breakers
  - "`0`" (no) for non-provisioned circuit breakers

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`name`> (O). Refer to Para 2.1.1.2.
– <`circuitBreakerClass`> (M). Refer to Para 2.1.1.3.1.
– <`location`> (O). Refer to Para 2.1.1.3.2.
– <`functionalPhysicalAreaRef`> (O). Refer to Chap 3.9.5.2.11.10.
– <`functionalItemRefGroup`> (O). Refer to Chapter 3.9.5.2.11.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of an alternate number.

**Markup example:**

```
<circuitBreakerAlt applicRefId="applic-001">
...
</circuitBreakerAlt>
```

*2.1.1.3.1 Circuit breaker class*

**Description:** This element indicates whether the circuit breaker is electronic or electro-mechanic.

**Markup element:** <`circuitBreakerClass`> (M)

**Attributes:**

– `id` (O), the identifier of the <`circuitBreakerClass`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `circuitBreakerType` (M), the circuit breaker type (electronic or electro-mechanic). This attribute can have one of the following values:
  - "`eltro`" for electronic circuit breakers
  - "`elmec`" for electro-mechanic circuit breakers
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<circuitBreakerClass circuitBreakerType="eltro"/>
```

*2.1.1.3.2 Circuit breaker location*

**Description:** This element is used to specify on which electric panel, with coordinates if necessary, the circuit breaker is located.

**Markup element:** <`location`> (O)

**Attributes:**

- id (O), the identifier of the <location> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <zoneRef> (O). Refer to Chap 3.9.5.2.1.10.
- <accessPointRef> (O). Refer to Chap 3.9.5.2.1.10.
- <quantity> (O), the coordinates on the access panel. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<location>
<accessPointRef .../>
</location>
```

*2.1.1.3.3 References to functional items*

**Description:** This element provides relationships and the types of relationships with other functional items.

**Markup element:** <functionalItemRefGroup> (O)

**Attributes:**

- id (O), the identifier of the <functionalItemRefGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- functionalItemRefType (M), the type of the relationship with the functional item.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <functionalItemRef> (M). Refer to Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the functional item relationship types.

**Markup example:**

```
<functionalItemRefGroup functionalItemRefType="card">
<functionalItemRef .../>
</functionalItemRefGroup>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the circuit breaker repository data modules.** The project or the organization must decide if the circuit breaker technical information repository must be used or not. Refer to Para 2.

**Use of several circuit breaker technical information repository data modules.** The project or the organization must decide whether there is one single circuit breaker technical information repository data module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the circuit breaker name.** The project or the organization must decide on the format of the functional item name and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.2.

**Use of an alternate number.** The project or the organization must decide on the use of an alternate number or not. If used, the project or the organization must determine how to populate the attribute `altNumber` and must ensure it is consistently applied. Refer to Para 2.1.1.3.

**Definition of the functional item relationship types.** The project or the organization must define the types of relationships to be implemented between a circuit breaker and functional items and how to populate the attribute `functionalItemRefType`. Refer to Para 2.1.1.3.

# 4 Examples

```
<referencedApplicGroup>
<applic id="appl-001">
<displayText><simplePara>SN: 001-005</simplePara></displayText>
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValues="001~005"/>
</applic>
<applic id="appl-002">
<displayText><simplePara>SN: 006-019</simplePara></displayText>
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValues="006~019"/>
</applic>
</referencedApplicGroup>
...
<techRepository>
<circuitBreakerRepository>
<circuitBreakerSpec>
<circuitBreakerIdent
circuitBreakerNumber="CB9LW"></circuitBreakerIdent>
<name>FMC-C PWR SPLY</name>
<functionalPhysicalAreaRef systemCode="33" subSystemCode="2"
subSubSystemCode="0" assyCode="00"/>
<circuitBreakerAlt altNumber="0001" applicRefId="appl-001"
monitoredFlag="1" provisionedFlag="1">
<circuitBreakerClass circuitBreakerType="eltro"/>
<location><zoneRef zoneNumber="121"/></location>
</circuitBreakerAlt>
<circuitBreakerAlt altNumber="0002" applicRefId="appl-002"
monitoredFlag="1" provisionedFlag="1">
<name>FMC-FAN PWR SPLY</name>
<circuitBreakerClass circuitBreakerType="eltro"/>
<location><zoneRef zoneNumber="121"/></location>
```

```
</circuitBreakerAlt>
</circuitBreakerSpec>
</circuitBreakerRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.3

## *Technical information repository - Parts*

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# 1 General

The technical information repository data module is used to capture and represent parts and their associated properties.

The part identification can be used to uniquely identify an item of the Product, forming part of an assembly or subassembly which is not normally broken down further.

# 2 Part technical repository data module content

## 2.1 Part repository

**Description:** This element is used to provide a list of parts and their associated properties.

**Markup element:** <partRepository> (M).

**Attributes:**

- id (O), the identifier of the <partRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <partSpec> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the part technical repository data module or not.
- Use of a single or multiple part repository data modules.

**Markup example:**

```
<partRepository>
<partSpec>...</partSpec>
</partRepository>
```

### 2.1.1 Part specification

**Description:** This element represents a part. It contains its associated properties.

**Markup element:** <partSpec> (M).

**Attributes:**

- id (O), the identifier of the <partSpec> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <partIdent> (M). Refer to Para 2.1.1.1.
- <itemIdentData> (M). Refer to Para 2.1.1.2.
- <procurementData> (O). Refer to Para 2.1.1.3.
- <techData> (O). Refer to Para 2.1.1.4.
- <partRefGroup> (O). Refer to Para 2.1.1.5.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<partSpec>
<partIdent partNumberValue="..." manufacturerCodeValue="..."/>

<itemIdentData>...</itemIdentData>
</partSpec>
```

2.1.1.1 Part identifier

**Description:** Contrary to the attribute `id`, this element identifies semantically the part as a result of its attributes.

**Markup element:** <`partIdent`> (M).

**Attributes:**

- `id` (O), the identifier of the <`partIdent`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `partNumberValue` (M), the part number. Refer to Chap 3.9.5.2.7.
- `manufacturerCodeValue` (M), the CAGE/CAGE code of the part manufacturer. As there is no standardized rule to assign a part number, the CAGE code of the part manufacturer ensures the uniqueness of a part number. Refer to Chap 3.9.5.2.7.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<partIdent partNumberValue="0-0204504-1"
manufacturerCodeValue="F0286"/>
```

2.1.1.2 Description data

**Description:** This element groups the properties that describe the part.

**Markup element:** <`itemIdentData`> (M).

**Attributes:**

- `id` (O), the identifier of the <`itemIdentData`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`name`> (M). Refer to Para 2.1.1.2.1.
- <`partKeyword`> (O). Refer to Para 2.1.1.2.2.
- <`shortName`> (O). Refer to Para 2.1.1.2.3.

- <overlengthPartNumber> (O). Refer to Para 2.1.1.2.4.
- <stockNumber> (O). Refer to Para 2.1.1.2.5.
- <natoStockNumber> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<itemIdentData>
<name>...</name>
</itemIdentData>
```

*2.1.1.2.1 Part designation*

**Description:** This element contains the textual designation of the part.

**Markup element:** <name> (M).

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the part name.

**Markup example:**

```
<name>PANEL-INSIDE CONTROL</name>
```

*2.1.1.2.2 Part keyword*

**Description:** This element contains the single word name of the part, as defined for the civil aviation.

**Markup element:** <partKeyword> (O).

**Attributes:**

- id (O), the identifier of the <partKeyword> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the part keyword.

**Markup example:**

```
<partKeyword>PANEL</partKeyword>
```

2.1.1.2.3 *Part short designation*

**Description:** This element gives an abbreviated alternate name of the part designation corresponding to the element <name>. This short form for the name of the part designation is meant to be presented in the narrative of the data module to make the reading easier.

**Markup element:** <shortName> (O).

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<shortName>INSIDE CONTROL</shortName>
```

2.1.1.2.4 *Over length part number*

**Description:** This element contains the initial over length part number for projects, whose part numbers cannot exceed a given length. In this case, the over length part numbers are shortened and the shortened part number is used all over the documentation.

**Markup element:** <overLengthPartNumber> (O).

**Attributes:**

– id (O), the identifier of the <overLengthPartNumber> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the over length part number element.

**Markup example:**

```
<overLengthPartNumber>FDBA57-8-
3ASNK090A499</overLengthPartNumber>
```

2.1.1.2.5 *Customer or stock part number*

**Description:** This element is used to store the number assigned by the customer to identify and control the part in their inventory and control system. As this value depends on the customer,

the attribute applicRefId and the referenced element <applic>, which must be populated in accordance with Chap 3.9.5.3, allows specifying the customer.

**Markup element:** <stockNumber> (O).

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <stockNumber> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<stockNumber>AFR281324</stockNumber>
```

2.1.1.3 Procurement data

**Description:** This element groups the properties to procure the part.

**Markup element:** <procurementData> (O).

**Attributes:**

- id (O), the identifier of the <procurementData> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <supplierCode> (M). Refer to Para 2.1.1.3.1.
- <optionalSupplierCode> (O). Refer to Para 2.1.1.3.2.
- <buyerFurnishedEquipFlag> (O). Refer to Para 2.1.1.3.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<procurementData>...</procurementData>
```

*2.1.1.3.1 Supplier code*

**Description:** This element contains the CAGE code of the authorized prime source supplier for the part.

**Markup element:** <supplierCode> (O).

**Attributes:**

- `id` (O), the identifier of the <`supplierCode`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<supplierCode>D4296</supplierCode>
```

2.1.1.3.2 *Optional supplier code*

**Description:** This element contains the CAGE/CAGE code of an additional optional supplier for the part.

**Markup element:** <`optionalSupplierCode`> (O).

**Attributes:**

- `id` (O), the identifier of the <`optionalSupplierCode`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<optionalSupplierCode> 04795</optionalSupplierCode>
```

2.1.1.3.3 *Buyer furnished equipment flag*

**Description:** This element is used as a flag to specify whether the customer furnishes the part or not. As this value depends on the customer, the attribute `applicRefId` and the referenced element <`applic`>, both must be populated in accordance with Chap 3.9.5.3.

**Markup element:** <`buyerFurnishedEquipFlag`> (O).

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`buyerFurnishedEquipFlag`> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<buyerFurnishedEquipFlag/>
```

2.1.1.4 Technical data

**Description:** This element groups the technical properties related to the part.

**Markup element:** <techData> (O).

**Attributes:**

- id (O), the identifier of the <techData> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- etopsFlag (O), a flag to specify whether the part is an extended twin operations part or not. This attribute can have one of the following values:
  - "1" (yes) for etops parts
  - "0" (no) for non-etops parts
- hazardousFlag (O), a flag to indicate that the part is a hazardous product or not. This attribute can have one of the following values:
  - "1" (yes) for hazardous parts
  - "0" (no) for non-hazardous parts
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <sparePartClass> (O). Refer to Para 2.1.1.4.1.
- <usageCategory> (O). Refer to Para 2.1.1.4.2.
- <specDocument> (O). Refer to Para 2.1.1.4.3.
- <quantity> (O), the dimensions of the part. Refer to Chap 3.9.5.2.1.10.
- <physicalSecurityPilferageCode> (O). Refer to Chap 3.9.5.2.7.
- <unitOfIssue> (O). Refer to Chap 3.9.5.2.7.
- <specialStorage> (O). Refer to Chap 3.9.5.2.7.
- <calibrationMarker> (O). Refer to Chap 3.9.5.2.7.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the attribute etopsFlag.

**Markup example:**

```
<techData>...</techData>
```

*2.1.1.4.1 Spare part class code*

**Description:** This element is used to contain the spare part class code, through its attribute.

**Markup element:** <sparePartClass> (O).

**Attributes:**

- id (O), the identifier of the <sparePartClass> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- sparePartClassCode (M), specifies whether the spare part class code of the part. This attribute can have one of the following values:
  - "0" for non-procurable parts
  - "1" for expandable parts
  - "2" for rotable parts
  - "6" for repairable parts
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<sparePartClass sparePartClassCode="1"/>
```

*2.1.1.4.2 Part usage category*

**Description:** This element is used to store, through its attribute, the usage category of the part, (manufacturer proprietary part, standards part, etc). Definition of the usage category values is up to the project.

**Markup element:** <usageCategory> (O).

**Attributes:**

- id (O), the identifier of the <usageCategory> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- usageCategoryCode (M)
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the usage category.

**Markup example:**

```
<usageCategory usageCategoryCode="10"/>
```

*2.1.1.4.3 Specification*

**Description:** This element is used to identify specifications of the part (drawing number for manufacturer parts, standard specification number for standard parts).

**Markup element:** <specDocument> (O).

**Attributes:**

– id (O), the identifier of the <specDocument> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– manufacturerCodeValue (O), the CAGE code of the specification owner.
– countryIsoCode (O), not used in this context
– specDocumentNumber (O), the identifier number of the specification or drawing.
– specDocumentType (O), the type of the specification (drawing or standard)
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<specDocument manufacturerCodeValue="I9009"
specDocumentNumber="86-2-IEC" specDocumentType="specification"/>
```

2.1.1.5 Relationships with other parts

**Description:** This element contains the different types of relationships with other parts.

**Markup element:** <partRefGroup> (O).

**Attributes:**

– id (O), the identifier of the <partRefGroup> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

At least one of the following elements must be used:

– <replacedBy> (O). Refer to Para 2.1.1.5.1.
– <optionalPart> (O). Refer to Para 2.1.1.5.2.
– <preferredSparePart> (O). Refer to Para 2.1.1.5.3.
– <optionalPart> (O). Refer to Para 2.1.1.5.4.

– <localFabricationMaterial> (O). Refer to Para 2.1.1.5.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<partRefGroup>...</partRefGroup>
```

2.1.1.5.1 *Replacement relationship*

**Description:** This element provides a part that can replace the defined part. The kind of replacement is specified by its attribute. It is also possible to associate a textual condition to this replacement relationship. Some replacement relationships can only be applicable to some product instances.

**Markup element:** <replacedBy> (O).

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <replacedBy> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– replacementCode (M), the type of replacement relationship (one or two ways, with condition or not). Definition of the codes is left to the projects.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <partRef> (M), the spare part. Refer to Para 2.1.1.5.2.
– <functionalItemRef> (O), functional items for which the replacement relationship is valid. Populate in accordance with Chap 3.9.5.1.
– <replacementCond> (O). Refer to Para 2.1.1.5.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the part replacement relationship codes.

**Markup example:**

Part number B can replace part number A, oneway.

```
<partSpec>
<partIdent partNumberValue="A".../>
...
<partRefGroup>
<replacedBy>
<partRef partNumberValue="B".../>
</replacedBy>
</partRefGroup>
</partSpec>
```

2.1.1.5.2 *Part*

**Description:** This element is used to markup a part (outside of its specification in the part technical repository) and also allows referring to its position in the part technical repository.

**Markup element:** <partRef> (O)

**Attributes:**

- id (O), the identifier of the <partRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- partNumberValue (M)
- manufacturerCodeValue (M)
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <refs> (O), used to explicitly reference the part in the part technical repository. For implicit reference, the part semantic identifiers (part number and manufacturer code) are sufficient. Populate in accordance with Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use explicit or implicit reference mechanism to the part technical repository.

**Markup example:**

```
<partRef partNumberValue="0-0204504-1"
manufacturerCodeValue="F0286"/>
```

2.1.1.5.3 *Replacement condition*

**Description:** This element is used to specify the condition that has to be fulfilled for the replacement, if any.

**Markup element:** <replacementCond> (O).

**Attributes:**

- id (O), the identifier of the <replacementCond> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<replacementCond>EXCEPT IN THE HEATER ASSY</replacementCond>
```

2.1.1.5.4 *Optional part*

**Description:** This element provides one or several optional part(s), ie parts that are strictly equivalent to the defined part.

**Markup element:** <optionalPart> (O).

**Attributes:**

- id (O), the identifier of the <optionalPart> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <partRef> (M), the optional part. Refer to Para 2.1.1.5.2.

**Business rules decisions:**

- None identified

**Markup example:**

Part number 2 is optional to part number 1.

```
<partSpec>
<partIdent partNumberValue="1".../>
...
<partRefGroup>
<optionalPart>
<partRef partNumberValue="2".../>
</optionalPart>
</partRefGroup>
</partSpec>
```

2.1.1.5.5 *Preferred spare parts*

**Description:** This element provides one or several preferred spare part(s), ie parts that are recommended by the data provider.

**Markup element:** <preferredSparePart> (O).

**Attributes:**

- id (O), the identifier of the <preferredSparePart> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <partRef> (M), the preferred spare part. Refer to Para 2.1.1.5.2.

**Business rules decisions:**

- None identified

**Markup example:**

Part number 3 is preferred to part number 1.

```
<partSpec>
<partIdent partNumberValue="1".../>
...
```

```
<partRefGroup>
<preferredSparePart>
<partRef partNumberValue="3".../>
</preferredSparePart>
</partRefGroup>
</partSpec>
```

2.1.1.5.6 *Alternate parts*

**Description:** This element provides one or several alternate part(s), ie parts that can be used on condition that a modification has been performed. The description of the modification can be provided.

**Markup element:** <altPart> (O).

**Attributes:**

- id (O), the identifier of the <altPart> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <partRef> (M), the alternate part. Refer to Para 2.1.1.5.2.
- <altPartDescr> (O). Refer to Para 2.1.1.5.7.

**Business rules decisions:**

- None identified

**Markup example:**

Part number 4 is an alternate to part number 1.

```
<partSpec>
<partIdent partNumberValue="1".../>
...
<partRefGroup>
<altPart>
<partRef partNumberValue="4".../>
</altPart>
</partRefGroup>
</partSpec>
```

2.1.1.5.7 *Alternate part modification*

**Description:** This element is used to describe the modification to be performed on one alternate part.

**Markup element:** <altPartDescr> (O).

**Attributes:**

- id (O), the identifier of the <altPartDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<altPartDescr>Loose part included in the
assembly.</altPartDescr>
```

*2.1.1.5.8 Raw parts*

**Description:** This element allows specifying one or several raw part(s) from which the defined part can be manufactured and their dimensions or quantity.

**Markup element:** <`localFabricationMaterial`> (O).

**Attributes:**

– `id` (O), the identifier of the <`localFabricationMaterial`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`partRef`> (M), the raw part.
– <`quantity`> (O), dimensions or quantity of raw part needed. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

Part number 1 can be manufactured from part numbers 2 and 3.

```
<partSpec>
<partIdent partNumberValue="1".../>
...
<partRefGroup>
<localFabricationMaterial>
<partRef partNumberValue="2".../>
<partRef partNumberValue="3".../>
</localFabricationMaterial>
</partRefGroup>
</partSpec>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the part technical information repository data modules.** The project or the organization must decide if the part technical information repository must be used or not. Refer to Para 2.

**Use of several part technical information repository data modules.** The project or the organization must decide whether there is one single part technical information repository data

module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the part name, element <name>.** The project or the organization must decide on the format of the part name and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.2.1.

**Use of the part keyword, element <partKeyword>.** The project or the organization must decide whether they use or not the over length part number. Refer to Para 2.1.1.2.2.

**Use of the over length part number, element <overLengthPartNumber>.** The project or the organization must decide whether they use or not the over length part number. Refer to Para 2.1.1.2.4.

**Use of extended twin operations, attribute etopsFlag.** The project or the organization must decide whether they use or not the air specific extended twin operations attribute. Refer to Para 2.1.1.2.4.

**Use of the usage category**. The project or the organization must decide on the use of the part usage category or not. If used, the project or the organization must determine how to populate the attribute usageCategoryCode. Refer to Para 2.1.1.4.2.

**Definition of the part replacement relationship codes.** The project or the organization must define the types of relationships between parts (eg one-way, two-ways, with condition...) and determine how to populate the attribute replacementCode. Refer to Para 2.1.1.5.

**Reference mechanism.** The project or the organization must decide whether to use the implicit or explicit reference mechanism to the part technical repository. Refer to Chap 4.13.2 and for details on the two reference mechanisms.

# 4 Examples

```
<techRepository>
<partRepository>
<partSpec>
<partIdent partNumberValue="0-0204504-1"
manufacturerCodeValue="F0286"/>
<itemIdentData><name>(CONNECTOR)</name><partKeyword>(CONNECTR)</
partKeyword></itemIdentData>
<procurementData><supplierCode>F0286</supplierCode><optionalSupp
lierCode>F0286</optionalSupplierCode></procurementData>
<techData><sparePartClass sparePartClassCode="1"/><usageCategory
usageCategoryCode="30"/></techData>
<partRefGroup>
<optionalPart><partRef partNumberValue="M24308-2-288"
manufacturerCodeValue="81349"/></optionalPart>
<optionalPart><partRef partNumberValue="NSA938361-05"
manufacturerCodeValue="F5442"/></optionalPart></partRefGroup>
</partSpec>
<partSpec>
<partIdent partNumberValue="0008037-802"
manufacturerCodeValue="C2683"/>
<itemIdentData><name>PANEL-INSIDE
CONTROL</name><partKeyword>PANEL</partKeyword></itemIdentData>
<procurementData><supplierCode>C2683</supplierCode><optionalSupp
lierCode>C2683</optionalSupplierCode></procurementData>
```

```
<techData><sparePartClass sparePartClassCode="2"/><usageCategory
usageCategoryCode="20"/></techData>
</partSpec>
</partRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.4

## *Technical information repository - Zones*

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## 1 General

The technical information repository data module is used to capture and represent zone identification and related information.

The zone identification can be used to uniquely identify a structural area of the Product, using the element <zoneRef>. Refer to Chap 3.4.

# 2 Zones technical repository data module content

The technical information repository data module is used to provide the list of zones (element <zoneRepository>).

## 2.1 Zone repository

**Description:** This element is used to provide a list of zones and their associated properties.

**Markup element:** <zoneRepository> (M)

**Attributes:**

- id (O), the identifier of the <zoneRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <figure> (O), zone illustrations. Refer to Chap 3.9.5.2.1.7.
- <zoneSpec> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the zone technical repository data module or not.
- Use of a single or multiple zone repository data modules.

**Markup example:**

```
<zoneRepository>
<zoneSpec>...</zoneSpec>
</zoneRepository>
```

### 2.1.1 Zone specification

**Description:** This element represents one zone. It contains its associated properties.

The zone has a container alternate structure. Indeed, some of its properties are generic in that they do not differ from a product instance to another. Some other properties depend on the product configuration. Generic properties are directly defined under the zone (container level), other properties are defined under the alternate zones. For some properties appearing both at container and alternate levels, the following rule must be applied: if the property is fulfilled in the alternate element, it supersedes the generic value stored in the container element.

Following container/alternate principles, data modules only refer to containers. Retrieval of the accurate alternate is achieved using applicability annotations.

Refer to Chap 4.13.3 for detail explanation of the container concept.

**Markup element:** <zoneSpec> (M)

**Attributes:**

- id (O), the identifier of the <zoneSpec> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`zoneIdent`> (M). Refer to Para 2.1.1.1.
- <`zoneRefGroup`> (O). Refer to Para 2.1.1.2.
- <`zoneAlt`> (M). Refer to Para 2.1.1.3.
- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<zoneSpec>
<zoneIdent zoneNumber="..."/>

<zoneAlt>...</zoneAlt>
</zoneSpec>
```

2.1.1.1 Zone identifier

**Description:** Contrary to the `id` attribute, this element identifies semantically the zone as a result of its attributes.

**Markup element:** <`zoneIdent`> (M)

**Attributes:**

- `zoneNumber` (M), the zone number. Refer to Chap 3.4.
- `id` (O), the identifier of the <`zoneIdent`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<zoneIdent zoneNumber="121"/>
```

2.1.1.2 References to other zones

**Description:** This element provides relationships and the type of relationship with other zones (eg sub-zones).

A proper use of this element enables to retrieve the zone breakdown (major zones that contain sub zones that contain specific zones).

Depending on the relationships, it can depend on the product instances or not. As a result, this element can be found at both container and alternate levels.

**Markup element:** <zoneRefGroup> (O)

**Attributes:**

- zoneRefType (M), the type of the relationship between the two zones
- id (O), the identifier of the <zoneRefGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <zoneRef> (M). The referenced zone. The target is always a zone container. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the zone relationship types.

**Markup example:**

```
<zoneRefGroup zoneRefType="breakdown">
<zoneRef .../>
</zoneRefGroup>
```

2.1.1.3 Alternate zone

**Description:** This element contains the properties of the zone that depend on the Product configuration. Thus this element contains applicability.

Configuration consistency between the various alternate zones must be ensured. This means that for a given product configuration and under given operational conditions, only one alternate zone is applicable at one time for a container zone.

**Markup element:** <zoneAlt> (M)

**Attributes:**

- altNumber (O), the alternate number.
- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <zoneAlt> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <itemDescr> (M). Refer to Para 2.1.1.3.1.
- <zoneSide> (O). Refer to Para 2.1.1.3.2.

- <boundaryFrom> (O). Refer to Para 2.1.1.3.3.
- <boundaryTo> (O). Refer to Para 2.1.1.3.3.
- <zoneRefGroup> (O). Refer to Para 2.1.1.2.
- <internalRef> (O), reference to the illustration where the zone is illustrated. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of an alternate number.

**Markup example:**

```
<zoneAlt applicRefId="applic-001">
...
</zoneAlt>
```

2.1.1.3.1 *Description*

**Description:** This element is used to contain the textual description of the father element.

**Markup element:** <itemDescr> (M)

**Attributes:**

- id (O), the identifier of the <itemDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<itemDescr> LOWER THIRD OF FUSELAGE (BELOW CABIN FLOOR)
INCLUDING RADOME TO FORWARD FACE OF REAR PRESSURE BULKHEAD NOSE
CONE STA650 TO FR95</itemDescr>
```

2.1.1.3.2 *Zone side*

**Description:** This element indicates on which side of the Product, the zone is located.

**Markup element:** <zoneSide> (M).

**Attributes:**

- zoneSideValue (M), the side of the Product where the zone is located. This attribute can have one of the following values:
  - "lh" for a zone located on the left side of the Product
  - "rh" for a zone located on the right side of the Product
  - "lr" when the zone is not located on one side of the Product
- id (O), the identifier of the <zoneSide> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<zoneSide zoneSideValue="lh"/>
```

*2.1.1.3.3 Zone boundaries*

**Description:** These elements are used to define the boundaries of a zone, respectively the start and the end boundaries.

A zone can have several "from" boundaries and several "to" boundaries.

ICN-S1000D-A-030905-A-FAPE3-00007-A-001-01

*Fig 1 Zone boundaries*

**Markup element:** <`boundaryFrom`> (O), <`boundaryTo`> (O)

**Attributes:**

– `id` (O), the identifier of the <`boundaryFrom`>, <`boundaryTo`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`boundary`> (M). Refer to Para 2.1.1.3.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<boundaryFrom>
<boundary>...</boundary>
</boundaryFrom>
<boundaryTo>
```

```
<boundary>...</boundary>
</boundaryTo>
```

2.1.1.3.4 *A boundary*

**Description:** This element describes a boundary. A boundary can be expressed textually or with specific measures (rib, frame...)

**Markup element:** <boundary> (M)

**Attributes:**

- id (O), the identifier of the <boundary> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <quantity> (O), to express the boundary in terms of stringers, ribs, frames or stations. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<boundary>
<quantity>...</quantity>
</boundary>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the zone technical information repository data modules.** The project or the organization must decide if the zone technical information repository must be used or not. Refer to Para 2.1.

**Use of several zone technical information repository data module.** The project or the organization must decide whether there is one single zone technical information repository data module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the zone relationship types.** The project or the organization must define the types of relationships to be implemented between zones (eg sub-zones) and how to populate the attribute functionalItemRefType. Refer to Para 2.1.1.2.

**Use of an alternate number.** The project or the organization must decide on the use of an alternate number or not. If used, the project or the organization must determine how to populate the attribute altNumber and must ensure it is consistently applied. Refer to Para 2.1.1.3.

# 4 Examples

```
<referencedApplicGroup>
<applic id="appl-001">
<displayText><simplePara>Serial number (SN): 001-
999</simplePara></displayText>
<assert applicPropertyIdent="serialno"
```

```
applicPropertyType="prodattr" applicPropertyValues="001~999"/>
</applic>
</referencedApplicGroup>
...
<techRepository>
<zoneRepository>
<figure>
<title>Zoning - Figure 1</title>
<graphic
infoEntityIdent="ICN-AE-A-00000000-Z-SF518-00000-A-01-1"
id="fig-0001"/>
</figure>
<zoneSpec zoneType="majorzone">
<zoneIdent zoneNumber="100"/>
<zoneRefGroup zoneRefType="contains"><zoneRef
zoneNumber="110"/></zoneRefGroup>
<zoneAlt applicRefId="appl-001">
<itemDescr>LOWER THIRD OF FUSELAGE (BELOW CABIN FLOOR) INCLUDING
RADOME TO FORWARD FACE OF REAR PRESSURE BULKHEAD NOSE CONE
STA650 TO FR95</itemDescr>
<zoneSide zoneSideValue="lr"/>
<boundaryFrom><boundary><quantity><quantityGroup
quantityGroupType="nominal">
<quantityValue>0</quantityValue></quantityGroup></quantity>
<quantity><quantityGroup quantityGroupType="nominal">
<quantityValue>650</quantityValue></quantityGroup></quantity></b
oundary>
</boundaryFrom>
<boundaryTo><boundary><quantity><quantityGroup
quantityGroupType="nominal">
<quantityValue>95</quantityValue></quantityGroup></quantity>
<quantity><quantityGroup quantityGroupType="nominal">
<quantityValue>0</quantityValue></quantityGroup></quantity></bou
ndary>
</boundaryTo>
<internalRef internalRefId="fig-0001"
internalRefTargetType="figure"/>
</zoneAlt>
</zoneSpec>
<zoneSpec zoneType="subzone">
<zoneIdent zoneNumber="110"/>
<zoneRefGroup zoneRefType="belongsto"><zoneRef
zoneNumber="100"/></zoneRefGroup>
<zoneAlt applicRefId="appl-001">
<itemDescr>Lower Deck Forward Cargo Compartment Rigth zoneSide -
limitRangeFrom lower Side of Pax floor limitRangeTo upper
zoneSide of cargo floor</itemDescr>
<boundaryFrom><boundary><quantity><quantityGroup
quantityGroupType="nominal">
<quantityValue>0</quantityValue></quantityGroup></quantity><quan
tity><quantityGroup quantityGroupType="nominal">
<quantityValue>650</quantityValue></quantityGroup></quantity></b
oundary>
</boundaryFrom>
<boundaryTo><boundary><quantity><quantityGroup
quantityGroupType="nominal">
<quantityValue>0</quantityValue></quantityGroup></quantity>
<quantity><quantityGroup quantityGroupType="nominal">
<quantityValue>0</quantityValue></quantityGroup></quantity></bou
ndary>
```

```
</boundaryTo>
<internalRef internalRefId="fig-0001"
internalRefTargetType="figure"/></zoneAlt>
</zoneSpec>
</zoneRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.5

## *Technical information repository - Access points*

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## 1 General

The technical information repository data module is used to capture and represent access point identification and related information. The access panels and doors identifications can be used to uniquely identify an access point versus a larger way (generally equipped with a handle), to be opened to getting access to the equipment, by using the element <`accessPoint`>. Refer to Chap 3.9.5.2.1.10.

# 2 Access points technical repository data module content

## 2.1 Access point repository

**Description:** This element is used to provide a list of access points and their associated properties.

**Markup element:** <accessPointRepository> (M)

**Attributes:**

- id (O), the identifier of the <accessPointRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <figure> (O), access point illustrations. Refer to Chap 3.9.5.2.1.7.
- <accessPointSpec> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the access point technical repository data module or not
- use of a single or multiple access point repository data modules

**Markup example:**

```
<accessPointRepository>
<accessPointSpec>...</accessPointSpec>
</accessPointRepository>
```

### 2.1.1 Access point specification

**Description:** This element represents one access point. It contains its associated properties.

The access point has a container-alternate structure. Indeed, some of its properties are generic in that they do not differ from one product instance to another. Some other properties depend on the product configuration. Generic properties are directly defined under the access point (container level), other properties are defined under the alternate access points. For some properties appearing both at container and alternate levels, the following rule must be applied: if the property is fulfilled in the alternate element, it supersedes the generic value stored in the container element.

Following container/alternate principles, data modules only refer to containers. Retrieval of the accurate alternate is achieved using applicability annotations.

Refer to Chap 4.13.3 for detail explanation of the container concept.

**Markup element:** <accessPointSpec> (M)

**Attributes:**

- id (O), the identifier of the <accessPointSpec> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`accessPointIdent`> (M). Refer to Para 2.1.1.1.
- <`accessPointRefGroup`> (O). Refer to Para 2.1.1.2.
- <`accessPointAlt`> (M). Refer to Para 2.1.1.3.
- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessPointSpec>
<accessPointIdent accessPointNumber="..."/>

<accessPointAlt>...</accessPointAlt>
</accessPointSpec>
```

2.1.1.1 Access point identifier

**Description:** Contrary to the attribute `id`, this element identifies semantically the access point with regard to its attributes.

**Markup element:** <`accessPointIdent`> (M)

**Attributes:**

- `id` (O), the identifier of the <`accessPointIdent`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `accessPointNumber` (M), the access point number. Refer to Chap 3.9.5.2.1.10.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessPointIdent accessPointNumber="121"/>
```

2.1.1.2 References to other access points

**Description:** This element allows providing relationships and the type of relationship with other access points (eg sub-access points).

Depending on the relationships, it can depend on the product instances or not. As a result, this element can be found at both container and alternate levels.

**Markup element:** <`accessPointRefGroup`> (O)

**Attributes:**

- id (O), the identifier of the <accessPointRefGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- accessPointRefType (M), the type of the relationship between the two access points.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <accessPointRef> (M). The referenced zone. The target is always a zone container. Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the access point relationship types.

**Markup example:**

```
<accessPointRefGroup accessPointRefType="contains">
<accessPointRef .../>
</accessPointRefGroup>
```

2.1.1.3 Alternate access points

**Description:** This element contains the properties of the access point that depend on the Product configuration. Thus this element contains applicability.

Configuration consistency between the various alternate access points must be ensured. This means that for a given product configuration and under given operational conditions, only one alternate access point is applicable at one time for a container zone.

**Markup element:** <accessPointAlt> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <accessPointAlt> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- altNumber (O), the alternate number.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <accessPointType> (M). Refer to Para 2.1.1.3.1.
- <zoneRef> (M). The zone where the access point is located. The target is always a zone container. Refer to Chap 3.9.5.2.1.10.
- <accessTo> (O). Refer to Para 2.1.1.3.2.
- <accessPanelRefGroup> (O). Refer to Para 2.1.1.2.

- <fastener> (O). Refer to Para 2.1.1.3.4.
- <quantity> (O), the access point dimensions. Refer to Chap 3.9.5.2.1.10.
- <hoursToOpen> (O). Refer to Para 2.1.1.3.7.
- <internalRef> (O), reference to the illustration where the access point is illustrated. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessPointAlt applicRefId="applic-001">
<accessPointType .../>
<zoneRef .../>
</accessPointAlt>
```

2.1.1.3.1 *Access point type*

**Description:** This element is used to specify, through its attribute, whether the access point is a panel, a door, an electrical panel or any other type of access point.

**Markup element:** <accessPointType> (M)

**Attributes:**

- id (O), the identifier of the <accessPointType> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- accessPointTypeValue (M), the access point type value. Refer to Chap 3.9.6.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessPointType accessPointTypeValue="accpnl01"/>
```

2.1.1.3.2 *Items reachable from the access point*

**Description:** This element allows listing items that can be reached from the access point. Those items can be functional items or other items.

**Markup element:** <accessTo> (O)

**Attributes:**

- id (O), the identifier of the <accessTo> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <functionalItemRef> (O). Refer to Chap 3.9.5.1.
- <otherItems> (O). Refer to Para 2.1.1.3.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<accessTo>
<functionalItemRef .../>
</accessTo>
```

*2.1.1.3.3 Other items*

**Description:** This element describes textually which items can be reached from the access point.

**Markup element:** <otherItems> (O)

**Attributes:**

- id (O), the identifier of the <otherItems> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<otherItems>INTERNAL STRUCTURE, ELECTRICAL WIRING, CONNECTORS
PLATE</otherItems>
```

*2.1.1.3.4 Fastener*

**Description:** This element is used to store access point fastener information.

**Markup element:** <fastener> (O)

**Attributes:**

- id (O), the identifier of the <fastener> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- hingedFastenerFlag (O), a flag to indicate if the access point is hinged or not. This attribute can have one of the following values:
  - "1" (yes) for hinged access points
  - "0" (no) for non-hinged access points
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <fastenerType> (M). Refer to Para 2.1.1.3.5.
- <fastenerQuantity> (M). Refer to Para 2.1.1.3.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<fastener hingedFastenerFlag="0">
<fastenerType>...</fastenerType>
<fastenerQuantity>...</fastenerQuantity>
</fastener>
```

2.1.1.3.5 *Fastener type*

**Description:** This element is used to indicate the type of the fastener.

**Markup element:** <fastenerType> (M)

**Attributes:**

- id (O), the identifier of the <fastenerType> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<fastenerType>SF</fastenerType>
```

2.1.1.3.6 *Fastener quantity*

**Description:** This element is used to indicate the quantity of fasteners.

**Markup element:** <fastenerQuantity> (M)

**Attributes:**

- id (O), the identifier of the <fastenerQuantity> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

– None identified

**Markup example:**

```
<fastenerQuantity>8</fastenerQuantity>
```

*2.1.1.3.7 Elapsed time to open the access point*

**Description:** This element indicates the elapsed time necessary to open the access point.

**Markup element:** <hoursToOpen> (O)

**Attributes:**

– id (O), the identifier of the <hoursToOpen> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<hoursToOpen>0,2</hoursToOpen>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the access point technical information repository data modules.** The project or the organization must decide if the access point technical information repository must be used or not. Refer to Para 2.

**Use of several access point technical information repository data module.** The project or the organization must decide whether there is one single access point technical information repository data module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the access point relationship types.** The project or the organization must define the types of relationships to be implemented between access points (eg sub-access points) and how to populate the attribute accessPointRefType. Refer to Para 2.1.1.2.

**Use of an alternate number.** The project or the organization must decide on the use of an alternate number or not. If used, the project or the organization must determine how to populate the attribute altNumber and must ensure it is consistently applied. Refer to Para 2.1.1.3.

# 4 Markup example

```
<referencedApplicGroup>
<applic id="appl-001">
<displayText>
<simplePara>Version: A SN: 001-009</simplePara>
</displayText>
```

```
<evaluate andOr="and">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValues="001~009"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="A"/>
</evaluate>
</applic>
<applic id="appl-002">
<displayText>
<simplePara>Version: A SN: 010-015</simplePara>
</displayText>
<evaluate andOr="and">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValues="010~015"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="A"/>
</evaluate>
</applic>
</referencedApplicGroup>
...
<techRepository>
<accessPointRepository>
<figure><title>Access panels - Figure 1</title>
<graphic infoEntityIdent="ICN-AE-A-00000000-Z-SF518-00000-A-01-
1"
id="fig-0001"/>
</figure>
<accessPointSpec id="ap00">
<accessPointIdent accessPointNumber="123BF"></accessPointIdent>
<accessPointRef accessPointRefType="contains"
accessPointNumber="123B"/>
<accessPointAlt altNumber="1" applicRefId="appl-001">
<accessPointType
accessPointTypeValue="accpnl01"></accessPointType>
<zoneRef>
<name>Lower Deck Forward Cargo Compartment Right side</name>
</zoneRef>
<accessTo><functionalItemRef functionalItemNumber="4000-EM-1"
functionalItemType="exact">
<name>INTERNAL STRUCTURE,
(ACCELEROMETERS)</name></functionalItemRef>
</accessTo>
<fastener><fastenerType>SF</fastenerType><fastenerQuantity>008</
fastenerQuantity></fastener>
<hoursToOpen>0,2</hoursToOpen>
</accessPointAlt>
<accessPointAlt altNumber="2" applicRefId="appl-002">
<accessPointType accessPointTypeValue="accpnl01"/>
<zoneRef>
<name>Lower Deck Forward Cargo Compartment Right side</name>
</zoneRef>
<accessTo><functionalItemRef functionalItemNumber="4000-EM-2"
functionalItemType="exact">
```

```
<name>INTERNAL STRUCTURE, ELECTRICAL WIRING, CONNECTORS
PLATE</name></functionalItemRef>
</accessTo>
<fastener><fastenerType>SF</fastenerType><fastenerQuantity>008</
fastenerQuantity></fastener>
<hoursToOpen>0,2</hoursToOpen>
</accessPointAlt>
</accessPointSpec>
</accessPointRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.6

## *Technical information repository - Enterprise information*

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## 1 General

The technical information repository data module is used to capture and represent enterprise identification and information.

The enterprise identification can be used to uniquely identify an enterprise involved in the manufacturing or in the supply of the Product or part of it.

## 2 Enterprise list

**Description:** The element <`enterpriseRepository`> contains a list of one or more element enterprise descriptions

**Markup element:** <enterpriseRepository> (M)

**Attributes:**

- id (O), the identifier of the <enterpriseRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <enterpriseSpec> (M). Refer to Para 2.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the enterprise technical repository

**Markup example:**

```
<enterpriseRepository>
<enterpriseSpec id="C001">
...
</enterpriseSpec>
</enterpriseRepository>
```

## 2.1 Enterprise specification

**Description:** The element <enterpriseSpec> contains the unique enterprise information for any enterprise that is involved in the development or supply of the product. It contains information about the enterprise such as manufacturer code, enterprise name, and business unit.

**Markup element:** <enterpriseSpec> (M)

**Attributes:**

- id (O), the identifier of the <enterpriseRepository> element. Refer to Chap 3.9.5.2.1.2
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

- <enterpriseIdent> (M). Refer to Para 2.2
- <enterpriseIdentAlt> (O). Refer to Para 2.3
- <enterpriseName> (M). Refer to Para 2.4
- <businessUnit> (O). Refer to Para 2.5
- <enterpriseRef> (O). Refer to Para 2.6
- <refs> (O). References must be populated in accordance with Chap 3.9.5.2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

```
<enterpriseSpec id="C001">
...
</enterpriseSpec>
```

## 2.2 Enterprise identification

**Description:** The element <enterpriseIdent> identifies the enterprise, through its CAGE code.

**Markup element:** <enterpriseIdent> (C)

**Attributes:**

– manufacturerCodeValue (M), containing the CAGE code of the enterprise.
– id (O), the identifier of the <enterpriseIdent> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<enterpriseIdent manufacturerCodeValue="KZ444"/>
```

## 2.3 Alternate enterprise identification

**Description:** The element <enterpriseIdentAlt> provides an alternate method of identifying an enterprise where the enterprise doesn't have a CAGE code.

**Markup element:** <enterpriseIdentAlt> (O)

**Attributes:**

– altCode (M), containing the enterprise identification code when no CAGE code is available.
– altCodeType (M), containing the type of code being used.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<enterpriseIdentAlt altCode="1235" altCodeType="DUNS"/>
```

## 2.4 Enterprise name

**Description:** The element <enterpriseName> contains a string identifying the enterprise name.

**Markup element:** <enterpriseName> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<enterpriseName>UTOPIA plc</enterpriseName>
```

## 2.5 Business unit

**Description:** The element <businessUnit> contains information about the business, including name, address, and contacts.

**Markup element:** <businessUnit> (O)

**Attributes:**

– id (O), the identifier of the <businessUnit> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <businessUnitName> (M). Refer to Para 2.5.1.
– <businessUnitAddress> (O). Refer to Para 2.5.2.
– <contactPerson> (O). Refer to Para 2.5.3.

**Business rules decisions:**

– None identified

**Markup example:**

```
<businessUnit>
<businessUnitName>Customers Services Business
Line</businessUnitName>
<businessUnitAddress>
...
</businessUnitAddress>
</businessUnit>
```

### 2.5.1 Business unit name

**Description:** The element <businessUnitName> contains a string identifying the name of the business unit.

**Markup element:** <businessUnitName> (C)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<businessUnitName>Customers Services Business
Line</businessUnitName>
```

### 2.5.2 Business unit address

**Description:** The element <businessUnitAddress> contains the information required to contact the business unit.

**Markup element:** <businessUnitAddress> (O)

**Attributes:**

– id (O), the identifier of the <businessUnitAddress> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <department> (O). Refer to Para 2.5.2.1.
– <street> (O). Refer to Para 2.5.2.2,
– <postOfficeBox> (O). Refer to Para 2.5.2.3.
– <postalZipCode> (O). Refer to Para 2.5.2.4.
– <city> (M). Refer to Para 2.5.2.5.
– <country> (M). Refer to Para 2.5.2.5.
– <state> (O). Refer to Para 2.5.2.7.
– <province> (O). Refer to Para 2.5.2.8.
– <building> (O). Refer to Para 2.5.2.9.
– <room> (O). Refer to Para 2.5.2.10.
– <phoneNumber> (O). Refer to Para 2.5.2.11.
– <faxNumber> (O). Refer to Para 2.5.2.12.
– <email> (O). Refer to Para 2.5.2.13.
– <internet> (O). Refer to Para 2.5.2.14.
– <SITA> (O). Refer to Para 2.5.2.15.

**Business rules decisions:**

– None identified

**Markup example:**

```
<businessUnitAddress>
<street>heaven street</street>
<postalZipCode>99999</postalZipCode><city>Saint Vitus</city>
<country>UTOPIA</country>
<phoneNumber>111 222 333 444</phoneNumber>
<faxNumber>111 222 333 445</faxNumber>
<email>customers_services@utopia.com</email>
<email>info@utopia.com</email>
<internet>www.utopia.customers.services.online.com</internet>
<internet>www.utopia.online.com</internet>
</businessUnitAddress>
```

2.5.2.1 Department

**Description:** The element <department> contains the identification of the business department.

**Markup element:** <department> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<department>Happy support group</department>
```

2.5.2.2 Street

**Description:** The element <street> contains the street address of the business.

**Markup element:** <street> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<street>123 Happy Lane</street>
```

2.5.2.3 Post office box

**Description:** The element <postOfficeBox> contains the post office box of the business defined.

**Markup element:** <postOfficeBox> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<postOfficeBox>12345</postOfficeBox>
```

2.5.2.4 Postal zip code

**Description:** The element <postalZipCode> contains the zip code for the business.

**Markup element:** <postalZipCode> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<postalZipCode>99999</postalZipCode>
```

2.5.2.5 City

**Description:** The element <city> contains the name of the city where the business is located.

**Markup element:** <city> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<city>Happy Valley</city>
```

2.5.2.6 Country Code

**Description:** The element <country> contains the International Standards Organisation (ISO) country code where the business is located.

**Markup element:** <country> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<country>UTOPIA</country>
```

2.5.2.7 State

**Description:** The element <state> contains the state where the business is located.

**Markup element:** <state> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<state>Euphoria</state>
```

2.5.2.8 Province

**Description:** The element <province> contains the province where the business is located.

**Markup element:** <province> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<province>Provincial</province>
```

2.5.2.9 Building identifier

**Description:** The element <building> contains the building number where the business is located.

**Markup element:** <building> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<building>11-22</building>
```

2.5.2.10 Room number

**Description:** The element <room> contains the room number in the building where the business is located.

**Markup element:** <room> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<room>99</room>
```

2.5.2.11 Phone numbers

**Description:** The element <phoneNumber> is repeatable and contains contact phone numbers for the business.

**Markup element:** <phoneNumber> (O)

**Attributes:**

– contactRole (O), containing whether this is the phone number for a primary, secondary or alternate contact.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<phoneNumber contactRole="primary">111 222 333 444</phoneNumber>
```

2.5.2.12 FAX numbers

**Description:** The element <faxNumber> is repeatable and contains contact fax numbers for the business.

**Markup element:** <faxNumber> (O)

**Attributes:**

– contactRole (O), containing whether this is the fax number for a primary, secondary or alternate contact.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<faxNumber>111 222 333 444</faxNumber>
```

2.5.2.13 Email addresses

**Description:** The element <email> is repeatable and contains contact fax numbers for the business.

**Markup element:** <email> (O)

**Attributes:**

– contactRole (O), containing whether this is the email address for a primary, secondary or alternate contact.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<email>customers_services@utopia.com</email>
```

2.5.2.14 Internet addresses

**Description:** The element <internet> is repeatable and contains internet addresses for the business.

**Markup element:** <internet> (O)

**Attributes:**

– contactRole (O), containing whether this is the internet address for a primary, secondary or alternate contact.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<internet>www.utopia.customers.services.online.com</internet>
```

2.5.2.15 SITA address

**Description:** The element <SITA> contains the address supplied in the aviation industry by SITA.

**Markup element:** <SITA> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<SITA>111.222.333.444</SITA>
```

**2.5.3 Contact persons**

**Description:** The element <contactPerson> is repeatable and contains all information related to individual contacts for a business unit.

**Markup element:** <contactPerson> (O)

**Attributes:**

– personPrefix (O), intended to capture information like Mr, Mrs, Ms, Dr etc

**Child elements:**

– <lastName> (M). Refer to Para 2.5.3.1.
– <middleName> (O). Refer to Para 2.5.3.2.
– <firstName> (O). Refer to Para 2.5.3.3.
– <jobTitle> (O). Refer to Para 2.5.3.4.
– <contactPersonAddress> (O). Refer to Para 2.5.3.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<contactPerson>
<lastName>Smiley</lastName>
</contactPerson>
```

2.5.3.1 Last name

**Description:** The element <lastName> contains the last name of the individual contact.

**Markup element:** <lastName> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<lastName>Smiley</lastName>
```

2.5.3.2 Middle name

**Description:** The element <middleName> contains the middle name of the individual contact.

**Markup element:** <middleName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<middleName>Quincy</middleName>
```

2.5.3.3 First name

**Description:** The element <firstName> contains the first name of the individual contact.

**Markup element:** <firstName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<firstName>Jonathon</firstName>
```

2.5.3.4 Job title

**Description:** The element <jobTitle> contains the job title of the individual contact.

**Markup element:** <jobTitle> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<jobTitle>Morale Booster</jobTitle>
```

2.5.3.5 Contact person address

**Description:** The element <contactPersonAddress> contains the information required to identify the contact person.

**Markup element:** <contactPersonAddress> (O)

**Attributes:**

– id (O), the identifier of the <contactPersonAddress> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <department> (O). Refer to Para 2.5.2.1.
– <street> (O). Refer to Para 2.5.2.2,
– <postOfficeBox> (O). Refer to Para 2.5.2.3.
– <postalZipCode> (O). Refer to Para 2.5.2.4.
– <city> (M). Refer to Para 2.5.2.5.
– <country> (M). Refer to Para 2.5.2.5.
– <state> (O). Refer to Para 2.5.2.7.
– <province> (O). Refer to Para 2.5.2.8.
– <building> (O). Refer to Para 2.5.2.9.
– <room> (O). Refer to Para 2.5.2.10.
– <phoneNumber> (O). Refer to Para 2.5.2.11.
– <faxNumber> (O). Refer to Para 2.5.2.12.
– <email> (O). Refer to Para 2.5.2.13.
– <internet> (O). Refer to Para 2.5.2.14.
– <SITA> (O). Refer to Para 2.5.2.15.

**Business rules decisions:**

– None identified

**Markup example:**

```
<contactPersonAddress>
<street>heaven street</street>
<postalZipCode>99999</postalZipCode><city>Saint Vitus</city>
<country>UTOPIA</country>
<phoneNumber>111 222 333 444</phoneNumber>
<faxNumber>111 222 333 445</faxNumber>
<email>customers_services@utopia.com</email>
<email>info@utopia.com</email>
<internet>www.utopia.customers.services.online.com
</internet>
```

```
<internet>www.utopia.online.com</internet>
</contactPersonAddress>
```

## 2.6 Enterprise references

**Description:** The element <enterpriseRef> is repeatable provides a method to refer other enterprises.

**Markup element:** <enterpriseRef> (O)

**Attributes:**

- enterpriseRefType (O), contains the type of enterprise reference.
- manufacturerCodeValue (M), containing the CAGE code of the enterprise being referenced.
- id (O), the identifier of the <enterpriseRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <dmRef> (O). Data module references must be populated in accordance with Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<enterpriseRef manufacturerCodeValue="KZ444"/>
```

# 3 Project specific decisions

Project specific decisions include, but are not limited, to the following:

**Use of the enterprise technical information repository data module.** Project must decide if the enterprise technical information repository is to be used.

**Use of several enterprise technical repository data modules.** Project must decide whether to have one single enterprise technical information repository data module or several, depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS.

# 4 Examples

```
<techRepository>
<enterpriseRepository>
<enterpriseSpec id="C001">
<enterpriseIdent manufacturerCodeValue="KZ444"/>
<enterpriseName>UTOPIA plc</enterpriseName>
<businessUnit>
<businessUnitName>Customers Services Business
Line</businessUnitName>
<businessUnitAddress>
<street>heaven street</street>
<postalZipCode>99999</postalZipCode>
<city>Saint Vitus</city>
```

```
<country>UTOPIA</country>
<phoneNumber>111 222 333 444</phoneNumber>
<faxNumber>111 222 333 445</faxNumber>
<email>customers_services@utopia.com</email>
<email>info@utopia.com</email>
<internet>www.utopia.customers.services.online.com
</internet>
<internet>www.utopia.online.com</internet>
</businessUnitAddress>
</businessUnit>
</enterpriseSpec>
</enterpriseRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.7

## *Technical information repository - Supplies*

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## 1 General

The technical information repository data module is used to capture and represent supplies intrinsic properties and related information.

The supplies properties identification can be used to uniquely identify the supplies products (such as oils, greases, paints) with their intrinsic properties which are always valid (eg the specification of the supply, its manufacturer, a flashpoint).

# 2 Supply technical repository data module content

## 2.1 Supply repository

**Description:** The element <`supplyRepository`> is used to provide a list of supplies and their associated properties.

**Markup element:** <`supplyRepository`> (M)

**Attributes:**

- `id` (O), the identifier of the <`supplyRepository`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`supplySpec`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the supply technical repository data module or not
- use of a single or multiple supply repository data modules

**Markup example:**

```
<supplyRepository>
<supplySpec>...</supplySpec>
</supplyRepository>
```

### 2.1.1 Supply specification

**Description:** The element <`supplySpec`> represents a supply. It contains its associated properties.

**Markup element:** <`supplySpec`> (M)

**Attributes:**

- `hazardousFlag` (O), a flag to indicate that the supply is a hazardous product or not. This attribute can have one of the following values:
  - "`1`" (yes) for hazardous supplies
  - "`0`" (no) for non-hazardous supplies
- `obsoleteFlag` (O), a flag to indicate that the supply is obsolete or not. This attribute can have one of the following values:
  - "`1`" (yes) for obsolete supplies
  - "`0`" (no) for non-obsolete supplies
- `specialLabelFlag` (O), a flag to indicate that the supply product has a special labeling or not. This attribute can have one of the following values:
  - "`1`" (yes) for supplies with special labeling
  - "`0`" (no) for supplies without special labeling
- `id` (O), the identifier of the <`supplySpec`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- `<supplyIdent>` (M). Refer to Para 2.1.1.1.
- `<name>` (O). Refer to Para 2.1.1.2.
- `<shortName>` (O). Refer to Para 2.1.1.3.
- `<specificationGroup>` (O). Refer to Para 2.1.1.4.
- `<supplierGroup>` (M). Refer to Para 2.1.1.5.
- `<natoStockNumber>` (O). Refer to Chap 3.9.5.1.
- `<quantity>` (O), the supply flash point. Refer to Chap 3.9.5.2.1.10.
- `<refs>` (O). Refer to Chap 3.9.5.2.1.2.
- `<lowestAuthorizedLevelGroup>` (O). Refer to Para 2.1.1.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
- <supplySpec>
  <supplyIdent ... />
<supplierGroup>...</supplierGroup>
</supplySpec>
```

2.1.1.1 Supply identifier

**Description:** Contrary to the attribute `id`, the element `<supplyIdent>` identifies semantically the supply as a result of its attributes.

**Markup element:** `<supplyIdent>` (M)

**Attributes:**

- `supplyNumber` (M), the supply number, which can be the supply trade name or a specification number
- `supplyNumberType` (M), indicates whether the supply number is a trade name or a specification. This attribute can have one of the following values:
  - "`comref`" for supply number corresponding to the supply trade name
  - "`spec`" when the supply number corresponds to a specification number
- `id` (O), the identifier of the `<supplyIdent>` element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

– None identified

**Markup example:**

```
– <supplyIdent supplyNumber="JET A1"
  supplyNumberType="comref"/>
```

2.1.1.2 Supply name

**Description:** The element <name> contains the textual definition of the supply.

**Markup element:** <name> (M)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the supply name.

**Markup example:**

```
<name>FUEL TANK SEALANT POLYSULFIDE</name>
```

2.1.1.3 Supply short name

**Description:** The element <shortName> gives an abbreviated alternate name of the supply name corresponding to the element <name>. This short form for the name of the supply is meant to be presented in the narrative of the data module to make the reading easier.

**Markup element:** <shortName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<shortName>SEALANT</shortName>
```

2.1.1.4 Specification list

**Description:** The element <specificationGroup> lists the specification that the supply meets.

**Markup element:** <specificationGroup> (O)

**Attributes:**

- `vendorFlag` (O), a flag to indicate if the list is defined by the Product manufacturer or by a supplier. This attribute can have one of the following values:
  - "`1`" for a list defined by the Product manufacturer
  - "`0`" for a list defined by a supplier
- `id` (O), the identifier of the <`specificationGroup`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`specDocument`> (O). Refer to Para 2.1.1.4.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<specificationGroup>
<specDocument ... />
</specificationGroup>
```

*2.1.1.4.1 Specification document*

**Description:** The element <`specDocument`> is used to identify a specification document with which the supply complies.

**Markup element:** <`specDocument`> (M)

**Attributes:**

- `manufacturerCodeValue` (O), not used in the context of supplies
- `countryIsoCode` (O), the country of the specification owner
- `specDocumentNumber` (O), the identifier number of the specification
- `specDocumentType` (O), the type of the document, always a specification for supplies
- `id` (O), the identifier of the <`specDocument`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<specDocument countryIsoCode="FR" specDocumentNumber="ASNA3572"
specDocumentType="specification"/>
```

2.1.1.5 Supplier list

**Description:** The element <supplierGroup> is used to specify the supply product list of suppliers.

**Markup element:** <supplierGroup> (M)

**Attributes:**

- id (O), the identifier of the <supplierGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <suppliedBy> (M). Refer to Para 2.1.1.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<supplierGroup>
<suppliedBy ...>...</suppliedBy>
</supplierGroup>
```

*2.1.1.5.1 Supplier*

**Description:** The element <suppliedBy> is used to contain information about a supplier of the supply.

**Markup element:** <suppliedBy> (M)

**Attributes:**

- manufacturerCodeValue (O), the CAGE code of the product supplier
- locallySuppliedFlag (M), a flag to indicate if the supply can be locally purchased or not. This attribute can have one of the following values:
  - "1" (yes) for locally purchased parts
  - "0" (no) for non-locally purchased parts
- id (O), the identifier of the <suppliedBy> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <shippingInfo> (O). Refer to Para 2.1.1.5.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<suppliedBy manufacturerCodeValue="F8808"
locallySuppliedFlag="0"/>
```

*2.1.1.5.2 Shipping information*

**Description:** The element <shippingInfo> contains the shipping information for the supply if any. They are divided into fours types of information.

**Markup element:** <shippingInfo> (O)

**Attributes:**

- id (O), the identifier of the <shippingInfo> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

One of the children has to be populated at least:

- <packaging> (O). Refer to Para 2.1.1.5.3.
- <transport> (O). Refer to Para 2.1.1.5.4.
- <shelfLife> (O). Refer to Para 2.1.1.5.5.
- <simpleRemark> (O). Refer to Para 2.1.1.5.6.

**Business rules decisions:**

- None identified

**Markup example:**

```
<shippingInfo>
<packaging>...</packaging>
</shippingInfo>
```

*2.1.1.5.3 Packaging*

**Description:** The element <packaging> contains information about the packaging of the supply.

**Markup element:** <packaging> (O)

**Attributes:**

- id (O), the identifier of the <packaging> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<packaging>1 AND 20 LITER (0.265 AND 5.3 GAL) CAN</packaging>
```

*2.1.1.5.4 Transport*

**Description:** The element <transport> contains information about the transport of the supply.

**Markup element:** <transport> (O)

**Attributes:**

– id (O), the identifier of the <transport> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<transport>FLAMMABLE LIQUID</transport>
```

*2.1.1.5.5 Shelf life*

**Description:** The element <shelfLife> contains information about the shelf life of the supply.

**Markup element:** <shelfLife> (O)

**Attributes:**

– id (O), the identifier of the <shelfLife> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<shelfLife>APPROX 4 YEARS AT 20 DEG C (68 DEG F)</shelfLife>
```

*2.1.1.5.6 General remark*

**Description:** The element <simpleRemark> contains general remarks about the shipping information related to the supply.

**Markup element:** <simpleRemark> (O)

**Attributes:**

- id (O), the identifier of the <simpleRemark> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<simpleRemark>FLAMMABLE,BUT DOES NOT REQUIRE A HAZARD
SYMBOL</simpleRemark>
```

2.1.1.6 Lowest authorized maintenance level group

**Description:** The element <lowestAuthorizedLevelGroup> contains groups the different lowest authorized maintenance levels associated to the supply.

**Markup element:** <lowestAuthorizedLevelGroup> (O)

**Attributes:**

- None

**Child elements:**

- <lowestAuthorizedLevel> (M). Refer to Para 2.1.1.6.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the lowest authorized maintenance level or not.

**Markup example:**

```
<lowestAuthorizedLevelGroup>
<lowestAuthorizedLevel .../>
</lowestAuthorizedLevelGroup>
```

*2.1.1.6.1 Lowest authorized maintenance level*

**Description:** The element <lowestAuthorizedLevel> indicates the minimum skill authorized to remove, replace, or use an item. The use of this element will facilitate supplying the bench stock applicable to the maintainer's skill level without having to go through an entire

manual to determine what consumable supplies might be needed. It also alerts the clerk in the supply room of which supplies the maintainer is allowed to acquire for bench stock.

**Markup element:** <`lowestAuthorizedLevel`> (O)

**Attributes:**

– `lowestLevel` (M), the lowest authorized level value. This attribute can have the following values:
  - "`la01`" - "`la99`", refer to Chap 3.9.6.1

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the attribute `lowestLevel` enumerated values.

**Markup example:**

```
<lowestAuthorizedLevel lowestLevel="la01"/>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the supplies properties technical information repository data modules.** The project or the organization must decide if the supplies properties technical information repository must be used or not. Use of this technical information repository data module can be considered as an alternative to the material data modules described in Chap 5.2.1.17 and Para 2.

**Use of several supplies properties technical information repository data modules.** The project must decide whether there is one single or several supply intrinsic properties technical repository data module depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the supply name.** The project or the organization must decide on the format of the supply name and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.2.

**Lowest authorized level**. The project or the organization must decide on the use of lowest authorized level or not. If used, the project or the organization must determine how to populate the enumerated attribute `lowestLevel`. Refer to Para 2.1.1.6.

# 4 Examples

This example shows the combined use of the supply intrinsic properties technical information repository and the supply requirement technical information repository.

The following example illustrates supply intrinsic properties technical information repository. It defines two supplies and related properties.

```
<techRepository>
<supplyRepository>
<supplySpec id="ENBSB-DUROFIX_FIXATIF_UW_SPECIAL">
<supplyIdent supplyNumber="BSB-DUROFIX_FIXATIF_UW_SPECIAL"
supplyNumberType="comref"/>
<specificationGroup vendorFlag="0">
```

```
<specDocument countryIsoCode="FR"
specDocumentNumber="IPDA 28-05"/>
</specificationGroup>
<supplierGroup>
<suppliedBy locallySuppliedFlag="0"
manufacturerCodeValue="F8808">
<shippingInfo>
<packaging>1 AND 20 LITER (0.265 AND 5.3 GAL) CAN</packaging>
<shelfLife>APPROX 4 YEARS AT 20 DEG C (68 DEG F)</shelfLife>
<transport>FLAMMABLE LIQUID</transport>
</shippingInfo>
</suppliedBy>
</supplierGroup>
</supplySpec>
<supplySpec id="ENBSB-DUROFIX_FIXATIF_UW">
<supplyIdent supplyNumber="BSB-DUROFIX_FIXATIF_UW"
supplyNumberType="comref"/>
<specificationGroup vendorFlag="0">
<specDocument countryIsoCode="FR"
specDocumentNumber="ASNA3572"/>
</specificationGroup>
<supplierGroup>
<suppliedBy locallySuppliedFlag="0"
manufacturerCodeValue="F8808">
<shippingInfo>
<packaging>1 AND 20 LITER (0.265 AND 5.3 GAL) CAN</packaging>
<shelfLife>APPROX 4 YEARS AT 20 DEG C (68 DEG F)</shelfLife>
<transport>FLAMMABLE LIQUID</transport>
</shippingInfo>
</suppliedBy>
</supplierGroup>
</supplySpec>
</supplyRepository>
</techRepository>
```

The following example illustrates supply requirement technical information repository. Defined supplies (see above) are targeted through the use of the element <`supplyRef`> with attribute `supplyNumber` properly filled.

```
<techRepository>
<supplyRqmtRepository>
<supplyRqmtSpec id="inv0105029-">
<supplyRqmtIdent materialCategory="05" supplyRqmtNumber="029"/>
<supplyRqmtAlt id="sol0105029">
<supplyRqmtAltIdent materialCategory="05" supplyRqmtNumber="029"
vendorFlag="0"/>
<supplySetGroup>
<supplySet>
<supplyRef supplyNumber="BSB-DUROFIX_FIXATIF_UW_SPECIAL"
supplyNumberType="comref"/>
<supplyRef supplyNumber="BSB-DUROFIX_FIXATIF_UW"
supplyNumberType="comref"/>
</supplySet>
```

```
</supplySetGroup>
<name>FIXATIVE FOR PLACARD INSTALLATION</name>
<safetyCategory safetyCategoryValue="C"/>
<usage>IMMERSION OF BSB LABEL</usage>
</supplyRqmtAlt>
</supplyRqmtSpec>
</supplyRqmtRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.8

## *Technical information repository - Supplies, requirements*

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## 1 General

The technical information repository data module is used to capture and represent supplies requirements and use conditions.

The supplies requirements identification can be used to uniquely identify the supplies use conditions (eg in which case a supply or a group of supplies can be used).

## 2 Supply requirements technical repository data module content

### 2.1 Supply requirement repository

**Description:** The element <`supplyRqmtRepository`> is used to provide a list of supply requirements and their associated properties.

**Markup element:** <`supplyRqmtRepository`> (M)

**Attributes:**

- `id` (O), the identifier of the <`supplyRqmtRepository`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`supplyRqmtSpec`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the supply requirement technical repository data module or not
- use of a single or multiple supply requirement repository data modules

**Markup example:**

```
<supplyRqmtRepository>
<supplyRqmtSpec>...</supplyRqmtSpec>
</supplyRqmtRepository>
```

### 2.1.1 Supply requirement specification

**Description:** The element <`supplyRqmtSpec`> represents one supply requirement. It contains its associated properties.

**Markup element:** <`supplyRqmtSpec`> (M)

**Attributes:**

- `id` (O), the identifier of the <`supplyRqmtSpec`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

- <`supplyRqmtIdent`> (M). Refer to Para 2.1.1.1.
- <`supplyRqmtAlt`> (M). Refer to Para 2.1.1.2.
- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
- <supplyRqmtSpec>
  <supplyRqmtIdent .../>
```

```
<supplyRqmtAlt>...</supplyRqmtAlt>
</supplyRqmtSpec>
```

2.1.1.1 Supply requirement identifier

**Description:** Contrary to the attribute `id`, the element <`supplyRqmtIdent`> identifies semantically the supply requirement as a result of its attributes.

**Markup element:** <`supplyRqmtIdent`> (M)

**Attributes:**

- `materialCategory` (M), the nature of use of the supply requirement (eg fuel, cleaning agent, lubricant...)
- `supplyRqmtNumber` (M), the supply requirement number.
- `vendorFlag` (O), a flag to indicate if the supply requirement is defined by the Product manufacturer, value "`0`" (no), or by a supplier, value "`1`" (yes)
- `id` (O), the identifier of the <`supplyRqmtIdent`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the material categories.
- Definition of the supply requirement numbers.

**Markup example:**

- ```
  <supplyRqmtIdent materialCategory="09"
  supplyRqmtNumber="09-001"/>
  ```

2.1.1.2 Alternatives of the supply requirement

**Description:** The element <`supplyRqmtAlt`> represents one alternative of the supply requirement. Each alternative lists one or several supplies that fulfill the supply requirement.

**Markup element:** <`supplyRqmtAlt`> (M)

**Attributes:**

- `supplyRqmtType` (O), the type of the supply requirement alternative
- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`supplyRqmtAlt`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
  ```

**Child elements:**

- <supplyRqmtAltIdent> (M). Refer to Para 2.1.1.2.1.
- <supplySetGroup> (M). Refer to Para 2.1.1.2.2.
- <name> (M). Refer to Para 2.1.1.2.5.
- <shortName> (O). Refer to Para 2.1.1.2.6.
- <safetyCategory> (O). Refer to Para 2.1.1.2.7.
- <usage> (O). Refer to Para 2.1.1.2.8.
- <rcmd> (O). Refer to Para 2.1.1.2.9.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<supplyRqmtAlt>
<supplyRqmtAltIdent .../>
<supplySetGroup>...</supplySetGroup>
<name>...</name>
</supplyRqmtAlt>
```

*2.1.1.2.1 Alternate supply item identifier*

**Description:** Contrary to the attribute id, the element <supplyRqmtAltIdent> identifies semantically the supply requirement as a result of its attributes.

**Markup element:** <supplyRqmtAltIdent> (M)

**Attributes:**

- materialCategory (M), the nature of use of the supply requirement alternative (eg fuel, cleaning agent, lubricant).
- supplyRqmtNumber (M), the supply requirement alternative number.
- vendorFlag (O), a flag to indicate if the supply requirement alternative is defined by the Product manufacturer, value "0" (no), or by a supplier, value "1" (yes).
- id (O), the identifier of the <supplyRqmtAltIdent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- definition of the material categories.
- definition of the supply requirement numbers.

**Markup example:**

```
<supplyRqmtAltIdent materialCategory="09"
supplyRqmtNumber="09-001A"/>
```

*2.1.1.2.2 Supplies*

**Description:** The element <supplySetGroup> is constituted of supplies and/or sets of supplies. Each supply or set of supplies can be used equally.

**Markup element:** <supplySetGroup> (M)

**Attributes:**

- id (O), the identifier of the <supplySetGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

At least, one of the following elements has to be used:

- <supplySet> (O). Refer to Para 2.1.1.2.3.
- <supplyRef> (O). Refer to Para 2.1.1.2.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<supplySetGroup>
<supplyRef .../>
</supplySetGroup>
```

*2.1.1.2.3 Supply set*

**Description:** The element <supplySet> identifies supplies that have to be used together (eg base and primer supply).

**Markup element:** <supplySet> (O)

**Attributes:**

- id (O), the identifier of the <supplySet> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <supplyRef> (M). Refer to Para 2.1.1.2.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<supplySet>
<supplyRef .../>
<supplyRef .../>
</supplySet>
```

*2.1.1.2.4 Supply*

**Description:** The element <supplyRef> represents a supply and also allows referring to its definition in the supply technical repository.

**Markup element:** <supplyRef> (O)

**Attributes:**

- supplyNumber (M), the supply number, which can be the supply trade name or a specification number
- supplyNumberType (M), indicates whether the supply number is a trade name or a specification. This attribute can have one of the following values:
  - "comref" for supply number corresponding to the supply trade name
  - "spec" when the supply number corresponds to a specification number
- id (O), the identifier of the <supplyRef> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <refs> (O), used to explicitly reference the supply in the supply technical repository. For implicit reference, the supply semantic identifiers (supply number and supply number type) are sufficient. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use explicit or implicit reference mechanism to the supply technical repository

**Markup example:**

```
<supplyRef supplyNumber="JET A1" supplyNumberType="comref"/>
```

*2.1.1.2.5 Supply requirement alternative name*

**Description:** The element <name> contains the textual definition of the supply requirement alternative.

**Markup element:** <name> (O)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- definition of the supply requirement name.

**Markup example:**

```
<name>FIXATIVE FOR PLACARD INSTALLATION</name>
```

2.1.1.2.6 *Supply requirement alternative short designation*

**Description:** The element <shortName> gives an abbreviated alternate name of the supply requirement alternative designation corresponding to the element <name>. This short form for the name of the supply requirement alternative designation is meant to be presented in the narrative of the data module to make the reading easier.

**Markup element:** <shortName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<shortName>FIXATIVE</shortName>
```

2.1.1.2.7 *Category*

**Description:** The element <safetyCategory> is used to specify, through its attribute, the safety category of the supply listed in the supply requirement alternative.

**Markup element:** <safetyCategory> (O)

**Attributes:**

– safetyCategoryValue (M), specifies the supply requirement safety category. This attribute can have one of the following values:
  - "A" for supply requirement alternatives mandatory for safety reasons
  - "B" for recommended supply requirement alternatives
  - "C" for commonly supply requirement alternatives
– id (O), the identifier of the <safetyCategory> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<safetyCategory safetyCategoryValue="A"/>
```

2.1.1.2.8 *Usage*

**Description:** The element <usage> contains the supply requirement alternative usage description.

**Markup element:** <usage> (O)

**Attributes:**

- `id` (O), the identifier of the <`usage`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<usage>IMMERSION OF BSB LABEL</usage>
```

*2.1.1.2.9 Recommendation*

**Description:** The element <`rcmd`> contains the recommendations linked to the supply requirement alternative.

**Markup element:** <`rcmd`> (O)

**Attributes:**

- `id` (O), the identifier of the <`rcmd`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<rcmd>REFER TO THE ENGINE MANUFACTURERS DATA FOR APPROVED FUEL
ADDITIVES</rcmd>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the supplies requirements technical information repository data modules.** The project or the organization must decide if the supplies requirements technical information repository must be used or not. Refer to Para 2.

**Use of several supplies requirements technical information repository data modules.** The project or the organization must decide whether there is one single or several supplies requirements technical repository data module depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Definition of the material categories.** The project or the organization must define the different material categories and how to populate the attribute `materialCategory`. Refer to Para 2.1.1.1.

**Definition of the supply requirement numbers.** The project or the organization must define the codification of the supply requirement identifiers and how to populate the attributes `supplyReqNumber`. Refer to Para 2.1.1.1.

**Reference mechanism.** The project or the organization must decide whether to use the implicit or explicit reference mechanism to the supply technical repository. Refer to Chap 4.13.2 for details on the two reference mechanisms. Refer to Para 2.1.1.2.1.

**Definition of the supply requirement alternative name.** The project or the organization must decide on the format of the supply requirement alternative name and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.2.5.

# 4 Examples

This example shows the combined use of the supply intrinsic properties technical information repository and the supply requirement technical information repository.

The following example illustrates supply intrinsic properties technical information repository. It defines two supplies and related properties.

```
<techRepository>
<supplyRepository>
<supplySpec id="ENBSB-DUROFIX_FIXATIF_UW_SPECIAL">
<supplyIdent supplyNumber="BSB-DUROFIX_FIXATIF_UW_SPECIAL"
supplyNumberType="comref"/>
<specificationGroup vendorFlag="0">
<specDocument countryIsoCode="FR"
specDocumentNumber="IPDA 28-05"/>
</specificationGroup>
<supplierGroup>
<suppliedBy locallySuppliedFlag="0"
manufacturerCodeValue="F8808">
<shippingInfo>
<packaging>1 AND 20 LITER (0.265 AND 5.3 GAL) CAN</packaging>
<shelfLife>APPROX 4 YEARS AT 20 DEG C (68 DEG F)</shelfLife>
<transport>FLAMMABLE LIQUID</transport>
</shippingInfo>
</suppliedBy>
</supplierGroup>
</supplySpec>
<supplySpec id="ENBSB-DUROFIX_FIXATIF_UW">
<supplyIdent supplyNumber="BSB-DUROFIX_FIXATIF_UW"
supplyNumberType="comref"/>
<specificationGroup vendorFlag="0">
<specDocument countryIsoCode="FR"
specDocumentNumber="ASNA3572"/>
</specificationGroup>
<supplierGroup>
<suppliedBy locallySuppliedFlag="0"
manufacturerCodeValue="F8808">
<shippingInfo>
```

```
<packaging>1 AND 20 LITER (0.265 AND 5.3 GAL) CAN</packaging>
<shelfLife>APPROX 4 YEARS AT 20 DEG C (68 DEG F)</shelfLife>
<transport>FLAMMABLE LIQUID</transport>
</shippingInfo>
</suppliedBy>
</supplierGroup>
</supplySpec>
</supplyRepository>
</techRepository>
```

The following example illustrates supply requirement technical information repository. Defined supplies are targeted through the use of the element `<supplyRef>` with attribute `supplyNumber` properly filled

```
<techRepository>
<supplyRqmtRepository>
<supplyRqmtSpec id="inv0105029-">
<supplyRqmtIdent materialCategory="05" supplyRqmtNumber="029"/>
<supplyRqmtAlt id="sol0105029">
<supplyRqmtAltIdent materialCategory="05" supplyRqmtNumber="029"
vendorFlag="0"/>
<supplySetGroup>
<supplySet>
<supplyRef supplyNumber="BSB-DUROFIX_FIXATIF_UW_SPECIAL"
supplyNumberType="comref"/>
<supplyRef supplyNumber="BSB-DUROFIX_FIXATIF_UW"
supplyNumberType="comref"/>
</supplySet>
</supplySetGroup>
<name>FIXATIVE FOR PLACARD INSTALLATION</name>
<safetyCategory safetyCategoryValue="C"/>
<usage>IMMERSION OF BSB LABEL</usage>
</supplyRqmtAlt>
</supplyRqmtSpec>
</supplyRqmtRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.9

## *Technical information repository - Tools*

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# 1 General

The technical information repository data module Schema is used to capture and represent tools and their associated properties.

The support equipment identification can be used to uniquely identify any support equipment, including standard and special tools required to correctly accomplish a given action, task or procedure, using the element <toolRef>. Refer to Chap 3.9.5.2.1.9.

# 2 Tools technical repository data module content

## 2.1 Tool repository

**Description:** The element <toolRepository> is used to provide a list of parts and their associated properties.

**Markup element:** <toolRepository> (M)

**Attributes:**

- id (O), the identifier of the <toolRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <figure> (O), tool illustrations. Refer to Chap 3.9.5.2.1.7
- <toolSpec> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the tool technical repository data module or not.
- Use of a single or multiple tool repository data modules.

**Markup example:**

```
<toolRepository>
<toolSpec>...</toolSpec>
</toolRepository>
```

### 2.1.1 Tool specification

**Description:** The element <toolSpec> represents a tool. It contains its associated properties.

The tool has a container-alternate structure. Indeed, some of its properties are generic: they do not differ from a product instance to another. Some other properties depend on the product configuration. Generic properties are directly defined under the tool (container level), other properties are defined under the alternate tools. For some properties appearing both at container and alternate levels, the following rule must be applied: if the property is fulfilled in the alternate element, it supersedes for the specific configuration under which it applies, the generic value stored in the container element.

Following container/alternate principles, data modules only refer to containers. Retrieval of the accurate alternate is achieved using applicability annotations.

Refer to Chap 4.13.3 for detail explanation of the container concept.

**Markup element:** <toolSpec> (M)

**Attributes:**

- id (O), the identifier of the <toolSpec> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

**Child elements:**

- <toolIdent> (M). Refer to Para 2.1.1.1.
- <itemIdentData> (M). Refer to Chap 3.9.5.2.11.3.
- <procurementData> (M). Refer to Chap 3.9.5.2.11.3.
- <techData> (M). Refer to Para 2.1.1.2.
- <toolRefGroup> (O). Refer to Para 2.1.1.3.
- <toolAlt> (M). Refer to Para 2.1.1.4.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
- <toolSpec>
  <toolIdent .../>
- <itemIdentData>...</itemIdentData>
- <procurementData>...</procurementData>
- <techData>...</techData>
- <toolAlt>...</toolAlt>
  </toolSpec>
```

2.1.1.1 Tool identifier

**Description:** Contrarily to the id attribute, the element <toolIdent> identifies semantically the tool thanks to its attributes.

**Markup element:** <toolIdent> (M)

**Attributes:**

- toolNumber (M), the tool part number.
- manufacturerCodeValue (M), the CAGE/CAGE code of the tool part manufacturer. As there is no standardized rule to assign a part number, the CAGE/CAGE code of the part manufacturer ensures the uniqueness of a part number.
- id (O), the identifier of the <toolIdent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<toolIdent toolNumber="0-0204504-1"
manufacturerCodeValue="F0286"/>
```

2.1.1.2 Technical data

**Description:** The element <`techData`> groups the technical properties related to the tool as a part.

**Markup element:** <`techData`> (M)

**Attributes:**

– `etopsFlag` (O), not used in this context, because this attribute property is specific to parts
– `hazardousFlag` (O), a flag to indicate that the part is a hazardous product or not. This attribute can have one of the following values:
  - "`1`" (yes) for hazardous parts
  - "`0`" (no) for non-hazardous parts
– `id` (O), the identifier of the <`techData`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`sparePartClass`> (O). Refer to Chap 3.9.5.2.1.3.
– <`usageCategory`> (O). Refer to Chap 3.9.5.2.1.3.
– <`specDocument`> (O). Refer to Chap 3.9.5.2.1.3.
– <`quantity`> (O), the dimensions of the tool. Refer to Chap 3.9.5.2.1.10.
– <`physicalSecurityPilferageCode`> (O). Refer to Chap 3.9.5.2.7.
– <`fitmentCode`> (O). Refer to Chap 3.9.5.2.7.
– <`unitOfIssue`> (O). Refer to Chap 3.9.5.2.7.
– <`specialStorage`> (O). Refer to Chap 3.9.5.2.7.
– <`calibrationMarker`> (O). Refer to Chap 3.9.5.2.7.

**Business rules decisions:**

– None identified

**Markup example:**

```
<techData>...</techData>
```

2.1.1.3 Relationships with others tools

**Description:** The element <`toolRefGroup`> allows providing relationships and the type of relationship with other tools.

**Markup element:** <toolRefGroup> (O)

**Attributes:**

- toolRefType (M), the type of the relationship between the tools (eg symmetry, replacement relationship).
- id (O), the identifier of the <toolRefGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <toolRef> (M). The referenced tool. The target is always a tool container. Refer to Chap 3.9.5.2.1.9.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Definition of the tool relationship types.

**Markup example:**

```
<toolRefGroup zoneRefType="symmetric">
<toolRef .../>
</toolRefGroup>
```

2.1.1.4 Alternate tool

**Description:** The element <toolAlt> contains the properties of the tool that depend on the Product configuration. Thus this element contains applicability.

Configuration consistency between the various alternate tools must be ensured. It means that for a given product configuration and under given operational conditions, only one alternate tool is applicable at one time for a container tool.

**Markup element:** <toolAlt> (M)

**Attributes:**

- altNumber (O), the alternate number.
- deliveredSpecificationFlag (O), indicates delivery of a specification sheet with the support equipment
- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <toolAlt> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <itemDescr> (M). Refer to Chap 3.9.5.2.11.4.

- <functionalPhysicalAreaRef> (O). Refer to Chap 3.9.5.2.11.10.
- <rcmdQuantity> (O). Refer to Para 2.1.1.4.1.
- <packaging> (O). Refer to Chap 3.9.5.2.11.7.
- <taskCategory> (O). Refer to Para 2.1.1.4.2.
- <simpleRemark> (O). Refer to Chap 3.9.5.2.11.7.
- <internalRef> (O), reference to the illustration where the zone is illustrated. Refer to Chap 3.9.5.2.1.2.
- <refs> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of an alternate number.

**Markup example:**

```
<toolAlt applicRefId="applic-001">
<itemDescr>...</itemDescr>
</toolAlt>
```

*2.1.1.4.1 Recommended quantity*

**Description:** The element <rcmdQuantity> contains the tool recommended quantity.

**Markup element:** <rcmdQuantity> (O)

**Attributes:**

- id (O), the identifier of the <rcmdQuantity> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<rcmdQuantity>2</rcmdQuantity>
```

*2.1.1.4.2 Task code*

**Description:** The element <taskCategory> is used to specify the usage of the tool (eg servicing, maintenance, overhaul, repair etc). This is done through its attribute.

**Markup element:** <taskCategory> (O)

**Attributes:**

- taskCategoryCode (M), the tool task category value.
- id (O), the identifier of the <taskCategory> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the tool task code.

**Markup example:**

```
<taskCategory taskCategoryCode="maintenance"/>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the support equipment technical information repository data modules.** The project or the organization must decide if the support equipment technical information repository must be used or not. Refer to Para 2.

**Use of several support equipment technical information repository data modules.** The project or the organization must decide whether there is one single support equipment technical information repository data module or several depending of the SNS. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.

**Use of the over length support equipment number element** `<overLengthPartNumber>`**.** The project or the organization must decide whether they use or not the over length part number. Refer to Para 2.1.

**Definition of the tool relationship types.** The project or the organization must define the types of relationships to be implemented between tools (eg symmetry, replacement relationships) and how to populate the attribute `toolRefType`. Refer to Para 2.1.1.3.

**Use of an alternate number.** The project or the organization must decide on the use of an alternate number or not. If used, the project or the organization must determine how to populate the attribute `altNumber` and must ensure it is consistently applied. Refer to Para 2.1.1.4.

**Use of the tool task category.** The project or the organization must decide on the use of a tool task category (eg servicing, maintenance, overhaul, repair etc) or not. If used, the project or the organization must determine how to populate the attribute `taskCategoryCode`. Refer to Para 2.1.1.4.2.

# 4 Examples

– 
```
<toolRepository>
<toolSpec>
<toolIdent toolNumber="PWC515916"
manufacturerCodeValue="0M197"/>
<itemIdentData><name>TUBE-GUIDE, BORESCOPE,POWER
TURBINE</name><partKeyword>GUIDE</partKeyword></itemIdentData
>
<procurementData>
<supplierCode>F0286</supplierCode>
</procurementData>
```

```
<techData>
<sparePartClass sparePartClassCode="1"/>
<usageCategory usageCategoryCode="00"/>
</techData>
<toolAlt applicRefId="applic-001">
<itemDescr>This tool is used to move the borescope during APU
internal inspections of the Power Turbine.</itemDescr>
<functionalPhysicalAreaRef systemCode="49" subSystemCode="2"
sub-subsystemCode="0" assyCode="00"/>
</toolAlt>
</toolSpec>
</toolRepository>
```

# Chapter 3.9.5.2.11.10

## *Technical information repository - Functional and/or physical areas*

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## 1 General

The technical information repository data module is used to capture and represent the functional and/or physical breakdown. The functional and/or physical breakdown is the collection of functional and/or physical areas with their properties and the relationships between them.

There are six types of functional and/or physical areas that describe a Product They are the systems, the subsystems, the sub-subsystems, the assemblies, the disassemblies and the disassembly variants. The systems and subsystems are defined in the S1000D specification (Refer to Chap 8.2), whereas the sub-subsystems, assemblies, disassemblies and disassembly variants are allocated by the data owner.

# 2 Functional and/or physical area technical repository data module content

## 2.1 Functional and/or physical repository

**Description:** The element <functionalPhysicalAreaRepository> is used to provide a list of functional and/or physical areas and their associated properties.

**Markup element:** <functionalPhysicalAreaRepository> (M)

**Attributes:**

– None

**Child elements:**

– <functionalPhysicalAreaSpec> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the functional and/or physical areas technical repository data module or not
– use of a single or multiple functional and/or physical areas repository data modules

**Markup example:**

```
<functionalPhysicalAreaRepository>
<functionalPhysicalAreaSpec>...</functionalPhysicalAreaSpec>
</functionalPhysicalAreaRepository>
```

### 2.1.1 Functional and/or physical area specification

**Description:** This element represents one functional and/or physical area and its properties.

There are six types of functional and/or physical areas: the systems, the subsystems, the sub-subsystems, the assemblies, the disassemblies and the disassembly variants.

A given functional and/or physical area may not be valid for all the product instances of the CSDB. As a result, a functional and/or physical area can have applicability.

**Markup element:** <functionalPhysicalAreaSpec> (M)

**Attributes:**

– id (O), the identifier of the <functionalPhysicalAreaSpec> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

– <functionalPhysicalAreaIdent> (M). Refer to Para 2.1.1.1.
– <name> (O). Refer to Para 2.1.1.2.
– <shortName> (O). Refer to Para 2.1.1.3.
– <functionalPhysicalAreaRefGroup> (O). Refer to Para 2.1.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<functionalPhysicalAreaSpec>
<functionalPhysicalAreaIdent .../>
</functionalPhysicalAreaSpec>
```

2.1.1.1 Functional and/or physical area identifier

**Description:** Contrary to the attribute `id`, the element `<functionalPhysicalAreaIdent>` identifies semantically the functional and/or physical area as a result of its attributes. In addition to the functional and/or physical area identifier, the system difference code can be specified for each functional and/or physical area.

**Markup element:** <functionalPhysicalAreaIdent> (M)

**Attributes:**

- `systemDiffCode` (O), to indicate to which system difference code the functional and/or physical area pertains to. Refer to Chap 3.9.5.1.
- `systemCode` (M), the functional and/or physical area system code. Refer to Chap 3.9.5.1.
- `subSystemCode` (M), the functional and/or physical area subsystem code. Refer to Chap 3.9.5.1.
- `sub-subsystemCode` (M), the functional and/or physical area sub-subsystem code. Refer to Chap 3.9.5.1.
- `assyCode` (M), the functional and/or physical area assembly code.. Refer to Chap 3.9.5.1.
- `disassyCode` (O), the functional and/or physical area disassembly code. Refer to Chap 3.9.5.1.
- `disassyCodeVariant` (O), the functional and/or physical area disassembly code variant. Refer to Chap 3.9.5.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the disassembly code and disassembly code variant
- use of system difference code

**Markup example:**

The subsystem 21-1 must be populated:

```
<functionalPhysicalAreaIdent systemCode="21" subSystemCode="1"
subSubSystemCode="0" assyCode="00"/>
```

In case of project managing the disassembly in the functional and/or physical area repository, the disassembly 21-11-32-02 must be populated:

```
<functionalPhysicalAreaIdent systemCode="21" subSystemCode="1"
subSubSystemCode="1" assyCode="32" disassyCode="02"/>
```

In case of project managing several system difference code, the system difference code value to which the functional area pertains to must to be indicated. The subsystem 21-1 in system difference code A must be populated:

```
<functionalPhysicalAreaIdent systemDiffCode="A" systemCode="21"
subSystemCode="1" subSubSystemCode="0" assyCode="00"/>
```

2.1.1.2 Functional and/or physical area designation

**Description:** The element <name> contains the long definition of the functional and /or physical area.

For systems and subsystems, this description has to follow the S1000D specification. Refer to Chap 8.2.

For sub-subsystems and assemblies, this description is defined by the data owner.

**Markup element:** <name> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Definition of the functional and/or physical area name from the sub-subsystem level.

**Markup example:**

```
<name>Those units and components which provide air
vehicle navigational information. Includes VOR,
pitot, static, ILS, flight director, compasses,
indicators, etc.</name>
```

2.1.1.3 Functional and/or physical area short designation

**Description:** The element <shortName> contains the short definition of the functional and /or physical area.

For systems and subsystems, this description has to follow the S1000D specification. Refer to Chap 8.2.

For sub- subsystems and assemblies, this description is defined by the data owner.

**Markup element:** <shortName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<shortName>Navigation</shortName>
```

2.1.1.4 References to other functional and/or physical areas

**Description:** The element <functionalPhysicalAreaRefGroup> allows reflecting the functional and/or physical breakdown. If used, it must only contain the links from a functional and/or physical area to its direct children.

This means that a system can only refer to subsystems with the same system code values, a subsystem can only refer to sub-subsystems with the same system and subsystem code values, etc.

**Markup element:** <functionalPhysicalAreaRefGroup> (O)

**Attributes:**

– None

**Child elements:**

– <functionalPhysicalAreaRef> (M). Refer to Para 2.1.1.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<functionalPhysicalAreaRefGroup>
<functionalItemRef .../>
</functionalPhysicalAreaRefGroup>
```

2.1.1.5 Functional and/or physical area

**Description:** The element <functionalPhysicalAreaRef> is used to markup a functional and/or physical area (outside of its specification in the functional and/or physical area technical repository) and also allows referring to its specification in the functional and/or physical area technical repository.

**Markup element:** <functionalPhysicalAreaRef> (M)

**Attributes:**

– systemDiffCode (O), to indicate to which system difference code the functional and/or physical area pertains to. Refer to Chap 3.9.5.1.
– systemCode (M), the functional and/or physical area system code. Refer to Chap 3.9.5.1.
– subSystemCode (M), the functional and/or physical area subsystem code. Refer to Chap 3.9.5.1.
– sub-subsystemCode (M), the functional and/or physical area sub- subsystem code. Refer to Chap 3.9.5.1.
– assyCode (M), the functional and/or physical area assembly code.. Refer to Chap 3.9.5.1.
– disassyCode (O), the functional and/or physical area disassembly code. Refer to Chap 3.9.5.1.
– disassyCodeVariant (O), the functional and/or physical area disassembly code variant. Refer to Chap 3.9.5.1.
– id (O), the identifier of the <functionalItemRef> element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- `<dmRef>` (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use explicit or implicit reference mechanism to the functional and/or physical area technical repository

**Markup example:**

```
<functionalPhysicalAreaRef systemCode="21" subSystemCode="1"
sub-subsystemCode="0" assyCode="00"/>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of the functional and/or physical area technical information repository data modules.** The project or the organization must decide if the functional and/or physical area technical repository must be used or not. Refer to Para 2.

**Use of several functional and/or physical area technical information repository data modules.** The project or the organization must decide whether there is one single functional and/or physical area technical repository data module or several. The decision can occur in the case of multi-partner CSDB. Indeed for multi-partner CSDB, each partner is allowed to maintain and exchange its own functional and/or physical area technical information repository data module. It is also the case for CSDB managing several system difference codes. The project or the organization must decide whether to have one or several functional and/or physical technical repositories (one per system difference code). Refer to Para 2.

**Consistency with the BREX.** If the SNS is defined within the BREX, then the project or the organization must ensure the consistency between the functional and/or physical area technical information repository data module and the definition of the SNS within the BREX. Refer to Para 2.

**Use of the disassembly code and disassembly code variant.** The project or the organization must decide if the disassembly codes and disassembly codes variants are managed in the functional and/or physical area technical repository or not. Refer to Para 2.

**Use of system difference code.** The project or the organization must decide if the system difference code must be populated in the functional and/or physical area technical repository or not. Refer to Para 2.

**Definition of the functional and/or physical area name.** The project or the organization must decide on the format of the functional and/or physical area name from the sub-subsystem level and apply these rules consistently in the project. This includes the case of the names and the source from which they are derived. Refer to Para 2.1.1.1.

**Reference mechanism.** The project or the organization must decide whether to use the implicit or explicit reference mechanism to the functional and/or physical technical repository. Refer to Chap 4.13.2 for details on the two reference mechanisms. Refer to Para 2.1.1.4.

# 4 Examples

The following example illustrates a functional item which is configuration dependant. As the zone can differ from one product range to the other, two alternate functional items have been defined.

```
<referencedApplicGroup>
<applic id="appl-001">
<displayText>
<simplePara>A340-300, A340-500</simplePara>
</displayText>

<evaluate andOr="or">
<assert applicPropertyIdent="serie"
applicPropertyType="prodattr" applicPropertyValues="A340-200"/>
<assert applicPropertyIdent="serie"
applicPropertyType="prodattr" applicPropertyValues="A340-500"/>
</evaluate>
</applic>
<applic id="appl-002">
<displayText><simplePara>A340-500</simplePara></displayText>
<assert applicPropertyIdent="serie"
applicPropertyType="prodattr" applicPropertyValues="A340-500"/>
</applic>
</referencedApplicGroup>
...
<techRepository>
<functionalPhysicalAreaRepository>
<functionalPhysicalAreaSpec applicRefId="appl001">
<functionalPhysicalAreaIdent systemCode="21" subSystemCode="0"
subSubSystemCode="0" assyCode="00"/>
<name>Environmental control</name>
<functionalPhysicalAreaRefGroup>
<functionalPhysicalAreaRef systemCode="21" subSystemCode="1"
subSubSystemCode="0" assyCode="00"/>
<functionalPhysicalAreaRef systemCode="21" subSystemCode="2"
subSubSystemCode="0" assyCode="00"/>
</functionalPhysicalAreaRefGroup>
</functionalPhysicalAreaSpec>
<functionalPhysicalAreaSpec applicRefId="appl001">
<functionalPhysicalAreaIdent systemCode="21" subSystemCode="1"
subSubSystemCode="0" assyCode="00"/>
<name>Compression</name>
...
</functionalPhysicalAreaSpec>
<functionalPhysicalAreaSpec applicRefId="appl002">
<functionalPhysicalAreaIdent systemCode="21" subSystemCode="2"
subSubSystemCode="0" assyCode="00"/>
<name>Distribution</name>
...
</functionalPhysicalAreaSpec>
...
</functionalPhysicalAreaRepository>
</techRepository>
```

# Chapter 3.9.5.2.11.11

## *Technical information repository - Controls and indicators*

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## 1 General

The technical information repository data module type is used to capture and represent control and indicator information. This information assists personnel in determining the location and function of the controls and indicators.

## 2 Content

The technical information repository data module type is used to provide a list of the controls and indicators.

## 2.1 Controls and indicators repository

**Description:** The element <controlIndicatorRepository> is used to capture and represent control and indicator information.

**Markup element:** <controlIndicatorRepository> (M)

**Attributes:**

- id (O), the identifier of the <controlIndicatorRepository> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <controlIndicatorGroup> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of the controls and indicators technical repository
- Use of a single or multiple control and indicator technical repository data modules

**Markup example:**

```
<controlIndicatorRepository>
<controlIndicatorGroup>...</controlIndicatorGroup>
</controlIndicatorRepository>
```

### 2.1.1 Control or indicator group

**Description:** The element <controlIndicatorGroup> (one or more) is used to contain unique identification of controls and indicators, each grouped by equipment, assembly, or control panel.

**Markup element:** <controlIndicatorGroup> (M)

**Attributes:**

- id (O), the identifier of the <controlIndicatorGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <figure> (M). Refer to Chap 3.9.5.2.1.7.
- <controlIndicatorSpec> (M). Refer to Para 2.1.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the explicit reference mechanism. Refer to Chap 4.13.2.

**Markup example:**

```
<controlIndicatorGroup>
<figure>...</figure>
<controlIndicatorSpec>...</controlIndicatorSpec>
</controlIndicatorGroup>
```

2.1.1.1 Control and indicator information

**Description:** The element <controlIndicatorSpec> contains control and indicator information including illustration or index key, designation, and description. This element is the target when a control or indicator is referenced from another data module (eg procedural data module), using the element <controlIndicatorRef>. Refer to Chap 3.9.5.2.1.10.

**Markup element:** <controlIndicatorSpec> (M)

**Attributes:**

– controlIndicatorNumber (M), the identifier which can be used for implicit referencing within other data modules. Refer to Chap 4.13.2.
– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of the <controlIndicatorSpec> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <controlIndicatorKey> (M). Refer to Para 2.1.1.1.1.
– <controlIndicatorName> (M). Refer to Para 2.1.1.1.2.
– <controlIndicatorDescr> (M). Refer to Para 2.1.1.1.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the implicit reference mechanism. Refer to Chap 4.13.2.

**Markup example:**

```
<controlIndicatorSpec controlIndicatorNumber="ci0005">
<controlIndicatorKey>...</controlIndicatorKey>
<controlIndicatorName>...</controlIndicatorName>
<controlIndicatorDescr>...</controlIndicatorDescr>
</controlIndicatorSpec>
```

*2.1.1.1.1 Control or indicator key*

**Description:** The element <controlIndicatorKey> contains the illustration or index key of the control or indicator.

**Markup element:** <controlIndicatorKey> (M)

**Attributes:**

- id (O), the identifier of the <controlIndicatorKey> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<controlIndicatorKey>5</controlIndicatorKey>
```

*2.1.1.1.2 Control or indicator designation*

**Description:** The element <controlIndicatorName> contains the designation of the control or indicator.

**Markup element:** <controlIndicatorName> (M)

**Attributes:**

- id (O), the identifier of the <controlIndicatorName> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <subScript> (O). Refer to Chap 3.9.5.2.1.10.
- <superScript> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<controlIndicatorName>Chrome Bell</controlIndicatorName>
```

*2.1.1.1.3 Control or indicator description*

**Description:** The element <controlIndicatorDescr> is used to store information specific to a control or indicator.

**Markup element:** <controlIndicatorDescr> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

- id (O), the identifier of the <controlIndicatorDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <note> (O). Refer to Chap 3.9.3.
- <controlIndicatorFunction> (M). Refer to Para 2.1.1.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<controlIndicatorDescr>
<controlIndicatorFunction>...</controlIndicatorFunction>
</controlIndicatorDescr>
```

*2.1.1.1.4 Control or indicator function*

**Description:** The element <controlIndicatorFunction> is used to store one or more brief descriptions of the control or indicator function.

**Markup element:** <controlIndicatorFunction> (M)

**Attributes:**

- id (O), the identifier of the <controlIndicatorFunction> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <symbol> (O). Refer to Chap 3.9.5.2.1.10.
- <inlineSignificantData> (O). Refer to Chap 3.9.5.2.1.10.
- <subScript> (O). Refer to Chap 3.9.5.2.1.10.
- <superScript> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<controlIndicatorFunction>Push button to turn light
<inlineSignificantData
significantParaDataType="psd10">ON</inlineSignificantData> or
<inlineSignificantData
significantParaDataType="psd10">OFF</inlineSignificantData>.</co
ntrolIndicatorFunction>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the controls and indicators technical information repository.** The project or the organization must decide whether to use the controls and indicators technical information repository or not. Refer to Para 2.1.

**Use of several controls and indicators technical information repository data modules.** The project or the organization must decide whether there is one single control and indicator technical information repository data module or several depending of the SNS or not. In this case, granularity of these data modules is determined by the application of the SNS. Refer to Para 2.1.

**Implicit reference mechanism.** The project or the organization must decide whether to use implicit references or not. Refer to Para 2.1.1.1 and Chap 4.13.2.

**Explicit reference mechanism.** The project or the organization must decide whether to use explicit references or not. Refer to Chap 4.13.2.

# 4 Markup example

```
<techRepository>
<controlIndicatorRepository>
<controlIndicatorGroup>
<figure>
<title>Bike controls and indicators</title>
<graphic infoEntityIdent="ICN-S1000DBIKE-AAA-D000000-0-U8025-
00999-A-03-1"></graphic>
</figure>
<controlIndicatorSpec controlIndicatorNumber="ci0005">
<controlIndicatorKey>5</controlIndicatorKey>
<controlIndicatorName>Chrome Bell</controlIndicatorName>
<controlIndicatorDescr>
<controlIndicatorFunction>Press to sound bell. Normally used to
signal a need for attention.</controlIndicatorFunction>
</controlIndicatorDescr>
</controlIndicatorSpec>
<controlIndicatorSpec controlIndicatorNumber="ci0006">
<controlIndicatorKey>6</controlIndicatorKey>
<controlIndicatorName>Platform Pedals</controlIndicatorName>
<controlIndicatorDescr>
<controlIndicatorFunction>Control the acceleration of the
bicycle.</controlIndicatorFunction>
</controlIndicatorDescr>
</controlIndicatorSpec>
<controlIndicatorSpec controlIndicatorNumber="ci0007">
<controlIndicatorKey>7</controlIndicatorKey>
<controlIndicatorName>LED Headlight</controlIndicatorName>
<controlIndicatorDescr>
<controlIndicatorFunction>Push button to turn light
<inlineSignificantData
significantParaDataType="psd10">ON</inlineSignificantData> or
<inlineSignificantData
significantParaDataType="psd10">OFF</inlineSignificantData>.</co
ntrolIndicatorFunction>
</controlIndicatorDescr>
</controlIndicatorSpec>
<controlIndicatorSpec controlIndicatorNumber="ci0008">
<controlIndicatorKey>8</controlIndicatorKey>
```

```
<controlIndicatorName>LED Taillight</controlIndicatorName>
<controlIndicatorDescr>
<controlIndicatorFunction>Lights illuminate automatically when
brakes are engaged.</controlIndicatorFunction>
</controlIndicatorDescr>
</controlIndicatorSpec>
</controlIndicatorGroup>
</controlIndicatorRepository>
</techRepository>
```

# Chapter 3.9.5.2.12

## *Content section - Container data module*

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| Chap 4.13.3 | Optimizing and reuse - Container data module |

# 1 General

This chapter details implementation of the container data module. The container data module provides a mechanism to associate several alternate data modules representing the same data. The general mechanism of the container data module is described in Chap 4.13.3.

# 2 Container data module content

## 2.1 Data module content

**Description:** This element is used to contain the container data module core content.

**Markup element:** <`content`> (M)

**Attributes:**

– `id` (M), the identifier of the <`content`> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <`refs`> (O). Refer to Chap 3.9.5.2.1.2.
– <`container`> (M). Refer to Para 2.1.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the container data module or not.

**Markup example:**

```
<content>
<container>...</container>
</content>
```

### 2.1.1 Container

**Description:** This element is used to provide the list of alternate data modules, that the "container" contains.

**Markup element:** <container> (M)

**Attributes:**

– id (M), the identifier of the <container> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <refs> (M), to refer to alternate data modules. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of applicability within container data module content

**Markup example:**

```
<container>
<refs/>
</container>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of container data module**. The project or the organization must decide if the container data module must be used or not. Refer to Para 2.

**Use of applicability within container data module content.** The project or the organization must decide if applicability annotations are duplicated from the referenced data modules to the container data module or not. Refer to Para 2.

# 4 Markup example

The following markup example illustrates a container data module referencing two alternate data modules.

```
<dmodule>
<identAndStatusSection>
```

```
<dmAddress>
<dmIdent>
<dmCode modelIdentCode="AJ" systemDiffCode="A"
systemCode="35" subSystemCode="1" subSubSystemCode="3"
assyCode="51" disassyCode="00" disassyCodeVariant="A"
infoCode="720" infoCodeVariant="A" itemLocationCode="A"/>
<language languageIsoCode="en" countryIsoCode="US"/>
<issueInfo issueNumber="001" inWork="00"/>
</dmIdent>
<dmAddressItems>
<issueDate day="03" month="01" year="2006"/>
<dmTitle>
<techName>Crew</techName>
<infoName>Install procedure</infoName>
</dmTitle>
</dmAddressItems>
</dmAddress>
<dmStatus issueType="new">
<security securityClassification="01"/>
<responsiblePartnerCompany>
<enterpriseName>A</enterpriseName>
</responsiblePartnerCompany>
<originator enterpriseCode="XXX"/>
<applic><displayText>All</displayText></applic>
<brexDmRef>
<dmRef>
...
</dmRef>
</brexDmRef>
<qualityAssurance>
<unverified/>
</qualityAssurance>
</dmStatus>
</identAndStatusSection>
<content>
<container>
<refs>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="AJ" systemDiffCode="A" systemCode="35"
subSystemCode="1" subSubSystemCode="3" assyCode="51"
disassyCode="00" disassyCodeVariant="B" infoCode="720"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="AJ" systemDiffCode="A" systemCode="35"
subSystemCode="1" subSubSystemCode="3" assyCode="51"
disassyCode="00" disassyCodeVariant="C" infoCode="720"
infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
```

```
</refs>
</container>
</content>
</dmodule>
```

# Chapter 3.9.5.2.13

## *Content section - Learning data module*

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| www.adlnet.org | ADL/SCORM |

# 1 General

S1000D supports technical training information development through the use of the learning data module. The Schema for this data module structures technical learning content and configures it to the system being instructed in the lessons. It also maintains the use of standard S1000D XML structures. By maintaining the common S1000D structures, reuse between technical data and its supporting learning content is possible without the need for conversion from other formats.

## 1.1 Purpose

The purpose of this chapter is to introduce the methods for authoring learning content.

### 1.1.1 Why use S1000D for technical training data?

The primary reason for using S1000D for technical training content is to ensure that the training content is current with other system documentation throughout the life cycle. S1000D improves life cycle configuration management. It is crucial for a data manager to know how a system design change effects supporting documentation, including training. There must be a common thread linked throughout the life cycle support data. That thread is supported by S1000D metadata. The use of S1000D provides a common set of metadata for all life cycle supportability content, thereby enabling queries and tools to help manage the content en masse. S1000D serves as a common digital data format for technical data and technical training content.

### 1.1.2 How S1000D supports training content structures and file naming

Five new data structures have been designed to support the instructional design process. These structures have been modeled with course development, course content and course assessment in mind. The target instructional development audience is the technical training community. Learning content designed to teach maintenance procedures, system breakdown and repair can be supported with file names configured according to a meaningful data module code.

In addition, the data module code applied as a technical training content file name fills in an ADL Initiative (ADL) specification gap: ADL does not provide naming conventions in the Sharable Content Object Reference Model (SCORM). SCORM primarily addresses how a learning content package is constructed so that it operates in any SCORM-conformant Learning Management System (LMS). Naming conventions are left to individual learning development teams. S1000D fills the ADL/SCORM file naming gap by providing data module coding structures that configures the learning content to the supported systems and assemblies.

### 1.1.3 How S1000D works with SCORM

SCORM is a United States (US) Department of Defense specification developed by ADL. It has been adopted around the world. Its function is to ensure that an electronic learning content package is interoperable with any SCORM-conformant LMS. An LMS tracks the learner's progress through a course.

SCORM is a model that references a collection of learning-oriented specifications that work to collect, describe, enable and distribute learning. SCORM does not specify course content or data formats. The technology is applicable to any learning subject matter and any data format. S1000D is a markup specification and fills SCORM's data specification gap for technical learning content. S1000D can name, identify and structure technical learning content and offer configuration management support.

S1000D works with SCORM in the same way all other file format works with SCORM. SCORM, in its most basic function, references files of any type into a distributable content package for use on an LMS.

## 1.2 Scope

The learning Schema supports the development of technical learning objects. Object structures include support for needs analysis, learning objectives and interactive assessment. The intention is to support technical learning content in the life cycle logistics process.

# 2 Learning content

**Description:** This element is used to contain the five learning information types:

- learning plan
- learning overview
- learning content
- learning summary
- learning assessment

**Markup element:** <learning> (M)

**Attributes:**

– None

**Child elements:**

– <learningPlan> (O). This element is used to contain the learning planning information. Refer to Chap 3.9.5.2.13.1.
– <learningOverview> (O). This element is used to contain the learning overview. Refer to Chap 3.9.5.2.13.2.
– <learningContent> (O). This element is used to contain the learning content. Refer to Chap 3.9.5.2.13.3.
– <learningSummary> (O). This element is used to contain the learning summary. Refer to Chap 3.9.5.2.13.4.
– <learningAssessment> (O). This element is used to contain the learning assessment. Refer to Chap 3.9.5.2.13.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the available branches

**Markup example:**

For examples of markup of the child elements, see Chap 3.9.5.2.13.1 thru Chap 3.9.5.2.13.5.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the available branches**. The project or the organization must decide which of the five available branches is most appropriate for the intended content. Refer to Para 2.

# Chapter 3.9.5.2.13.1

## *Learning data module - Learning plan information type*

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# 1 General

The learning plan information model is the first branch in the learning schema. It contains content, such as learning objectives, that drives course strategy and development. The learning plan structure covers five essential components to the lesson planning process: course administrative details, needs analysis, gap analysis, instructional design and technical requirements.

# 2 Learning plan content

**Description:** A learning plan topic describes learning needs and goals, instructional design models, task analyses, learning taxonomies, and other information necessary to the lesson planning process. The learning plan structure is contained within the element <`learning`>.

**Markup element:** <`learningPlan`> (O)

**Attributes:**

- `id` (O), the identifier of the <`learningPlan`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`lcProject`> (O). Refer to Para 2.1
- <`lcNeedsAnalysis`> (O). Refer to Para 2.2
- <`lcGapAnalysis`> (O). Refer to Para 2.3
- <`lcIntervention`> (O). Refer to Para 2.4
- <`lcTechnical`> (M). Refer to Para 2.5

**Business rules decisions:**

- Developing learning objectives in accordance with task analysis items
- Packaging lesson plans in SCORM content packages

**Markup example:**

Refer to Para 4.

## 2.1 Project

**Description:** The element <lcProject> is the first high level container element in the element <learningPlan>. It contains the learning content project plan description.

**Markup element:** <lcProject> (O)

**Attributes:**

- id (O), the identifier of the <lcProject> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <description> (O). Refer to Para 2.1.2
- <lcClient> (O). Refer to Para 2.1.3
- <lcPlanTitle> (O). Refer to Para 2.1.4
- <lcCIN> (O). Refer to Para 2.1.5
- <lcModDate> (O). Refer to Para 2.1.6
- <lcDelivDate> (O). Refer to Para 2.1.7
- <lcPlanSubject> (O). Refer to Para 2.1.8
- <lcPlanDescript> (O). Refer to Para 2.1.9
- <lcPlanPrereqs> (O). Refer to Para 2.1.10

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.1.1 Title

**Description:** The element <title> contains a title for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.1.5.

**Markup element:** <title> (O)

**Attributes:**

- id (O), the identifier of the <title> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.1.2 Description

**Description:** The element <`description`> contains a description for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.

**Markup element:** <`description`> (O)

**Attributes:**

- `id` (O), the identifier of the <`description`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.1.3 Client

**Description:** The element <`lcClient`> provides the person or organization sponsoring or requiring the learning event development.

**Markup element:** <`lcClient`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcClient`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`title`> (O). Refer to Para 2.1.1
- <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.4 Plan Title

**Description:** The element <`lcPlanTitle`> provides a title for the lesson plan.

**Markup element:** <`lcPlanTitle`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcPlanTitle`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.5 Course Identification Number

**Description:** The element <`lcCIN`> provides an alpha-numeric alternate identifier to the project title.

**Markup element:** <`lcCIN`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcCIN`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.6 Modification Date

**Description:** The element <`lcModDate`> provides the project modification date.

**Markup element:** <`lcModDate`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcModDate`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.7 Delivery Date

**Description:** The element <`lcDelivDate`> provides the project delivery date.

**Markup element:** <`lcDelivDate`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcDelivDate`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.8 Subject

**Description:** The element <`lcPlanSubject`> provides a complete description of the subject of the planned learning.

**Markup element:** <`lcPlanSubject`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcPlanSubject`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.9 Plan Description

**Description:** The element <`lcPlanDescrip`> provides a complete description of the learning plan.

**Markup element:** <`lcPlanDescrip`> (O)

**Attributes:**

– `id` (O), the identifier of the <`lcPlanDescrip`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`title`> (O). Refer to Para 2.1.1
– <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

### 2.1.10 Plan Prerequisites

**Description:** The element <lcPlanPreReqs> provides the knowledge, skills, abilities, courses and other activities learners must have satisfied to take the instruction.

**Markup element:** <lcPlanPreReqs>

**Attributes:**

– id (O), the identifier of the <lcPlanPreReqs> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <title> (O). Refer to Para 2.1.1
– <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

## 2.2 Needs Analysis

**Description:** This is the second high level container element in the element <learningPlan>. It describes the training requirement and identifies the need to develop or revise content. These include periodic training gap analyses, changes to operational or maintenance requirements, and changes to equipment or systems.

**Markup element:** <lcNeedsAnalysis> (O)

**Attributes:**

– id (O), the identifier of the <lcNeedsAnalysis> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <title> (O). Refer to Para 2.1.1

- <description> (O). Refer to Para 2.1.2
- <lcOrganizational> (O). Refer to Para 2.2.1
- <lcPlanAudience> (O). Refer to Para 2.2.2
- <lcWorkEnv> (O). Refer to Para 2.2.3
- <lcTask> (O). Refer to Para 2.2.4

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.2.1 Organizational

**Description:** The element <lcOrganizational> is the first wrapper within <lcNeedsAnalysis>. It describes the organization's learning requirements.

**Markup element:** <lcOrganizational> (O)

**Attributes:**

- id (O), the identifier of the <lcOrganizational> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <lcGeneralDescription> (O). Refer to Para 2.2.1.1
- <lcGoals> (O). Refer to Para 2.2.1.2
- <lcNeeds> (O). Refer to Para 2.2.1.3
- <lcValues> (O). Refer to Para 2.2.1.4
- <lcOrgConstraints> (O). Refer to Para 2.2.1.5

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

#### 2.2.1.1 General Description

**Description:** The element <lcGeneralDescription> provides a space to develop a general description about the organization's training needs.

**Markup element:** <lcGeneralDescription> (O)

**Attributes:**

- id (O), the identifier of the <lcGeneralDescription> element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.1.2 Goals

**Description:** The element <`lcGoals`> describes the outcomes desired by the organization to be addressed by the training effort. These goals may require concurrent efforts outside of training such as technology acquisition, reorganization, and so forth.

**Markup element:** <`lcGoals`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcGoals`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.1.3 Needs

**Description:** The element <`lcNeeds`> describes the needs behind the outcomes described in the element <`lcGoals`>.

**Markup element:** <`lcNeeds`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcNeeds`> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.1.4 Values

**Description:** The element <lcValues> describes affective components of desired instructional outcomes.

**Markup element:** <lcValues> (O)

**Attributes:**

- id (O), the identifier of the <lcValues> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.1.5 Organizational Constraints

**Description:** The element <lcOrgConstraints> describes organizational aspects that may limit the organization's ability to effectively use the instruction to meet its goals.

**Markup element:** <lcOrgConstraints> (O)

**Attributes:**

- id (O), the identifier of the <lcOrgConstraints> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.2.2 Audience

**Description:** The element <lcPlanAudience> is the second wrapper within the element <lcNeedsAnalysis>. It describes the learners' profile taking the instruction.

**Markup element:** <lcPlanAudience> (O)

**Attributes:**

- id (O), the identifier of the <lcPlanAudience> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1
- <lcGeneralDescription> (O). Refer to Para 2.2.1.1
- <lcEdLevel> (O). Refer to Para 2.2.2.1
- <lcAge> (O). Refer to Para 2.2.2.2
- <lcBackground> (O). Refer to Para 2.2.2.3
- <lcSkills> (O). Refer to Para 2.2.2.4
- <lcKnowledge> (C). Refer to Para 2.2.2.5
- <lcMotivation> (C). Refer to Para 2.2.2.6
- <lcSpecChars> (O). Refer to Para 2.2.2.7

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.1 Education Level

**Description:** The element <lcEdLevel> describes the range of learners' education level and the relevancy to the learning plan.

**Markup element:** <lcEdLevel> (O)

**Attributes:**

- id (O), the identifier of the <lcEdLevel> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.2 Age

**Description:** The element <lcAge> describes the learners' age range.

**Markup element:** <lcAge> (O)

**Attributes:**

- id (O), the identifier of the <lcAge> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.3 Background

**Description:** The element <lcBackground> describes the learners' professional background and the relevancy to the learning plan.

**Markup element:** <lcBackground> (O)

**Attributes:**

- id (O), the identifier of the <lcBackground> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.4 Skills

**Description:** The element <lcSkills> describes the learners' current skill set and the relevancy to the learning plan.

**Markup element:** <lcSkills> (O)

**Attributes:**

- id (O), the identifier of the <lcSkills> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.5 Knowledge

**Description:** The element <lcKnowledge> describes the learners' current knowledge of the learning topics.

**Markup element:** <lcKnowledge> (C)

**Attributes:**

- id (O), the identifier of the <lcKnowledge> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.6 Motivation

**Description:** The element <lcMotovation> describes the reasons why the learners' want and/or need to take the instruction.

**Markup element:** <lcMotivation> (C)

**Attributes:**

- id (O), the identifier of the <lcMotivation> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.2.7 Special Characteristics

**Description:** The element <lcSpecChars> describes learner characteristics specific to the population that will influence the design, including learning disabilities, physical handicaps, and so forth.

**Markup element:** <lcSpecChars> (O)

**Attributes:**

- id (O), the identifier of the <lcSpecChars> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.2.3 Work Environment

**Description:** The element <lcWorkEnv> is the third wrapper tag within the element <lcNeedsAnalysis>. It describes the working conditions and contexts in which the training will be applied.

**Markup element:** <lcWorkEnv> (O)

**Attributes:**

- id (O), the identifier of the <lcWorkEnv> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <lcWorkEnvDescription> (C). Refer to Para 2.2.3.1
- <lcPlanResources> (O). Refer to Para 2.2.3.2
- <lcProcesses> (O). Refer to Para 2.2.3.3

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

#### 2.2.3.1 Work Environment Description

**Description:** The element <lcWorkEnvDescription> describes the general working environment in which the training will be applied.

**Markup element:** <lcWorkEnvDescription> (C)

**Attributes:**

- id (O), the identifier of the <lcWorkEnvDescription> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.3.2 Plan Resources

**Description:** The element <lcPlanResources> describes the materials available to learners for learning in the course of their daily routine. It may include computers, books, manuals, tutors.

**Markup element:** <lcPlanResources> (O)

**Attributes:**

- id (O), the identifier of the <lcPlanResources> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.3.3 Processes

**Description:** The element <lcProcesses> describes processes learners routinely follow – ISO, SOPs, etc.

**Markup element:** <lcProcesses> (O)

**Attributes:**

- id (O), the identifier of the <lcProcesses> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.2.4 Task

**Description:** The element <lcTask> is the fourth wrapper within the element <lcNeedsAnalysis>. It captures a work item to be performed.

**Markup element:** <lcTask> (O)

**Attributes:**

- id (O), the identifier of the <lcTask> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <lcTaskItem> (C). Refer to Para 2.2.4.1
- <lcKnowledge> (O). Refer to Para 2.2.4.2
- <lcSkills> (O). Refer to Para 2.2.4.3
- <lcAttitude> (O). Refer to Para 2.2.4.4

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.4.1 Task Item

**Description:** The element <lcTaskItem> is a repeatable wrapper describing discrete tasks to be taught.

**Markup element:** <lcTaskItem> (O)

**Attributes:**

- id (O), the identifier of the <lcTaskItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.4.2 Knowledge

**Description:** The element <lcKnowledge> describes foundational information required to accomplish the tasks.

**Markup element:** <lcKnowledge> (O)

**Attributes:**

- id (O), the identifier of the <lcKnowledge> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.4.3 Skills

**Description:** The element <lcSkills> describes enduring attributes that facilitate learning and is directly associated with a task.

**Markup element:** <lcSkills> (O)

**Attributes:**

- id (O), the identifier of the <lcSkills> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.2.4.4 Attitude

**Description:** The element <lcAttitude> describes the mental state that influences the choices of personal actions.

**Markup element:** <lcAttitude> (O)

**Attributes:**

- id (O), the identifier of the <lcAttitude> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

## 2.3 Gap Analysis

**Description:** The element <lcGapAnalysis> is the third high level container within the element <lcLearningPlan>. Analysis compares existing learning objectives to current job task analysis (JTA).

**Markup element:** <lcGapAnalysis> (O)

**Attributes:**

- id (O), the identifier of the <lcGapAnalysis> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <shortDesc> (C). Refer to Para 2.3.1
- <lcGapItem> (O). Refer to Para 2.3.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.3.1 Short Description

**Description:** The element <shortDescr> gives a description of the element which it is contained in.

**Markup element:** <shortDescr> (O)

**Attributes:**

- id (O), the identifier of the <shortDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.3.2 Gap Item

**Description:** The element <lcGapItem> is a repeatable wrapper capturing gaps between existing training objectives and related job-task-analysis content.

**Markup element:** <lcGapItem> (O)

**Attributes:**

- id (O), the identifier of the <lcGapItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <shortDescr> (O). Refer to Para 2.3.1
- <lcPlanObjective> (O). Refer to Para 2.3.2.1
- <lcJtaItem> (O). Refer to Para 2.3.2.2
- <lcGapItemDelta> (C). Refer to Para 2.3.2.3

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

#### 2.3.2.1 Learning Plan Objective

**Description:** The element <lcPlanObjective> describes actions, behaviors, conditions and standards required of the learner in order to complete a course.

**Markup element:** <lcPlanObjective> (O)

**Attributes:**

- id (O), the identifier of the <lcPlanObjective> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.3.2.2 Job Task Analysis Item

**Description:** The element <lcJtaItem> provides the description of job task analysis as related to a particular learning objective.

**Markup element:** <lcJtaItem> (O)

**Attributes:**

- id (O), the identifier of the <lcJtaItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.3.2.3 Gap Item Delta

**Description:** The element <lcGapItemDelta> describes the gap between the learning objective and the job task analysis.

**Markup element:** <lcGapItemDelta> (C)

**Attributes:**

- id (O), the identifier of the <lcGapItemDelta> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

## 2.4 Intervention

**Description:** The element <lcIntervention> is the fourth wrapper under the element <learningPlan>. It describes the approach and strategies to building the learning materials based on the element <lcNeedsAnalysis> content.

**Markup element:** <lcIntervention> (O)

**Attributes:**

- id (O), the identifier of the <lcIntervention> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <shortDescr> (O). Refer to Para 2.3.1
- <lcInterventionItem> (O). Refer to Para 2.4.1

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.4.1 Intervention Item

- **Description:** The element <lcInterventionItem> is a repeatable wrapper describing how learning content is built. It describes the systems approach to analyzing, designing, developing, implementing, and evaluating any instructional experience.

**Markup element:** <lcInterventionItem> (O)

**Attributes:**

- id (O), the identifier of the <lcInterventionItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.1
- <shortDescr> (O). Refer to Para 2.3.1
- <lcLearnStrat> (O). Refer to Para 2.4.1.1
- <lcPlanObjective> (O). Refer to Para 2.4.1.2

- <lcAssessment> (O). Refer to Para 2.4.1.3
- <lcDelivery> (O). Refer to Para 2.4.1.4

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.4.1.1 Learning Strategy

**Description:** The element <lcLearnStrat> describes the manner in which the learning content will be instructed. It should be a high level design that applies instructional-design theories and models.

**Markup element:** <lcLearnStrat> (O)

**Attributes:**

- id (O), the identifier of the <lcLearnStrat> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

2.4.1.2 Learning Objective

**Description:** The element <lcPlanObjective> describes actions, behaviors, conditions and standards required of the learner in order to complete a course.

**Markup element:** <lcPlanObjective> (O)

**Attributes:**

- id (O), the identifier of the <lcPlanObjective> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.4.1.3 Assessment

**Description:** The element <lcAssessment> describes the manner in which the learning will be assessed. It is the high level design that captures how embedded, pre- and post-assessments will be employed.

**Markup element:** <lcAssessment> (O)

**Attributes:**

– id (O), the identifier of the <lcAssessment> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4.

2.4.1.4 Delivery

**Description:** The element <lcDelivery> describes the instructional delivery methods and technologies. To maximize training effectiveness and optimize resource utilization, content developed should be founded upon needs and job task analysis data and leverage instructional delivery methods and technologies (eg, computer-based, web-based, video, performance support systems). A training delivery analysis includes review of the NLOS, identification and evaluation of available delivery options, and selection of the optimum delivery means.

**Markup element:** <lcDelivery> (O)

**Attributes:**

– id (O), the identifier of the <lcDelivery> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

## 2.5 Technical

**Description:** The element <`lcTechnical`> is the fifth high level container element under the element <`learningPlan`>. It describes the technical requirements to the learning content and how those requirements are supported by the instructional design.

**Markup element:** <`lcTechnical`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcTechnical`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`title`> (O). Refer to Para 2.1.1
- <`shortDescr`> (O). Refer to Para 2.3.1
- <`lcLMS`> (O). Refer to Para 2.5.1
- <`lcNoLMS`> (O). Refer to Para 2.5.2
- <`lcClassroom`> (O). Refer to Para 2.5.3
- <`lcOJT`> (O). Refer to Para 2.5.4
- <`lcConstraints`> (O). Refer to Para 2.5.5
- <`lcW3C`> (O). Refer to Para 2.5.6
- <`lcPlayers`> (O). Refer to Para 2.5.7
- <`lcGraphics`> (O). Refer to Para 2.5.8
- <`lcViewers`> (O). Refer to Para 2.5.9
- <`lcResolution`> (O). Refer to Para 2.5.10
- <`lcFileSizeLimitations`> (O). Refer to Para 2.5.11
- <`lcDownloadTime`> (O). Refer to Para 2.5.12
- <`lcSecurity`> (O). Refer to Para 2.5.13

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.1 LMS

**Description:** The element <lcLMS> describes the LMS name and version number.

**Markup element:** <lcLMS> (O)

**Attributes:**

- id (O), the identifier of the <lcLMS> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.2 NoLMS

**Description:** The element <lcNoLMS> describes any technical requirements when SCORM and an LMS is not required.

**Markup element:** <lcNoLMS> (O)

**Attributes:**

- id (O), the identifier of the <lcNoLMS> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.3 Classroom

**Description:** The element <lcClassroom> describes technical aspects of the course to take place in a classroom.

**Markup element:** <lcClassroom> (O)

**Attributes:**

- id (O), the identifier of the <lcClassroom> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.4 On The Job Training

**Description:** The element <lcOJT> describes technical aspects of the course taking place in the work environment.

**Markup element:** <lcOJT> (O)

**Attributes:**

- id (O), the identifier of the <lcOJT> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.5 Constraints

**Description:** The element <lcConstraints> describes constraints imposed by the technologies used to create, distribute, deliver, and display the instruction. For example, if constraints are not met, the learner will not experience the instruction as designed. These must be considered in light of how the instruction will be used in relation to the learning objectives.

**Markup element:** <lcConstraints> (O)

**Attributes:**

- id (O), the identifier of the <lcConstraints> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.6 World Wide Web Consortium (W3C)

**Description:** The element <lcW3C> describes standards used for data accessibility and conformity to standards.

**Markup element:** <lcW3C> (O)

**Attributes:**

- id (O), the identifier of the <lcW3C> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.7 Players

**Description:** The element <lcPlayers> describes tools used for time-sequenced display at runtime.

**Markup element:** <lcPlayers> (O)

**Attributes:**

- id (O), the identifier of the <lcPlayers> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.8 Graphics

**Description:** The element <lcGraphics> describes standards and system requirements for displaying graphics, 3D animations from CAD, navigation through virtual spaces, etc.

**Markup element:** <lcGraphics> (O)

**Attributes:**

- id (O), the identifier of the <lcGraphics> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.9 Viewers

**Description:** The element <lcViewers> describes viewers used for time-sequenced display at runtime.

**Markup element:** <lcViewers> (O)

**Attributes:**

- id (O), the identifier of the <lcViewers> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.10 Resolution

**Description:** The element <lcResolution> describes the required computer screen resolution delivered instruction.

**Markup element:** <lcResolution> (O)

**Attributes:**

- id (O), the identifier of the <lcResolution> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.11 File Size Limitations

**Description:** The element <lcFileSizeLimitations> describes the file size limitations in the client's delivery environment.

**Markup element:** <lcFileSizeLimitations> (O)

**Attributes:**

- id (O), the identifier of the <lcFileSizeLimitations> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.12 Download Time

**Description:** The element <lcDownloadTime> describes the maximum time allowed for download time in the client's delivery environment.

**Markup element:** <lcDownloadTime> (O)

**Attributes:**

- id (O), the identifier of the <lcDownloadTime> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

### 2.5.13 Security

**Description:** The element <lcSecurity> describes the security requirements in the delivered instruction.

**Markup element:** <lcSecurity> (O)

**Attributes:**

- id (O), the identifier of the <lcSecurity> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.1.2

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4.

# 3 Business rules decisions

Refer to Chap 2.5 for an overview of business rule categories and layers that ought to be considered for S1000D technical lesson plan development projects. Business rule decisions will vary from project to project. Below are suggested considerations for technical lesson plan development projects.

Business rules decisions include, but are not limited to, the following:

**Developing learning objectives in accordance with task analysis items.** Learning objectives ought to be developed in accordance with task analysis items that support system maintenance and operational procedures. Aligning learning objectives with task analysis items in the early content preplanning stages will foster reusable data and content alignment. See Chap 3.9.7 for content preplanning discussions.

**Packaging lesson plans in SCORM content packages.** Lesson plans are not traditionally viewed or utilized by learners. However, a lesson plan is the precursor and the foundation to instructional material. Kept together, lesson plans and the learning content developed from the plans form a complete instructional unit.

As of the release of S1000D version 4, lesson plans have not been aggregated into SCORM conformant learning content packages. In addition, technical learning content has not been named or structured according to S1000D learning information models. The question of inserting lesson plans into a content package is new. Its utility is primarily associated with instructors registering learning content and other instructors searching for learning content. The SCORM learning object metadata (LOM) can describe a course. The LOM does not constitute a lesson plan. Inserting a lesson plan into a content package which forms a complete instructional unit benefits the instructor searching for content. The business rules for associating lesson plans with a content package must be developed through best practices and prototypes then communicated throughout the learning community.

# 4 Markup Example

Below is a complete markup example for the element <lcLearningPlan>. It describes an actual lesson plan developed by ADL covering ADL implementation for defense acquisition professionals.

```
<learningPlan id="learningPlanTest">
<lcProject>
<title>ADL and Acquisition</title>
<description>
<para>This learning is sponsored by the Joint ADL Co-Lab.</para>
</description>
<lcClient>
<title> Joint ADL Co-Lab</title>
<description>
<para>The Joint ADL Co-Lab is one of four labs in the United
States promoting distributed learning for DoD.</para>
</description>
</lcClient>
<lcPlanTitle>
<title>ADL Implementation for Defense Acquisition
Professionals</title>
<description>
<para>This lesson plan describes the learning needs and
instructional strategies for teaching methods for acquiring
learning content in accordance with ADL.</para>
</description>
</lcPlanTitle>
<lcCIN>
<title>Course Identification Number</title>
<description>
<para>(ADLACQ)</para>
</description>
</lcCIN>
<lcModDate>
<title>Modification Date:</title>
<description>
<para>20070315</para>
</description>
</lcModDate>
<lcDelivDate>
<title>Delivery Date:</title>
<description>
<para>2007063</para>
</description>
</lcDelivDate>
<lcPlanSubject>
<title>Learning Plan Subject Matter</title>
<description>
<para>Acquisition of Training Materials</para>
</description>
</lcPlanSubject>
<lcPlanDescript>
<title>Learning Plan Description</title>
<description>
<para> The goal of the ADLACQ module is to provide learners with
a broad overview of the ADL, the fundamentals of the SCORM
initiative, and the process for acquiring SCORM-conformant
distributed learning (DL) products.></para>
</description>
```

```
</lcPlanDescript>
<lcPlanPrereqs>
<title>Learning Plan Prerequisites</title>
<description>
<para>ACQ 101 (Fundamentals of Systems Acquisition Management)
or equivalent</para>
</description>
</lcPlanPrereqs>
</lcProject>
<lcNeedsAnalysis>
<title>Needs Analysis for Defense Acquisition
Professionals</title>
<lcOrganizational>
<title>Organizational Analysis</title>
<lcGeneralDescription>
<description>
<para>Many government and private sector organizations are
unaware of ADL and SCORM capabilities. Organizations with new
SCORM requirements can benefit from the use of this
course.</para>
</description>
</lcGeneralDescription>
<lcGoals>
<description>
<para>The goal for taking this course is to develop
organizational self-sufficiency in planning for and developing
SCORM-conformant courseware.</para>
</description>
</lcGoals>
<lcNeeds>
<description>
<para>All DoD training content must be delivered in a SCORM-
conformant format. Private sector training efforts require a
greater capability in tracking employee learning
progress.</para>
</description>
</lcNeeds>
<lcValues>
<description>
<para>Adult learning should life-centered. Students must have a
positive association between the curriculum and their daily
acquisition responibilities.</para>
</description>
</lcValues>
<lcOrgConstraints>
<description>
<para>Some organizations may not have the technical ability to
develop SCORM training. Overcome this constraint with guidance
on selecting contractor support.</para>
</description>
</lcOrgConstraints>
</lcOrganizational>
<lcPlanAudience>
<title>Audience Profile</title>
<lcGeneralDescription>
<description>
<para>Intended audience will have little to no experience with
ADL and SCORM.</para>
</description>
</lcGeneralDescription>
```

```
<lcEdLevel>
<description>
<para>College graduate, post-graduate </para>
</description>
</lcEdLevel>
<lcAge>
<description>
<para>All adults over 30 years of age.</para>
</description>
</lcAge>
<lcBackground>
<description>
<para> The target audience for this module includes acquisition
personnel, program managers, project engineers, instructional
designers, and business developers within the Department of
Defense (DoD) and related industry responsible for or tasked
with the acquisition and management of SCORM-conformant
distributed learning.</para>
</description>
</lcBackground>
<lcSkills>
<description>
<para>Audience has no skill set in ADL implementation. Skills
are in acquisition business procedures.</para>
</description>
</lcSkills>
<lcKnowledge>
<description>
<para>Acquisition procedures, program management, instructional
systems design </para>
</description>
</lcKnowledge>
<lcMotivation>
<description>
<para>Acquisition managers must comply with (DODI) 1322.26;
Manage lifecycle costs of content development </para>
</description>
</lcMotivation>
<lcSpecChars>
<description>
<para>Half of the students have earned advanced acquisition
certifications through Defense Acquisition University.</para>
</description>
</lcSpecChars>
</lcPlanAudience>
<lcWorkEnv>
<title>lcWorkEnv</title>
<lcWorkEnvDescription>
<description>
<para> All learners work in a typical office environment.</para>
</description>
</lcWorkEnvDescription>
<lcPlanResources>
<description>
<para>Learners will have access to a desktop or laptop PC with
Internet access.</para>
</description>
</lcPlanResources>
<lcProcesses>
<description>
```

```
<para>(DFAR)s for acquisition; ISD process for content
development.</para>
</description>
</lcProcesses>
</lcWorkEnv>
<lcTask>
<title>lcTask</title>
<lcTaskItem>
<description>
<para>Identify and describe the five phases of the (ADDIE) model
of instructional design process.</para>
</description>
</lcTaskItem>
<lcTaskItem>
<description>
<para>Describe the components of a Front End Analysis and their
applicability to the acquisition process.</para>
</description>
</lcTaskItem>
<lcTaskItem>
<description>
<para>Describe the Sharable Content Object (SCO) concept, and
identify the three defining characteristics of a SCO.</para>
</description>
</lcTaskItem>
<lcTaskItem>
<description>
<para>Explain the importance of content reuse, and provide
examples of reuse strategy options.</para>
</description>
</lcTaskItem>
<lcTaskItem>
<description>
<para>Describe SCORM-related impacts on specific instructional
content design: Navigational Strategy, Sequencing Strategy,
Instructional Testing Strategy.</para>
</description>
</lcTaskItem>
</lcTask>
<lcTask>
<lcKnowledge>
<description>
<para>Learner’s must understand their company’s training
objectives and acquisition strategies.</para>
</description>
</lcKnowledge>
<lcSkills>
<description>
<para>Learners must know how to apply their company’s learning
and acquisition strategies to SCORM concepts.</para>
</description>
</lcSkills>
<lcAttitude>
<description>
<para>Learners must be willing to be open and flexible to allow
SCORM to benefit their organizations.</para>
</description>
</lcAttitude>
</lcTask>
</lcNeedsAnalysis>
```

```
<lcGapAnalysis>
<title>Gap Analysis</title>
<lcGapItem>
<title>Learning Objectives</title>
<lcPlanObjective>
<description>
<para>Learning objectives will extend job descriptions in the
training development and management in the areas of distributed
learning and object-oriented development.</para>
</description>
</lcPlanObjective>
<lcJtaItem>
<description>
<para>Current JTAs focus attention on developing whole courses.
Current learning objectives will provide guidance to developing
small modules with terminal learning objectives.</para>
</description>
</lcJtaItem>
<lcGapItemDelta>
<description>
<para>Current learners do not have the capability to approach
learning development in a modular strategy that saves time and
costs across the enterprise.</para>
</description>
</lcGapItemDelta>
</lcGapItem>
</lcGapAnalysis>
<lcIntervention>
<title>Instructional Interventions</title>
<lcInterventionItem>
<title>Intervention #1</title>
<lcLearnStrat>
<description>
<para>Lesson 5 will consist of three SCOs, available from the
LMS table of contents. The lesson addresses teaching points that
support the module objectives. The lesson has one terminal
learning objective (TLO); and each SCO will have two or more
enabling learning objectives (ELOs). The lesson material will be
"chunked" into clearly defined, separate topics to facilitate
the learning. The lesson will also feature instructional
elements to keep the learner mentally and actively engaged to
aid in learning reinforcement. Each SCO will include Knowledge
Review questions that check and reinforce learners'
comprehension. Knowledge Reviews are not graded. These questions
may consist of multiple-choice (one correct answer), multiple
answers (more than one correct answer), one-line fill-in-the-
blank, hot graphic area or ranking. Immediate feedback to
learners after each correct response and after the final
incorrect response provides reinforcement and clarification to
learning. Depending upon the structure of the question, learners
will have one or more opportunities to answer the question
correctly. Learners will receive remediation if answers to
true/false questions are incorrect on the first try or, for
multiple choice and multiple answer questions, after the second
try. A return button allows learners to return to the question
screen and try again.</para>
</description>
</lcLearnStrat>
<lcPlanObjective>
<description>
```

```
<para>Identify and describe the five phases of the ADDIE model
of instructional design process.</para>
<para>Describe the components of a Front End Analysis and their
applicability to the acquisition process.</para>
<para>Describe the Sharable Content Object (SCO) concept, and
identify the three defining characteristics of a SCO.</para>
<para>Explain the importance of content reuse, and provide
examples of reuse strategy options.</para>
<para>Describe SCORM-related impacts on specific instructional
content design: Navigational Strategy, Sequencing Strategy,
Instructional Testing Strategy.</para></description>
</lcPlanObjective>
<lcAssessment>
<description>
<para>The ADLACQ module will have a final assessment with
questions associated to the SCOs that comprise the module. Some
SCOs may contain one or more ELOs, and at least one question
will address each ELO covered in the SCO. The test pool will
consist of a minimum of three questions per ELO to allow for
randomization when presented on the final assessment. The SBI
Team will develop the test questions prior to SBI loading the
questions into the Atlas Test engine (used for validation before
migrating to AtlasPro for learner access). The passing score
will be 100%. Learners will be given unlimited attempts to pass
the End-of-Module Assessment.</para>
</description>
</lcAssessment>
<lcDelivery>
<description>
<para>The ADLACQ module will meet Section 508 and SCORM 2004
standards, reside on the DAU LMS, AtlasPro, and be registered in
ADL-R. Learners will access the module through a link from the
DAU Virtual Campus. AtlasPro also will contain an End-of-Module
Final Assessment for the ADLACQ module.</para>
</description>
</lcDelivery>
</lcInterventionItem>
</lcIntervention>
<lcTechnical>
<title>Technical Requirements</title>
<lcLMS>
<description>
<para>Lesson content packages will be tracked in the blank
LMS.</para>
</description>
</lcLMS>
<lcClassroom>
<description>
<para>Instruction will take place in a classroom at the ADL
(SMART) Room in Alexandria, VA. SCORM course will serve as
homework that serves as review, practice and look-ahead for the
next day’s lessons.</para>
</description>
</lcClassroom>
<lcOJT>
<description>
<para>There are no technical requirements for OJT. ADL will
offer a support line for questions concerning the development of
contract language.</para>
</description>
```

```
</lcOJT>
<lcConstraints>
<description>
<para>Students will require after hours internet access to
perform nightly homework.</para>
</description>
</lcConstraints>
<lcW3C>
<description>
<para>Acquisition managers will require general knowledge of W3C
standards, such as XML, (XSLT) and web services to better
articulate deliverables specified in their contracts.</para>
</description>
</lcW3C>
<lcPlayers>
<description>
<para>Students will be taught an overview of players to better
understand how learning content should developed for specific
media. Players that are required for course delivery will be
provided during class and will be standard in IE for nightly
homework.</para>
</description>
</lcPlayers>
<lcViewers>
<description>
<para>Standard viewers will be used.</para>
</description>
</lcViewers>
<lcResolution>
<description>
<para>The are no graphics resolution issues.</para>
</description>
</lcResolution>
<lcFileSizeLimitations>
<description>
<para>Class does not require file downloads. All extra materials
will be provided on a complimentary memory stick.</para>
</description>
</lcFileSizeLimitations>
<lcDownloadTime>
<description>
<para>find all about it right here</para>
</description>
</lcDownloadTime>
<lcSecurity>
<description>
<para>Security level is unclassified. All learning content is in
the public domain.</para>
</description>
</lcSecurity>
</lcTechnical>
</learningPlan>
```

# Chapter 3.9.5.2.13.2

## *Content section - Learning overview information*

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## 1 General

The learning overview information model is the second module in the learning schema. It contains content, such as learning objectives, that introduces the course to students.

# 2 Learning overview content

**Description:** The learning overview structure covers introductory course information. It identifies the learning objectives, includes other information helpful to the learner, such as prerequisites, duration, intended audience, and can include information and strategies that seek to gain attention and stimulate recall of prior learning.

**Markup element:** <learningOverview> (O)

**Attributes:**

- id (O), the identifier of the <learningOverview> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (C). Refer to Para 2.1.
- <shortDescr> (O). Refer to Para 2.2.
- <lcIntro> (O). Refer to Para 2.3.
- <lcAudience> (O). Refer to Para 2.4.
- <lcDuration> (O). Refer to Para 2.5.
- <1cPrereqs> (O). Refer to Para 2.6.
- <lcObjectives> (O). Refer to Para 2.7.
- <lcResources> (O). Refer to Para 2.8.
- <lcSection> (O). Refer to Para 2.9.

Business rules:

Business rules decisions include, but are not limited to, the following:

- Discussing learning objectives in accordance with system task analysis.

**Markup example:**

```
<learningOverview>
<title>...</title>
</learningOverview>
```

## 2.1 Title

**Description:** The <title> element provides a title for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.1.5.

**Markup element:** <title> (C)

## 2.2 Short description

**Description:** The element <shortDescr> gives a description of the element which it is contained in.

**Markup element:** <shortDescr> (O)

**Attributes:**

- id (O), the identifier of the <shortDescr> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

Refer to Para 4

## 2.3 Introduction

**Description:** The element <lcIntro> provides a detailed introduction and description of the content to be delivered, in cases where the <shortDescr> is not adequate to fully describe the content.

**Markup element:** <lcIntro> (O)

**Attributes:**

- id (O), the identifier of the <lcIntro> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

- None identified

**Markup example:**

```
<lcIntro>
<description>...</description>
</lcIntro>
```

### 2.3.1 Description

**Description:** The element <description> contains a description for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.

**Markup element:** <description> (C)

## 2.4 Audience

**Description:** The element <lcAudience> describes the learner's profile taking the instruction.

**Markup element:** <lcAudience> (O)

**Attributes:**

- id (O), the identifier of the <lcAudience> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

- None identified

**Markup example:**

```
<lcAudience>
<description>...</description>
</lcAudience>
```

## 2.5 Duration

**Description:** The element <lcDuration> provides an estimated duration for the learning activity.

**Markup element:** <lcDuration> (O)

**Attributes:**

- id (O), the identifier of the <lcDuration> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.
- <lcTime> (O). Refer to Para 2.5.1.

Business rules:

- None identified

**Markup example:**

```
<lcDuration>...</lcDuration>
```

### 2.5.1 Time

**Description:** The element <lcTime> specifies the time expected to complete an activity.

**Markup element:** <lcTime> (O)

**Attributes:**

- id (O), the identifier of the <lcTime> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

- None identified

**Markup example:**

```
<lcTime>
<description>...</description>
</lcTime>
```

## 2.6 Prerequisites

**Description:** The element <1cPrereqs> describes required knowledge, credits and experience a student must have to take a course.

**Markup element:** <1cPrereqs> (O)

**Attributes:**

- id (O), the identifier of the <1cPrereqs> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

- None identified

**Markup example:**

```
<lcPrereqs>
<description>...</description>
</lcPrereqs>
```

## 2.7 Objectives

**Description:** The element <lcObjectives> lists or describes the learning goals.

**Markup element:** <lcObjectives> (O)

**Attributes:**

- id (O), the identifier of the <lcObjectives> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 2.1.
- <lcObjectivesStem> (O). Refer to Para 2.7.1.
- <lcObjectiveGroup> (O). Refer to Para 2.7.2.

Business rules:

- None identified

**Markup example:**

```
<lcObjectives>
<lcObjectivesStem>...</lcObjectivesStem>
<lcObjectiveGroup>...</lcObjectiveGroup>
</lcObjectives>
```

### 2.7.1 Objectives stem

**Description:** The element <lcObjectivesStem> provides a leading sentence to introduce a list of learning objectives.

**Markup element:** <lcObjectivesStem> (O)

**Attributes:**

- id (O), the identifier of the <lcObjectivesStem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

- None identified

**Markup example:**

```
<lcObjectivesStem>
<description>...</description>
</lcObjectivesStem>
```

### 2.7.2 Objective group

**Description:** The element <lcObjectiveGroup> provides contains a list of one or more learning objectives.

**Markup element:** <lcObjectiveGroup> (O)

**Attributes:**

- id (O), the identifier of the <lcObjectiveGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <lcObjective> (C). Refer to Para 2.7.2.1.

Business rules:

- None identified

**Markup example:**

```
<lcObjectiveGroup>
<lcObjective>
<description><para>...</para></description>
</lcObjective>
</lcObjectiveGroup>
```

#### 2.7.2.1 Objective

**Description:** The element <lcObjective> describes a single learning objective.

**Markup element:** <lcObjective> (C)

**Attributes:**

- id (O), the identifier of the <lcObjective> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

Business rules:

– None identified

**Markup example:**

```
<lcObjective>
<description>...</description>
</lcObjective>
```

## 2.8 Resources

**Description:** The element <lcResources> provides a list of related resources and information about them, such as related articles or samples on the web.

**Markup element:** <lcResources> (O)

**Attributes:**

– id (O), the identifier of the <lcResources> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <description> (C). Refer to Para 2.3.1.

Business rules:

– None identified

**Markup example:**

```
<lcResources>
<description>...</description>
</lcResources>
```

## 2.9 Section

**Description:** The element <lcSection> provides a generic element to contain other learning content.

**Markup element:** <lcSection> (O)

**Attributes:**

– id (O), the identifier of the <lcSection> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <description> (C). Refer to Para 2.3.1.

Business rules:

– None identified

**Markup example:**

```
<lcSection>
<description>...</description>
</lcSection>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

Refer to Chap 2.5 for an overview of business rule categories and layers that ought to be considered for S1000D technical learning overview development projects. Business rules decisions will vary from project to project. Below are suggested considerations any technical learning overview development project.

**Discussing learning objectives in accordance with system task analysis.** Learning objectives must be documented in accordance with task analysis items that support system maintenance and operational procedures. Ensure that the learning objectives are linked with the task analysis items in the technical documentation Student awareness of learning objectives in alignment with system task analysis with improve course content context. The early content preplanning stages will foster reusable data and content alignment. Refer to Para 2.

Refer to Chap 3.9.7 for content preplanning discussions.

# 4 Examples

Below is a markup example for <learningOverview>. It describes a short lesson on using an email program.

```
<learning>
<learningOverview id="understanding_the_basics">
<title>Overview: Understanding the basics</title>
<shortDescr>Mail basics start from the inbox, viewing and
opening messages you receive, and moving them to appropriate
mail folders for easy access and retrieval.</shortDescr>
<lcAudience><description><para>The intended audience includes
new users of the company email system and anyone wanting a
refresher on the basic features.</para></description>
</lcAudience>
<lcDuration>
<title>Expected duration</title>
<lcTime>
<description>
<para>It should take you no more than 30 minutes to complete
this module.</para>
</description>
</lcTime>
</lcDuration>
<lcPrereqs>
<description>
<para>Students must know how to turn on a computer before taking
this course.</para>
</description>
```

```
</lcPrereqs>
<lcObjectives>
<lcObjectivesStem>
<description>
<para>When you complete this lesson, you’ll know how to perform
the following mail basics:</para>
</description>
</lcObjectivesStem>
<lcObjectiveGroup>
<lcObjective>
<description>
<para>Viewing the inbox</para>
</description>
</lcObjective>
<lcObjective>
<description>
<para>Opening a message</para>
</description>
</lcObjective>
<lcObjective>
<description>
<para>Moving messages to a folder</para>
</description>
</lcObjective>
</lcObjectiveGroup>
</lcObjectives>
<lcResources>
<description>
<para>Lesson requires email program documentation, email
program, desktop computers, and email accounts. </para>
</description>
</lcResources>
</learningOverview>
</learning>
```

# Chapter 3.9.5.2.13.3

## *Content section - Learning content information*

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## 1 General

The learning content information model provides the bulk of the learning content. The learning content structure covers learning objectives, learning activities and language that forms the learning materials. It holds the most potential for the appropriate reuse of technical data where content supplements are useful.

# 2 Learning content

**Description:** A learning content topic comprises a set of self-contained content about a single terminal learning objective supported by zero or more enabling learning objectives. It provides the learning content itself, and enables direct use of content from the S1000D descript data module. It supports specific objectives declared in the Learning plan topic type.

**Markup element:** <learningContent> (O)

**Attributes:**

- id (O), the identifier of the <learningContent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (C). Refer to Para 2.1.
- <shortDescr> (O). Refer to Para 2.2.
- <lcIntro> (O). Refer to Para 2.3.
- <lcDuration> (O). Refer to Para 2.4.
- <lcObjectives> (O). Refer to Para 2.5.
- <lcChallenge> (O). Refer to Para 2.6.
- <lcInstruction> (O). Refer to Para 2.7.

Business rules:

Business rules decisions include, but are not limited to, the following:

- Reuse or repurposing of technical data
- Development of multimedia or graphics

**Markup example:**

Refer to Para 4

## 2.1 Title

**Description:** The element <title> provides a title for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.1.5.

**Markup element:** <title> (C)

## 2.2 Short description

**Description:** The element <shortDescr> provides a short description of the learning content portion of the course or lesson. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <shortDescr> (O)

## 2.3 Introduction

**Description:** The element <lcIntro> provides a detailed introduction and description of the learning content in cases where the <shortDescr> is not adequate to fully describe the content. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcIntro> (O)

## 2.4 Duration

**Description:** The element <lcDuration> provides an estimated duration for the learning activity. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcDuration> (O)

## 2.5 Objectives

**Description:** The element <lcObjectives> lists or describes the learning goals. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcObjectives> (O)

## 2.6 Challenge

**Description:** The element <lcChallenge> describes student practice exercises. For example, if network diagrams are the subject matter, a challenge might be "put this network into its proper sequence".

**Markup element:** <lcChallenge> (O)

**Attributes:**

- id (O), the identifier of the <lcChallenge> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.6.1.

Business rules:

- None identified

**Markup example:**

```
<lcChallenge>
<description>...</description>
</lcChallenge>
```

### 2.6.1 Description

**Description:** The element <description> contains a description for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.

**Markup element:** <description> (C)

## 2.7 Instruction

**Description:** This element describes the specifics of a learning activity.

**Markup element:** <lcInstruction> (O)

**Attributes:**

- `id` (O), the identifier of the <`listItem`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.6.1.

Business rules:

- None identified

**Markup example:**

```
<lcInstruction>
<description>...</description>
</lcInstruction>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

Refer to Chap 2.5 for an overview of business rule categories and layers that ought to be considered for S1000D technical learning development projects. Business rule decisions will vary from project to project. Below are suggested considerations for any technical learning development project:

**Reuse or repurposing of technical data.** The project or the organization must formulate how much technical data will be reused or repurposed in the course material. Refer to Para 2.

**Development of multimedia or graphics.** The project or the organization must formulate what multimedia and graphics must be developed for both electronic technical manuals and training courses. Refer to Para 2.

Refer to Chap 3.9.7 for a content preplanning discussion.

# 4 Examples

Below is a complete markup example for <`learningContent`>. It describes a short lesson on using an email program.

```
<learning>
<learningContent id="understanding_the_basics">
<title>Understanding Email Basics</title>
<shortDescr></shortDescr>
<lcIntro>
<description><para>Introduce the email learning
content.</para></description>
</lcIntro>
<lcDuration>
<title>Expected course duration</title>
<lcTime>
<description>
<para>It should take you no more than 30 minutes to complete
```

```
this module.</para>
</description>
</lcTime>
</lcDuration>
<lcObjectives>
<lcObjectivesStem>
<description><para>When you complete this lesson, you’ll know
how to perform the following mail basics:</para></description>
</lcObjectivesStem>
<lcObjectiveGroup>
<lcObjective>
<description><para>Viewing the inbox</para></description>
</lcObjective>
 <lcObjective>
<description><para>Opening a message</para></description>
</lcObjective>
 <lcObjective>
<description><para>Moving messages to a
folder</para></description>
</lcObjective>
</lcObjectiveGroup>
</lcObjectives>
<lcChallenge>
<description><para>Describe the learning
challenge.</para></description>
</lcChallenge>
<lcInstruction>
<description><para>Describes the instruction to meet the
challenge.</para></description>
</lcInstruction>
</learningContent>
</learning>
```

# Chapter 3.9.5.2.13.4

## *Content section - Learning summary information*

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## 1 General

The learning summary information model completes the bulk of the learning content. The learning summary structure reviews learning objectives, learning activities and language that

forms the learning materials. It can also discuss lesson assessments and future learning requirements.

## 2 Learning summary content

**Description:** A learning summary recaps and provides context for the achievement or accomplishment of learning objectives, provides guidance to reinforce learning and long-term memory, and can pose questions to enhance encoding and verification of the learning content.

**Markup element:** <learningSummary> (O)

**Attributes:**

- id (O), the identifier of the <learningSummary> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (C). Refer to Chap 3.9.5.2.1.5.
- <shortDescr> (O). Refer to Chap 3.9.5.2.13.1.
- <lcSummary> (O). Refer to Para 2.3.
- <lcObjectives> (O). Refer to Chap 3.9.5.2.13.2.
- <lcReview> (O). Refer to Para 2.5.
- <lcNextSteps> (O). Refer to Para 2.6.
- <lcResources> (O). Refer to Chap 3.9.5.2.13.2.
- <lcSection> (O). Refer to Chap 3.9.5.2.13.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- reusing and repurposing technical data

**Markup example:**

```
<learningSummary>
<title>...</title>
<shortDescr>...</shortDescr>
<lcSummary>...</lcSummary>
<lcObjectives>...</lcObjectives>
<lcReview>...</lcReview>
<lcNextSteps>...</lcNextSteps>
<lcResources>...</lcResources>
<lcSection>...</lcSection>
</learningSummary>
```

### 2.1 Title

**Description:** The element <title> provides a title for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.1.5.

**Markup element:** <title> (C)

## 2.2 Short description

**Description:** The element <shortDescr> provides a short description of the learning summary portion of the course or lesson. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <shortDescr> (O)

## 2.3 Summary

**Description:** The element <lcSummary> provides a textual summary that describes the main learning goals and lessons learned.

**Markup element:** <lcSummary> (O)

**Attributes:**

- id (O), the identifier of the <lcSummary> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 2.3.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcSummary>
<description>...</description>
</lcSummary>
```

### 2.3.1 Description

**Description:** The element <description> contains a description for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.

**Markup element:** <description> (C)

## 2.4 Objectives

**Description:** The element <lcObjectives> lists or describes the learning goals. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcObjectives> (O)

## 2.5 Review

**Description:** The element <lcReview> provides a review of the main points.

**Markup element:** <lcReview> (O)

**Attributes:**

- id (O), the identifier of the <lcReview> element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.3.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcReview>
<description>...</description>
</lcReview>
```

## 2.6 Next steps

**Description:** The element <`lcNextSteps`> describes the next steps to reinforce the knowledge learned.

**Markup element:** <`lcNextSteps`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcNextSteps`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 2.3.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcNextSteps>
<description>...</description>
</lcNextSteps>
```

## 2.7 Resources

**Description:** The element <`lcResources`> provides a list of related resources and information about them, such as related articles or samples on the web. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <`lcResources`> (O)

## 2.8 Section

Refer to Chap 3.9.5.2.13.2 for details.

**Description:** The element <lcSection> provides a generic element to contain other learning content. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcSection> (O)

# 3 Business rules decisions

Refer to Chap 2.5 for an overview of business rule categories and layers that ought to be considered for S1000D technical learning development projects. Business rule decisions will vary from project to project. Below are suggested considerations for any technical learning development project.

**Reusing and repurposing technical data.** The project and the organization must formulate how much technical learning data will be reused from module to module. For example, objectives are stated in the learning overview and in the learning summary. Learning objectives must be accurately stated in all related data modules. Refer to Para 2.

Refer to Chap 3.9.7 for content preplanning information.

# 4 Examples

Below is a complete markup example for <learningContent>. It describes a short lesson on using an email program.

```
<learning>
<learningSummary id="understanding_the_basics">
<title>Understanding Email Basics</title>
<shortDescr>...</shortDescr>
<lcSummary>
<description><para>Summarize the email learning
content.</para></description>
</lcSummary>
 <lcObjectives>
<lcObjectivesStem>
<description><para>Now that you have completed this lesson, you
can now perform the following mail basics:</para></description>
</lcObjectivesStem>
<lcObjectiveGroup>
<lcObjective>
<description><para>Viewing the inbox</para></description>
</lcObjective>
 <lcObjective>
<description><para>Opening a message</para></description>
</lcObjective>
 <lcObjective>
<description><para>Moving messages to a
folder</para></description>
</lcObjective>
</lcObjectiveGroup>
</lcObjectives>
<lcReview>
<description><para>Review all main points that support the
learning objectives.</para></description>
</lcReview>
<lcNextSteps>
<description><para>The next steps to advance email proficiency
```

```
are creating distribution lists, creating new accounts and
adding new email servers.</para></description>
</lcNextSteps>
<lcResources>
<description>
<para>There many resources on the internet to advance your email
skills.</para>
</description>
</lcResources>
</learningSummary>
</learning>
```

# Chapter 3.9.5.2.13.5

## *Content section - Learning assessment information*

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| IMS QTI 2.1 v2 | IMS Global Learning Consortium, Inc. Question & Test Interoperability (QTI) specification, Version 2.1 Public Draft 2 |

# 1 General

The learning assessment information model contains a series of questions meant to test the student's learning assessment is modeled as a series of questions, each regarded as an independent interaction.

# 2 Learning assessment

**Description:** A Learning Assessment presents questions or interactions that measure progress, encourage recollection, and stimulate reinforcement of the learning content, and can be presented before the content as a pre-assessment or as a post-assessment test. The format of each interactive assessment question can be structured as one of the following question types: true-false, single select, multiple select, sequencing, matching or hotspot. Therefore, one "learning assessment" can contain a series of individual "interactions", each of which contains a "question type". The interactions use a subset of the Question-Test Interoperability (IMS QTI) specification.

**Note**

The true-false, single select and multiple select structures use the same content model, <`lcQuestionOptionGroup`>. There is one <`lcQuestionOptionGroup`> for each assessment question.

**Markup element:** <`learningAssessment`> (O)

**Attributes:**

- `id` (O), the identifier of the <`learningAssessment`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`title`> (C). Refer to Para 1.1.
- <`shortDescr`> (O). Refer to Para 1.2.
- <`lcIntro`> (O). Refer to Para 1.3.
- <`lcDuration`> (O). Refer to Para 1.4.
- <`lcInteraction`> (O). Refer to Para 1.5.
- <`lcSummary`> (O). Refer to Para 1.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- linking assessment questions to technical source materials

**Markup example:**

```
<learningAssessment>
<title>...</title>
<shortDescr>...</shortDescr>
<lcIntro>...</lcIntro>
<lcDuration>...</lcDuration>
<lcInteraction>...</lcInteraction>
<lcSummary>...</lcSummary>
</learningAssessment>
```

## 1.1 Title

**Description:** The element <`title`> contains a title for learning assessment information. It is used in accordance with the rules in Chap 3.9.5.2.1.5.

**Markup element:** <`title`> (O)

## 1.2 Short description

**Description:** The element <`shortDescr`> gives a short description of the learning assessment portion of the course or lesson.

**Markup element:** <`shortDescr`> (O)

**Attributes:**

- `id` (O), the identifier of the <`shortDescr`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

– None identified

**Markup example:**

Refer to Para 4

## 1.3 Introduction

**Description:** The element <lcIntro> provides a detailed introduction and description of the assessment to be taken in cases where the <shortDescr> is not adequate to fully describe the content. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcIntro> (O)

## 1.4 Duration

**Description:** The element <lcDuration> provides an estimated duration of the assessment. Refer to Chap 3.9.5.2.13.2 for details.

**Markup element:** <lcDuration> (O)

## 1.5 Interaction

**Description:** The repeatable container element <lcInteraction> provides the assessment question interactions.

**Markup element:** <lcInteraction> (O)

**Attributes:**

– id (O), the identifier of the <lcInteraction> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <lcTrueFalse> (O). Refer to Para 1.5.1.
– <lcSingleSelect> (O). Refer to Para 1.5.2.
– <lcMultipleSelect> (O). Refer to Para 1.5.3.
– <lcSequencing> (O). Refer to Para 1.5.4.
– <lcMatching> (O). Refer to Para 1.5.5.
– <lcHotspot> (O). Refer to Para 1.5.6.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lcInteraction>
<lcTrueFalse>...</lcTrueFalse>
<lcSingleSelect>...</lcSingleSelect>
<lcMultipleSelect>...</lcMultipleSelect>
<lcSequencing>...</lcSequencing>
```

```
<lcMatching>...</lcMatching>
<lcHotspot>...</lcHotspot>
</lcInteraction>
```

### 1.5.1 True-false

**Description:** The true-false interaction presents the learner with two choices: one correct, the other incorrect, and is often presented as true/false or yes/no responses.

**Note**

The element <lcTrueFalse> contains the same content model as the element <lcSingleSelect> and the element <lcMultipleSelect>. For the element <lcTrueFalse>, enter two element <lcAnswerOptionGroup> of each "true" and "false" answer possibility.

**Markup element:** <lcTrueFalse> (O)

**Attributes:**

- id (O), the identifier of the <lcTrueFalse> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 1.1.
- <lcQuestion> (C). Refer to Para 1.5.1.1.
- <lcAsset> (O). Refer to Para 1.5.1.2.
- <lcAnswerOptionGroup> (O). Refer to Para 1.5.1.4.
- <lcFeedbackIncorrect> (O). Refer to Para 1.5.1.9.
- <lcFeedbackCorrect> (O). Refer to Para 1.5.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcTrueFalse>
<lcQuestion>
<description><para>...</para></description>
</lcQuestion>
<lcAnswerOptionGroup>
<lcAnswerOption>
<lcAnswerOptionContent>
<description><para>...</para></description>
</lcAnswerOptionContent>
<lcCorrectResponse></lcCorrectResponse>
<lcFeedback>
<description><para>...</para></description>
</lcFeedback>
</lcAnswerOption>
</lcAnswerOptionGroup>
<lcFeedbackIncorrect>
<description><para>...</para></description>
```

```
</lcFeedbackIncorrect>
<lcFeedbackCorrect>
<description><para>...</para></description>
</lcFeedbackCorrect>
</lcTrueFalse>
```

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*Fig 1 <`lcTrueFalse`> Content Model*

1.5.1.1 Question

**Description:** The <`lcQuestion`> element is used to hold a question in an assessment interaction.

**Markup element:** <`lcQuestion`> (C)

**Attributes:**

- `id` (O), the identifier of the <`lcQuestion`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`description`> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcQuestion>
<description>...</description>
</lcQuestion>
```

1.5.1.2 Description

**Description:** The element <description> contains a description for the element which it is contained in. It is used in accordance with the rules in Chap 3.9.5.2.

**Markup element:** <description> (C)

1.5.1.3 Asset

**Description:** The <lcAsset> element is used to hold images and other graphic assets to support an assessment interaction.

**Markup element:** <lcAsset> (O)

**Attributes:**

- id (O), the identifier of the <lcAsset> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <figure> (C). Refer to Chap 3.9.5.2.1.7.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcAsset>
<figure>
<graphic infoEntityIdent="entityName">...</graphic>
</figure>
</lcAsset>
```

1.5.1.4 Answer option group

**Description:** The <lcAnswerOptionGroup> container element provides answer options for true-false, single-select, or multiple-select assessment interactions.

**Markup element:** <lcAnswerOptionGroup> (O)

**Attributes:**

- id (O), the identifier of the <lcAnswerOptionGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.

– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`lcAnswerOption`> (C). Refer to Para 1.5.1.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lcAnswerOptionGroup>
<lcAnswerOption>...</lcAnswerOption>
<lcAnswerOption>...</lcAnswerOption>
</lcAnswerOptionGroup>
```

1.5.1.5 Answer option

**Description:** The <`lcAnswerOption`> container element provides a single answer option for true-false, single-select, or multiple-select assessment interactions.

**Markup element:** <`lcAnswerOption`> (C)

**Attributes:**

– `id` (O), the identifier of the <`lcAnswerOption`> element. Refer to Chap 3.9.5.2.1.2.
– `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <`lcAnswerOptionContent`> (C). Refer to Para 1.5.1.6.
– <`lcCorrectResponse`> (O). Refer to Para 1.5.1.7.
– <`lcFeedback`> (O). Refer to Para 1.5.1.8.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>...</para>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse></lcCorrectResponse>
</lcAnswerOption>
```

1.5.1.6 Answer option content

**Description:** The <lcAnswerOptionContent> container element provides the content and feedback for an answer option to a question, and can indicate that the option is correct or incorrect.

**Markup element:** <lcAnswerOptionContent> (C)

**Attributes:**

- id (O), the identifier of the <lcAnswerOptionContent> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcAnswerOptionContent>
<description>...</description>
</lcAnswerOptionContent>
```

1.5.1.7 Correct response

**Description:** The empty <lcCorrectResponse> element indicates a correct <lcOptionContent> response in a <lcAnswerOption>.

**Markup element:** <lcCorrectResponse> (O)

**Attributes:**

- lcName (D), the default value is "lcCorrectResponse". Require
- lcValue (O), which indicates the value of the correct response

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="a1"/>
```

1.5.1.8 Feedback

**Description:** The <lcFeedback> element provides information to the learner about a correct or incorrect response during an interactive assessment.

**Markup element:** <lcFeedback> (O)

**Attributes:**

- id (O), the identifier of the <lcFeedback> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcFeedback>
<description><para>...</para></description>
</lcFeedback>
```

1.5.1.9 Feedback incorrect

**Description:** The <lcFeedbackIncorrect> element provides feedback to the learner about an incorrect response in an assessment interaction.

**Markup element:** <lcFeedbackIncorrect> (C)

**Attributes:**

- id (O), the identifier of the <lcFeedbackIncorrect> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcFeedbackIncorrect>
<description><para>...</para></description>
</lcFeedbackIncorrect>
```

1.5.1.10 Feedback correct

**Description:** The <lcFeedbackCorrect> element provides feedback to the learner about a correct response in an assessment interaction.

**Markup element:** <lcFeedbackCorrect> (C)

**Attributes:**

- id (O), the identifier of the <lcFeedbackCorrect> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcFeedbackCorrect>
<description>...</description>
</lcFeedbackCorrect>
```

### 1.5.2 Single select

**Description:** A single select interaction presents the assessment taker with a question and three or more possible answers, only one of which is correct.

**Markup element:** <lcSingleSelect> (O)

**Note**

The element <lcSingleSelect> contains the same content model as the element <lcTrueFalse> and the element <lcMultipleSelect>. Enter two or more element <lcAnswerOptionGroup> for each possible correct answer.

**Attributes:**

- id (O), the identifier of the <lcSingleSelect> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- lcName (C), the default value is "lcSingleSelect"
- lcValue (O), which indicates the value of the correct response
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 1.1.
- <lcQuestion> (C). Refer to Para 1.5.1.1.
- <lcAsset> (O). Refer to Para 1.5.1.3.
- <lcAnswerOptionGroup> (C). Refer to Para 1.5.1.4.

– <lcFeedbackIncorrect> (C). Refer to Para 1.5.1.9.
– <lcFeedbackCorrect> (C). Refer to Para 1.5.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lcSingleSelect>
<title>...</title>
<lcQuestion>...</lcQuestion>
<lcAsset>...</lcAsset>
<lcAnswerOptionGroup>...</lcAnswerOptionGroup>
<lcFeedbackCorrect>...</lcFeedbackCorrect>
</lcSingleSelect>
```

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*Fig 2 <lcSingleSelect> Content Model*

### 1.5.3 Multiple select

**Description:** A multiple select interaction presents the assessment taker with a question and three or more possible answers, where two or more answers are correct.

**Markup element:** <lcMultipleSelect> (O)

**Note**

The element <lcMultipleSelect> contains the same content model as the element <lcTrueFalse> and the element <lcSingleSelect>. Enter three or more element <lcAnswerOptionGroup> for each possible correct answer.

**Attributes:**

– id (O), the identifier of the <lcMultipleSelect> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- lcName (C), the default value is "lcMultipleSelect"
- lcValue (O), which indicates the value of the correct response
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 1.1.
- <lcQuestion> (C). Refer to Para 1.5.1.1.
- <lcAsset> (O). Refer to Para 1.5.1.3.
- <lcAnswerOptionGroup> (O). Refer to Para 1.5.1.4.
- <lcFeedbackIncorrect> (O). Refer to Para 1.5.1.9.
- <lcFeedbackCorrect> (O). Refer to Para 1.5.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMultipleSelect>
<title>...</title>
<lcQuestion>...</lcQuestion>
<lcAsset>...</lcAsset>
<lcAnswerOptionGroup>...</lcAnswerOptionGroup>
<lcFeedbackCorrect>...</lcFeedbackCorrect>
</lcMultipleSelect>
```

ICN-83007-0000000057-001-01

*Fig 3 <`lcMultipleSelect`> Content Model*

### 1.5.4 Sequencing

**Description:** The sequence interaction presents the assessment taker with a list of items that must be put into a correct sequential order.

**Markup element:** <`lcSequencing`> (O)

**Note**

The element <`lcSequencing`> contains the same basic content model as the element <`lcTrueFalse`>, the element <`lcSingleSelect`> and the element <`lcMultipleSelect`> except that the element <`lcSequenceOptionGroup`> replaces the element <`lcAnswerOptionGroup`>.

**Attributes:**

- `id` (O), the identifier of the <`lcSequencing`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`title`> (O). Refer to Para 1.1.
- <`lcQuestion`> (C). Refer to Para 1.5.1.1.
- <`lcAsset`> (O). Refer to Para 1.5.1.3.
- <`lcSequenceOptionGroup`> (O). Refer to Para 1.5.4.1.
- <`lcFeedbackIncorrect`> (O). Refer to Para 1.5.1.9.

– <lcFeedbackCorrect> (O). Refer to Para 1.5.1.10.

**Business rules decisions:**

– None identified

**Markup example:**

```
<lcSequencing>
<title>...</title>
<lcQuestion>
<description>
<para>...</para>
</description>
</lcQuestion>
<lcAsset>...</lcAsset>
<lcSequenceOptionGroup>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="1"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="2"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="3"/>
</lcSequenceOption>
</lcSequenceOptionGroup>
<lcFeedbackCorrect>...</lcFeedbackCorrect>
</lcSequencing>
```

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*Fig 4 <`lcSequencing`> Content Model*

1.5.4.1 Sequence option group

**Description:** The element <`lcSequenceOptionGroup`> provides the options for an assessment sequence interaction.

**Markup element:** <`lcSequenceOptionGroup`> (O)

**Attributes:**

- `id` (O), the identifier of the <`lcSequenceOptionGroup`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`lcSequenceOption`> (C). Refer to Para 1.5.4.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcSequenceOptionGroup>
<lcSequenceOption>
```

```
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="1"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="2"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="3"/>
</lcSequenceOption>
</lcSequenceOptionGroup>
```

1.5.4.2 Sequence option

**Description:** This element contains the contents of an item to be sequenced within an assessment interaction.

**Markup element:** <`lcSequenceOption`> (C)

**Attributes:**

- `id` (O), the identifier of the <`lcSequenceOption`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`lcAnswerOptionContent`> (O). Refer to Para 1.5.1.6.
- <`lcSequence`> (O). Refer to Para 1.5.4.3.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="1"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="2"/>
</lcSequenceOption>
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="3"/>
</lcSequenceOption>
```

1.5.4.3 Sequence

**Description:** The <`lcSequence`> element provides the position of a sequence option in a sequence in an assessment interaction.

**Markup element:** <`lcSequence`> (O)

**Attributes:**

- id (O), the identifier of the <lcSequence> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- lcName (O), the default is "lcSequence".
- 1cValue (O), the value indicates the sequence order of the <lcSequenceOption>
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcSequenceOption>
<lcSequence></lcSequence>
<lcSequence lcName="lcSequence" lcValue="1"/>
</lcSequenceOption>
```

### 1.5.5 Matching

**Description:** The matching interaction asks the assessment taker to link two related items together from a list of multiple options.

**Markup element:** <lcMatching> (O)

**Attributes:**

- id (O), the identifier of the <lcMatching> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 1.1.
- <lcQuestion> (C). Refer to Para 1.5.1.1.
- <lcAsset> (O). Refer to Para 1.5.1.2.
- <lcMatchTable> (O). Refer to Para 1.5.5.1.
- <lcFeedbackIncorrect> (O). Refer to Para 1.5.1.9.
- <lcFeedbackCorrect> (O). Refer to Para 1.5.1.10.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMatching>
<title>...</title>
<lcQuestion>...</lcQuestion>
<lcAsset>...</lcAsset>
<lcMatchTable...</lcMatchTable>
<lcFeedbackIncorrect>...</lcFeedbackIncorrect>
<lcFeedbackCorrect></lcFeedbackCorrect>
</lcMatching>
```

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*Fig 5 <`lcMatching`> Content Model*

1.5.5.1 Match table

**Description:** The <`lcMatchTable`> element contains a format for matching items in an assessment interaction.

**Markup element:** <`lcMatchTable`> (O)

**Attributes:**

- id (O), the identifier of the <lcMatchTable> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <lcMatchingHeader> (O). Refer to Para 1.5.5.2.
- <lcMatchingPair> (C). Refer to Para 1.5.5.5.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMatchTable>
<lcMatchingHeader>...</lcMatchingHeader>
<lcMatchingPair>...</lcMatchingPair>
</lcMatchTable>
```

1.5.5.2 Matching header

**Description:** The <lcMatchingHeader> container element provides column headings for items to be matched in a match table interaction.

**Markup element:** <lcMatchingHeader> (O)

**Attributes:**

- id (O), the identifier of the <lcMatchingHeader> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <lcItem> (C). Refer to Para 1.5.5.3.
- <lcMatchingItem> (C). Refer to Para 1.5.5.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMatchingHeader>
<lcItem>...</lcItem>
<lcMatchingItem>...</lcMatchingItem>
</lcMatchingHeader>
```

1.5.5.3 Item

**Description:** The <lcItem> element contains content for an item that matches the matching item in a match table contained in a match table interaction.

**Markup element:** <lcItem> (C)

**Attributes:**

- id (O), the identifier of the <lcItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcItem>
<description><para>...</para></description>
</lcItem>
```

1.5.5.4 Matching item

**Description:** The <lcMatchingItem> element contains content for the matching side of a matching pair of items in a match table interaction.

**Markup element:** <lcMatchingItem> (C)

**Attributes:**

- id (O), the identifier of the <lcMatchingItem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMatchingItem>
<description><para>...</para></description>
</lcMatchingItem>
```

1.5.5.5 Matching pair

**Description:** The <lcMatchingPair> container element provides a table row with the pair of items that comprise a correct match in a matching interaction.

**Markup element:** <lcMatchingPair> (C)

**Attributes:**

- id (O), the identifier of the <lcMatchingPair> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <lcItem> (C). Refer to Para 1.5.5.3.
- <lcMatchingItem> (C). Refer to Para 1.5.5.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcMatchingPair>
<lcItem>...</lcItem>
<lcMatchingItem>...</lcMatchingItem>
</lcMatchingPair>
```

**1.5.6 Hotspot**

**Description:** The hotspot interaction asks the assessment taker to click on a region of the screen to indicate a choice.

**Markup element:** <lcHotspot> (O)

**Attributes:**

- id (O), the identifier of the <lcHotspot> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O). Refer to Para 1.1.
- <lcQuestion> (C). Refer to Para 1.5.1.1.
- <lcHotspotMap> (C). Refer to Para 1.5.6.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcHotspot>
<title>...</title>
<lcQuestion>...</lcQuestion>
<lcHotspotMap>...</lcHotspotMap>
</lcHotspot>
```

1.5.6.1 Hotspot map

**Description:** This interaction designates an action area or region over an image, allowing a click in that region to get scored as correct or incorrect in response to an interaction question. Refer to Chap 3.9.5.2.1.8.

**Markup element:** <`lcHotspotMap`> (C)

**Attributes:**

- `id` (O), the identifier of the <`lcHotspotMap`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`figure`> (C). Refer to Chap 3.9.5.2.1.7.

**Business rules decisions:**

- None identified

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*Fig 6 <lcHotspotMap> content model*

- <lcHotspot> is derived from the native S1000D figure content model. Use of <lcHotspotMap> in a learning assessment requires the element <figure>, then the element <graphic>, followed by the element <hotspot>. The following learning-based elements are used in element <hotspot> when inserted in the learning data module:
- <lcCorrectResponse> (O). Refer to Para 1.5.1.7.
- <lcFeedbackIncorrect> (O). Refer to Para 1.5.1.9.
- <lcFeedbackCorrect> (O). Refer to Para 1.5.1.10.

**How to use <lcHotspot>**

Each <hotspot> wrapper element inserted into <graphic> represents an answer option to a question posed in the element <lcQuestion>. For each correct answer, or correct hotspot, the element <lcCorrectResponse> is inserted into the element <hotspot>. A direct reference between the attributes `id` on <hotspot> and `lcValue` on <lcCorrectResponse> represent a correct answer, or click. Any number of hotspots can be offered as answers, and any number of hotspots can serve as correct answers. The elements <lcFeedbackIncorrect> and <lcFeedbackCorrect> can also be

inserted into <hotspot> that present feedback to correct and incorrect choices. Refer to the markup example in paragraph 4.6.

Refer to chapter 3.9.5.2.1.8 about linking to data modules after clicking a hotspot.

Refer to chapter 7.3.2 about use of CGM graphics.

**Markup example:**

```
<lcHotspotMap>
<figure>
<title>...</title>
<graphic infoEntityIdent="graphic001">
<hotspot id="hotspot001">
<lcCorrectResponse lcValue="hotspot001"/>
<!-- lcCorrectResponse or lcFeedbackCorrect, not both
<lcFeedbackCorrect>
<description><para>Correct!</para></description>
</lcFeedbackCorrect> -->
</hotspot>
<hotspot id="hotspot002">
<lcFeedbackIncorrect>
<description><para>Incorrect!</para></description>
</lcFeedbackIncorrect>
</hotspot>
</graphic>
</figure>
</lcHotspotMap>
```

## 1.6 Summary

**Description:** The element <lcSummary> provides a summary of the learning assessment.

**Markup element:** <lcSummary> (O)

**Attributes:**

- id (O), the identifier of the <lcInteraction> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <description> (C). Refer to Para 1.5.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<lcSummary>
<description>...</description>
</lcSummary>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Linking assessment questions to technical source materials.** Projects and organizations can require assessments questions and answers to be linked to technical source materials for further reference and feedback. In cases where a learner is given multiple opportunities to pass a test, the questions answered incorrectly can be retaken after review of source materials. Refer to Para 2.

Refer to Chap 2.5 for an overview of business rule categories and layers that must be considered for S1000D technical learning development projects. Business rule decisions will vary from project to project. Below are suggested considerations for any technical learning development project.

Refer to Chap 3.9.7 for a content preplanning discussion.

# 4 Examples

Below is a complete markup example for <learningAssessment>.

## 4.1 True-false assessment markup example

```
<lcTrueFalse id="tf1">
<title>True - False sun rising</title>
<lcQuestion>
<description>
<para>On Earth, the sun rises in the West and sets in the
East.</para>
</description>
</lcQuestion>
<lcAnswerOptionGroup>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>True</para>
</description>
</lcAnswerOptionContent>
</lcAnswerOption>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>False</para>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="tf1"/>
</lcAnswerOption>
</lcAnswerOptionGroup>
<lcFeedbackIncorrect>
<description>
<para>No, look to the East.</para>
</description>
</lcFeedbackIncorrect>
<lcFeedbackCorrect>
<description>
<para>Yes, look to the East.</para>
</description>
</lcFeedbackCorrect>
</lcTrueFalse>
```

## 4.2 Single select assessment markup example

```
<lcSingleSelect id="singleselect">
<title>Multiple Choice - IEEE standards trivia</title>
<lcQuestion>
<description>
<para>Which one of the listed standards committees is
responsible for developing the token ring specification?</para>
</description>
</lcQuestion>
<lcAnswerOptionGroup>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>IEEE 802.3</para>
</description>
</lcAnswerOptionContent>
<lcFeedback>
<description>
<para>Sorry. A little low.</para>
</description>
</lcFeedback>
</lcAnswerOption>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>IEEE 802.5</para>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="a1"/>
<lcFeedback>
<description>
<para>That’s the one.</para>
</description>
</lcFeedback>
</lcAnswerOption>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>IEEE 802.6</para>
</description>
</lcAnswerOptionContent>
<lcFeedback>
<description>
<para>Nope. Too high.</para>
</description>
</lcFeedback>
</lcAnswerOption>
<lcAnswerOption>
<lcAnswerOptionContent>
<description>
<para>IEEE 802.11</para>
</description>
</lcAnswerOptionContent>
<lcFeedback>
<description>
<para>Nope. Way too high.</para>
</description>
</lcFeedback>
</lcAnswerOption>
```

```
</lcAnswerOptionGroup>
</lcSingleSelect>
```

## 4.3 Multiple select assessment markup example

```
<lcMultipleSelect id="ms1">
<title>Finding Major League Baseball logos</title>
<lcQuestion>
<description>
<para>Which one of the following is a logo of a Major League
Baseball team? (You may choose more than one.)</para>
</description>
</lcQuestion>
<lcAnswerOptionGroup>
<lcAnswerOption id="A">
<lcAnswerOptionContent>
<description>
<figure>
<title>...</title>
<graphic infoEntityIdent="logo001"/>
</figure>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="a1"/>
<lcFeedback>
<description>
<para>Yes, that’s one.</para>
</description>
</lcFeedback>
</lcAnswerOption>
<lcAnswerOption id="B">
<lcAnswerOptionContent>
<description>
<figure>
<title>...</title>
<graphic infoEntityIdent="logo002"/>
</figure>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="b2"/>
<lcFeedback>
<description>
<para>Yes, that’s one.</para>
</description>
</lcFeedback>
</lcAnswerOption>
<lcAnswerOption id="C">
<lcAnswerOptionContent>
<description>
<figure>
<title>...</title>
<graphic infoEntityIdent="logo003"/>
</figure>
</description>
</lcAnswerOptionContent>
<lcFeedback>
<description>
<para>No, not that one. Sorry!</para>
</description>
</lcFeedback>
</lcAnswerOption>
```

```
<lcAnswerOption id="D">
<lcAnswerOptionContent>
<description>
<figure>
<title>...</title>
<graphic infoEntityIdent="logo004"/>
</figure>
</description>
</lcAnswerOptionContent>
<lcCorrectResponse lcName="lcCorrectResponse" lcValue="c3"/>
<lcFeedback>
<description>
<para>Yes, that’s one.</para>
</description>
</lcFeedback>
</lcAnswerOption>
</lcAnswerOptionGroup>
</lcMultipleSelect>
```

## 4.4 Sequencing assessment markup example

```
<lcSequencing id="sequencing">
<title>Sequencing City Populations in the U.S.</title>
<lcQuestion>
<description>
<para>Order the following U.S. cities according to population,
from largest to smallest.</para>
</description>
</lcQuestion>
<lcSequenceOptionGroup>
<lcSequenceOption>
<lcAnswerOptionContent>
<description>
<para>Portland, Oregon</para>
</description>
</lcAnswerOptionContent>
<lcSequence lcName="lcSequence" lcValue="2"/>
</lcSequenceOption>
<lcSequenceOption>
<lcAnswerOptionContent>
<description>
<para>Chicago, Illinois</para>
</description>
</lcAnswerOptionContent>
<lcSequence lcName="lcSequence" lcValue="1"/>
</lcSequenceOption>
<lcSequenceOption>
<lcAnswerOptionContent>
<description>
<para>Portland, Maine</para>
</description>
</lcAnswerOptionContent>
<lcSequence lcName="lcSequence" lcValue="4"/>
</lcSequenceOption>
<lcSequenceOption>
<lcAnswerOptionContent>
<description>
<para>Syracuse, New York</para>
</description>
</lcAnswerOptionContent>
<lcSequence lcName="lcSequence" lcValue="3"/>
```

```
</lcSequenceOption>
</lcSequenceOptionGroup>
<lcFeedbackIncorrect>
<description>
<para>No, try again, please.</para>
</description>
</lcFeedbackIncorrect>
<lcFeedbackCorrect>
<description>
<para>Very good.</para>
</description>
</lcFeedbackCorrect>
</lcSequencing>
```

## 4.5 Matching assessment markup example

```
<lcMatching id="matching">
<title>Matching teams with cities</title>
<lcQuestion>
<description>
<para>Match the team with the city.</para>
</description>
</lcQuestion>
<lcMatchTable>
<lcMatchingHeader>
<lcItem>
<description>
<para>Team</para>
</description>
</lcItem>
<lcMatchingItem>
<description>
<para>City</para>
</description>
</lcMatchingItem>
</lcMatchingHeader>
<lcMatchingPair>
<lcItem>
<description>
<para>Boston</para>
</description>
</lcItem>
<lcMatchingItem>
<description>
<para>Red Sox</para>
</description>
</lcMatchingItem>
</lcMatchingPair>
<lcMatchingPair>
<lcItem>
<description>
<para>San Francisco</para>
</description>
</lcItem>
<lcMatchingItem>
<description>
<para>Giants</para>
</description>
</lcMatchingItem>
</lcMatchingPair>
<lcMatchingPair>
```

```
<lcItem>
<description>
<para>Chicago</para>
</description>
</lcItem>
<lcMatchingItem>
<description>
<para>Cubs</para>
</description>
</lcMatchingItem>
</lcMatchingPair>
<lcMatchingPair>
<lcItem>
<description>
<para>Toronto</para>
</description>
</lcItem>
<lcMatchingItem>
<description>
<para>Blue Jays</para>
</description>
</lcMatchingItem>
</lcMatchingPair>
</lcMatchTable>
</lcMatching>
```

## 4.6 Hotspot assessment markup example

```
<lcHotspot id="hotspotsAssessment001">
<title>Identifying Safe Mode Regions on the Acme Radar</title>
<lcQuestion>
<description>
<para>Click on the area of the system that initiates a safe
mode.</para>
</description>
</lcQuestion>
<lcHotspotMap>
<figure>
<title>...</title>
<graphic id="hotspotsAssessments001" infoEntityIdent="ICN-
S1000DRADAR-AAA-DA10000-0-U8025-09999-A-01-1">
<hotspot id="hotspot001">
<lcFeedbackCorrect>
<description>
<para>Correct!</para>
</description>
</lcFeedbackCorrect>
</hotspot>
<hotspot id="hotspot002">
<lcFeedbackIncorrect>
<description>
<para>Incorrect!</para>
</description>
</lcFeedbackIncorrect>
</hotspot>
<hotspot id="hotspot003">
<lcFeedbackIncorrect>
<description>
<para>Incorrect!</para>
</description>
</lcFeedbackIncorrect>
```

```
</hotspot>
</graphic>
</figure>
</lcHotspotMap>
</lcHotspot>
```

# Chapter 3.9.5.2.14

## *Content section - Maintenance checklists and inspections*

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# 1 General

This chapter contains details about the maintenance checklists and inspection schema. This schema can be used when the maintenance data contains procedural tasks that must be presented with the maintenance data. These procedural tasks are not a full procedure like those contained in a procedural data module.

# 2 Content

## 2.1 Definition

The checklist and maintenance planning schema is robust enough that it can accommodate many forms of maintenance checklist data. It can be used for items such as Preventive Maintenance Checks and Services (PMCS) table, checking unpacked equipment conditions, preventive maintenance inspection form, and criteria for special Inspections to name a few. The sections that follow will describe the elements in detail and will include markup examples.

## 2.2 References

References must be populated in accordance with Chap 3.9.5.2.1.2.

## 2.3 Checklist and maintenance planning information

**Description:** The element <`checkList`> is used to contain the checklist information. It has an attribute `checkListCategory` which can be set to the checklist type. Checklist type is an organization or project specific business rule decision and is populated as described in Chap 3.9.6.1. For each category identified, an organization or project can establish business rules for which elements to use and/or how to markup checklists for each category type.

**Markup element:** <`checkList`> (M)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`checkList`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `checkListType` (O), indicates the type of checklist.
- `checkListCategory` (O), indicates the type of checklist based on the category defined in the business rules. Uses an enumerated list "`clc01`" through "`clc99`".
- `worthinessLimit` (O), indicates if the task is mandatory or recommended. Refer to Chap 3.9.5.2.5.
- `reducedMaint` (O), indicates reduced maintenance information. Refer to Chap 3.9.5.2.5.
- `skillLevelCode` (O), indicates the skill level required to complete the task. Refer to Chap 3.9.5.2.5.

- skillType (O), indicates the category of skill for the task. Refer to Chap 3.9.5.2.5.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <commonInfo> (O), used for common information. Refer to Chap 3.9.5.2.1.12.
- <preliminaryRqmts> (O), used for preliminary requirements. Refer to Chap 3.9.5.2.1.9.
- <checkListInfo> (M), contains check list items. Refer to Para 2.3.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the checklist schema
- use of the element <commonInfo>
- use of the element <preliminaryRqmts>
- to use attribute checkListCategory
- definition of the allowed values for the attribute checkListCategory

**Markup example:**

```
<checkList checkListCategory="cl01">
<commonInfo>
...
</commonInfo>
<preliminaryRqmts>
...
</preliminaryRqmts>
<checkListInfo>
...
</checkListInfo>
</checkList>
```

### 2.3.1 Common information

The element <commonInfo> will be populated in accordance with Chap 3.9.5.2.1.12.

### 2.3.2 Preliminary requirements

The element <preliminaryRqmts> will be populated in accordance with Chap 3.9.5.2.1.9.

### 2.3.3 Check list information

**Description:** Checklist information includes a variety of optional elements and repeatable elements allowing for markup in a variety of ways. The check list information is intended to group items together that will create the checklist data. This element includes the following elements.

**Markup element:** <checkListInfo> (M)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the <checkListGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- worthinessLimit (O), indicates if the task is mandatory or recommended. Refer to Chap 3.9.5.2.5.
- reducedMaint (O), indicates reduced maintenance information. Refer to Chap 3.9.5.2.5.
- skillLevelCode (O), indicates the skill level required to complete the task. Refer to Chap 3.9.5.2.5.
- skillType (O), indicates the category of skill for the task. Refer to Chap 3.9.5.2.5.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O), used to contain the title for the element <checkListGroup>. Refer to Chap 3.9.5.2.1.5.
- <checkListIntervals> (O), used to capture maintenance intervals. Refer to Para 2.3.3.1.
- <warning> (O), captures warning statements. Refer to Chap 3.9.3.
- <caution> (O), captures caution statements. Refer to Chap 3.9.3.
- <note> (O), captures note information. Refer to Chap 3.9.3.
- <checkListItems> (M), used to contain the items pertinent to the checklist. Refer to Para 2.3.3.5.

**Business rules decisions:**

- None identified

**Markup example:**

```
<checkListInfo>
<checkListItems>...</checkListItems>
</checkListInfo>
```

2.3.3.1 Check list intervals

**Description:** The element <checkListIntervals> contains an optional and repeatable element <checkListInterval>. This element is used to capture the various maintenance intervals used in an inspection or checklist. These intervals can be used to capture information for use with maintenance interval columns. For example, a table might have a column for 500 hours and a column for 1000 hours. These columns would then have a check mark in the appropriate task row to indicate when the maintenance should be performed.

**Markup element:** <checkListIntervals> (O)

**Attributes:**

- None

**Child elements:**

- <checkListInterval> (M), used to capture the individual intervals corresponding to the checklist.

**Attributes:**

- id (O), the identifier of the <checkListInterval> element. Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of check list intervals element <checkListIntervals>

**Markup example:**

```
<checkListIntervals>
<checkListInterval id="cl01">500h</checkListInterval>
<checkListInterval id="cl02">1000h</checkListInterval>
</checkListIntervals>
```

2.3.3.2 Warning, caution or note

The elements <warning>, <caution>, and <note> must be marked up in accordance with Chap 3.9.3.

2.3.3.3 Zone

The element <zoneRef> must be marked up in accordance with Chap 3.9.5.2.1.9 if used.

2.3.3.4 Work area

The element <workArea> must be marked up in accordance with Chap 3.9.5.2.1.9 if used.

2.3.3.5 Check list item

**Description:** The repeatable element <checkListItem> contains a number of elements used to capture items specific for an inspection or maintenance check. The element <checkListItem> presents an optional item number, followed by an optional threshold. It continues with a choice of equipment or nomenclature and a choice of references and check list procedures. The next two items are an optional zone and optional remarks. These items are detailed in paragraphs that follow.

**Markup element:** <checkListItem> (M)

**Attributes:**

– None

**Child elements:**

– <itemNumber> (O), used for reference purposes. Refer to Para 2.3.3.5.1.
– <threshold> (O) , used to contain threshold limits. Refer to Para 2.3.3.5.2.
– An optional choice of
  - <equip> (O), used to identify the equipment. Refer to Chap 3.9.5.2.5.
  - <name> (O), used to identify the equipment name. Refer to Chap 3.9.5.2.5.
– A mandatory choice between
  - <refs> (C), lists any reference information. Refer to Chap 3.9.5.2.1.2.
  - <checkListProcedure> (C), contains procedures pertinent to the checklist. Refer to Para 2.3.3.5.6.
– <zoneRef> (O), used to contain the zoning information. Refer to Chap 3.9.5.2.1.9.
– <remarks> (O), used to contain relevant remarks. Refer to Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional elements in check list item element <checkListItem>

**Markup example:**

```
<checkListItem>
<itemNumber>8</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue>After</thresholdValue>
</threshold>
</checkListItem>
```

*2.3.3.5.1 Item number*

**Description:** The element <itemNumber> is assigned to the checklist item for reference purposes. It is used to identify the line item or the row number for data presented in tabular format.

**Markup element:** <itemNumber> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional element item number element <itemNumber>

**Markup example:**

```
<itemNumber>8</itemNumber>
```

*2.3.3.5.2 Threshold*

**Description:** The element <threshold> is used to contain information such as value and tolerances. The element <threshold> has an optional attribute thresholdType that is used to specify if the threshold applies "from the beginning" of the maintenance program or if it applies to the last time the check was performed.

**Markup element:** <threshold> (O)

**Attributes:**

– thresholdUnitOfMeasure (M).
– thresholdType (O).

**Child elements:**

– <thresholdValue> (M), used capture threshold values. Refer to Chap 3.9.5.2.5.
– <tolerance> (O), used to indicate tolerance levels. Refer to Chap 3.9.5.2.5.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the optional and repeatable element threshold

**Markup example:**

```
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
```

```
<thresholdValue>X</thresholdValue>
</threshold>
```

2.3.3.5.3 *Equipment*

The element <equip> must be marked up in accordance with Chap 3.9.5.2.5.

2.3.3.5.4 *Name of support equipment element*

The element <nomenclature> must be marked up in accordance with Chap 3.9.5.2.1.

2.3.3.5.5 *References*

The element <refs> is used to contain any reference information that is relevant to the individual task. This is populated as described in Chap 3.9.5.2.1.2.

2.3.3.5.6 *Check list procedure*

**Description:** The element <checkListProcedure> is used to contain a brief description of each check to be performed as well as any information required to accomplish a check or service. This element contains either paragraph text or a series of check list steps.

**Markup element:** <checkListProcedure> (C), repeatable

**Attributes:**

- id (O), the identifier of the <checkListProcedure> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (O), indicates the skill level required to complete the task. Refer to Chap 3.9.5.2.5.
- hcp (O), indicates if the item is hardness critical.
- esd (O), indicates if the item is sensitive to electrostatic discharge.
- crewMember (O), indicates the crew member that will perform the procedure. Refer to Chap 3.9.5.2.6.
- safeFlight (O), indicates the equipment is safe for flight.
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <title> (O), used to contain the title for the element <checkListProcedure>. Refer to Chap 3.9.5.2.1.5.
- <checkListPara> (C), check list paragraph. Refer to Para 2.3.3.5.8.
- <checkListStep> (C), check list step. Refer to Para 2.3.3.5.8.

These elements are identical with the exception of the element <checkListStep> which is included as an optional and repeatable element to allow for nested check list steps. The structure for element <checkListStep> and element <checkListPara> includes an optional and repeatable element <warning>, element <caution>, and element <note> followed by a required paragraph element <para>. The next item can either be element <equipmentNotAvailable> or element <remarks>. The element <checkListPara> has no further elements. The <checkListStep> includes another level of the element <checkListStep>.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the checklist procedure element <checkListProcedure>

**Markup example:**

```
<checkListProcedure>
<checkListPara>
<para>Aircraft forms and records for recorded
discrepancies</para>
</checkListPara>
</checkListProcedure>
```

*2.3.3.5.7 Warning, caution or note*

The element <warning>, element <caution>, and element <note> must be marked up in accordance with Chap 3.9.3.

*2.3.3.5.8 Paragraph*

The element <para> must be marked up in accordance with Chap 3.9.5.2.1.10.

*2.3.3.5.9 Equipment not available*

**Description:** The element <equipNotAvailable> defines the condition of the equipment (shortages, malfunctions, etc.) that will make equipment not ready or not available for use. This element is aligned with the checklist item or paragraph for which the equipment not ready/available is applicable. This element includes a required element <para>.

**Markup element:** <equipNotAvailable> (O)

**Attributes:**

– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

– <para> (C), must be marked up in accordance with Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the checklist procedure element <checkListProcedure>

**Markup example:**

```
<checkListProcedure>
<checkListPara>
<para>Aircraft forms and records for recorded
discrepancies</para>
</checkListPara>
</checkListProcedure>
```

*2.3.3.5.10 Zone*

The element <zoneRef> must be marked up in accordance with Chap 3.9.5.2.1.9.

*2.3.3.5.11 Remarks*

The element <remarks> must be marked up in accordance with Chap 3.9.5.1.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the attribute `checkListCategory`**. The project or the organization must decide how to populate the enumerated attribute `checkListCategory`. Refer to Para 2.3.

**Checklist categories**. The project or the organization must decide if business rules need to be created for which elements to use and how to markup checklists for each category type. Refer to Para 2.3.

**Use of the element <`commonInfo`>**. The project or the organization must decide if the element <`commonInfo`> is used in the checklist data module. Refer to Para 2.3.1.

**Use of the element <`preliminaryRqmts`>**. The project or the organization must decide if the element <`preliminaryRqmts`> is used in the checklist data module. Refer to Para 2.3.2.

**Use of the element <`title`>**. The project or the organization must decide if the element <`title`> is used in the checklist data module. Refer to Para 2.3.3.

**Use of the element <`checkListIntervals`>**. The project or the organization must decide if the element <`checkListIntervals`> is used in the checklist data module. Refer to Para 2.3.3.1.

**Use of the element <`zoneRef`>**. The project or the organization must decide if the element <`zoneRef`> is used in the checklist data module and how it should be populated. Refer to Para 2.3.3.3.

**Use of the element <`workArea`>**. The project or the organization must decide if the element <`workArea`> is used in the checklist data module and how it should be populated. Refer to Para 2.3.3.4.

**Use of the optional element <`checkListItem`>**. The project or the organization must decide which elements within <`checkListItem`> are used and how they should be populated.

- Item number. Projects must decide if item number will be used or not.
- Threshold. Projects must decide on the appropriate thresholds, if used.
- Equipment. Projects must decide if equipment will be used or not.
- Nomenclature. Projects must decide if nomenclature will be used or not.
- Zone references. Projects must decide if zone references will be used or not.
- Remarks. Projects must decide if remarks will be used or not. Refer to Para 2.3.3.5.

# 4 Examples

This section includes several markup examples to demonstrate how the checklist data module can be used to accommodate a variety of maintenance checklist and inspection forms. The examples include only a sampling of the items that can be marked up.

## 4.1 Example 1

The first of these examples is a preventive maintenance inspection form. Using the checklist data module, an inspection form can be marked up to identify which items must be inspected for several intervals such as Daily, Intermediate and Periodic. The following markup example demonstrates the use of the element <`checkList`> for this particular type of data. A sample display is included at the end for review purposes only. This does not dictate what it should look like. It is only included here to support the markup structure.

```
<checkList checkListCategory="clc01">
<checkListInfo>
<checkListIntervals>
<checkListInterval id="th51">D</checkListInterval>
<checkListInterval id="th52">I</checkListInterval>
<checkListInterval id="th53">P</checkListInterval>
</checkListIntervals>
<workArea>Nose Area</workArea>
<checkListItems>
<checkListItem><itemNumber>1.1</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th52">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th53">
<thresholdValue>X</thresholdValue></threshold>
<checkListProcedure>
<checkListPara><para>Aircraft forms and records for recorded
discrepancies</para></checkListPara>
</checkListProcedure>
</checkListItem>
<!-- ... -->
<checkListItem>
<itemNumber>1.4</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th52">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th53">
<thresholdValue>X</thresholdValue></threshold>
<checkListProcedure>
<checkListPara><para>Pilot lube and static ports for
obstructions and cleanliness.</para></checkListPara>
</checkListProcedure>
</checkListItem>
<checkListItem>
<itemNumber>1.4.1</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue></thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th52">
<thresholdValue></thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th53">
<thresholdValue>X</thresholdValue></threshold>
<checkListProcedure>
<checkListPara><para>Disconnect pilot/static lines from
instrument ports. Remove drain caps from moisture traps.</para>
</checkListPara>
</checkListProcedure>
</checkListItem>
<checkListItem>
<itemNumber>1.4.2</itemNumber>
```

```
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue></thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th52">
<thresholdValue></thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th53">
<thresholdValue>X</thresholdValue></threshold>
<checkListProcedure>
<checkListPara><para>Purge pilot/static system with clean air
pressure (10-60 PSI). Reconnect lines and caps and inspect
system for leaks utilizing instrument test set.</para>
</checkListPara>
</checkListProcedure>
</checkListItem>
<checkListItem>
<itemNumber>1.5</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th52">
<thresholdValue>X</thresholdValue></threshold>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th53">
<thresholdValue>X</thresholdValue></threshold>
<checkListProcedure>
<checkListPara><para>Windshields and windows for cleanliness,
scratches, and cracks.</para></checkListPara>
</checkListProcedure>
</checkListItem>
</checkListItems>
</checkListInfo>
</checkList>
```

INSPECTION TOTAL WORK TIME D _____
I _____
P _____

| Seq. No. | Item and Procedure | D | I | P | W/T |
|---|---|---|---|---|---|
| | NOSE AREA | | | | |
| 1.1 | Aircraft forms and records for recorded discrepancies (TM 38-750) | X | X | X | |
| 1.2 | Nose section exterior for damage. | X | X | X | |
| 1.3 | Nose compartment interior for cleanliness, equipment for damage and loose connections, and door for secure latching. | X | X | X | |
| 1.4 | Pilot lube and static ports for obstructions and cleanliness. | X | X | X | |
| 1.4.1 | Disconnect pilot/static lines from instrument ports. Remove drain caps from moisture traps. | | | X | |
| 1.4.2 | Purge pilot/static system with clean dry air pressure (10-60 PSI). Reconnect lines and caps and inspect system for leaks utilizing instrument test set. | | | X | |
| 1.5 | Windshields and windows for cleanliness, scratches, and cracks. | X | X | X | |
| 1.6 | Test FAT gage (TM 55-1500-204-25/1). | | | X | |

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*Fig 1 Preventive Maintenance Inspection Form*

## 4.2 Example 2

This example demonstrates how to markup PMCS data. Using the checklist data module, PMCS data can be marked up and published in various formats for use by the maintainer. The following markup example demonstrates the use of the <checkList> element for this particular type of data. A sample display is included at the end for review purposes only. This does not dictate how the data should be presented. It is only serves to help interpret the markup structure.

```
<checkList checkListCategory="cl02">
<checkListInfo>
<checkListItems>
<checkListItem>
<itemNumber>7</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th02">
<thresholdValue>Before</thresholdValue>
</threshold>
<equip>
<name>Internal Fire Extinguishers</name>
</equip>
```

```
<checkListProcedure crewMemberType="Driver">
<checkListStep>
<para>Check engine compartment fire extinguisher.</para>
<checkListStep>
<para>Check wire or lead seals on engine compartment fire
extinguisher.</para>
<equipmentNotAvailable>
<para>Wire or lead seals on engine compartment fire extinguisher
are missing broken or improperly laced.</para>
</equipmentNotAvailable>
</checkListStep>
<checkListStep>
<note>
<para>If engine compartment fire extinguisher is in yellow zone,
notify unit maintenance after mission is completed.</para>
</note>
<para>Check that pressure gage on engine compartment fire
extinguisher is in green or yellow zone. </para>
<equipmentNotAvailable>
<para>Pressure gage on engine compartment fire extinguisher
reads in red zone. </para>
</equipmentNotAvailable>
</checkListStep>
</checkListStep>
</checkListProcedure>
</checkListItem>
<checkListItem>
<itemNumber>8</itemNumber>
<threshold thresholdType="interval"
thresholdUnitOfMeasure="th51">
<thresholdValue>After</thresholdValue>
</threshold>
<checkListProcedure>
<checkListPara>
<para></para>
</checkListPara>
</checkListProcedure>
</checkListItem>
</checkListInfo>
</checkList>
```

Table 1 Preventive Maintenance Checks and Services for Model M2A3/M3A3, Before –Continue

| ITEM NO. | INTERVAL | ITEM TO BE CHECKED OR SERVICED | PROCEDURE | EQUIPMENT NOT READY/ AVAILABLE IF: |
|---|---|---|---|---|
| | | | **WARNING**<br>**Hydraulic fluid is poisonous and can be absorbed through your skin. Never service hydraulic system when fluid is hot or under pressure. Avoid skin contact. Wash hands with soap immediately after servicing, and wash off any fluid which comes in contact with skin. If fluid gets into eyes, wash eyes immediately and get medical help.**<br>b. Check ramp hydraulic power unit.<br>1. Lower ramp (WP 0090).<br>2. Remove ramp hydraulic power unit cover and check sight glass. If fluid level is below ADD mark, add FRH (MIL-H-46170) as needed. Never fill over halfway between ADD and FULL with ramp down. Ramp hydraulic power unit will be overfilled with ramp up.<br>3. Install ramp hydraulic power unit cover.<br>4. Raise ramp (WP 0090). | |
| 6 | Before | Hull Drain Plugs | **Driver**<br>a. Check for open or missing front hull drain plug and that bridge plates are fully seated. | Front hull drain plug is missing or bridge plates will not seat. |
| 7 | Before | Internal Fire Extinguisher | **Driver**<br>a. Check engine compartment fire extinguisher.<br>1. Check wire or lead seals on engine compartment fire extinguisher.<br>2. Check that pressure gage on engine compartment fire extinguisher is in green or yellow zone.<br>**NOTE**<br>**If engine compartment fire extinguisher is in yellow zone, notify unit maintenance after mission is completed.** | Wire or lead seals on engine compartment fire extinguisher are missing, broken or improperly laced.<br>Pressure gage on engine compartment fire extinguisher reads in red zone. |

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*Fig 2 Preventive Maintenance Checks and Services*

# Chapter 3.9.5.3

## *Data modules - Applicability*

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# 1 General

Applicability information allows the technical author to specify which data is appropriate in what situations. The S1000D applicability model supports simple to very complex implementations. Chap 4.14 and subchapters provide an overview of applicability. It is recommended that these chapters have been read and the concepts understood before reading this chapter and subchapters.

This chapter covers general applicability implementation issues and the implementation of applicability annotations that are used within data modules.

- Chap 3.9.5.3.1 covers the authoring and implementation of the Applicability Cross-reference Table (ACT) data module.
- Chap 3.9.5.3.2 covers the authoring and implementation of the Conditions Cross-reference Table (CCT) data module.
- Chap 3.9.5.3.3 covers the authoring and implementation of the Products Cross-reference Table (PCT) data module.

# 2 Applicability

## 2.1 Overall concepts

### 2.1.1 Data module applicability versus content applicability

Applicability information, for the whole data module, is stored in the applicability construct in the identification and status section of the data module. Refer to Para 2.2 for the description of the applicability model.

This applicability, for the whole data module, always applies to all parts of the content. Within the content section it is, however, often necessary to indicate applicability at a more granular level than the data module as a whole. In the content section any applicability annotations must be covered by the applicability given at the data module level. Entering applicability information in the content section that is not encompassed by the applicability specified at the data module level is not permitted.

The applicability information is stored in the element <`applic`> and has the same construct whether applied to the whole data module or a part of the content.

### 2.1.2 Applicability branches

The element <`applic`> has two logical branches (three branches for process data modules) which are used for separate purposes:

- A human readable applicability annotation – consists of the element <`displayText`> which provides human readable applicability information. This branch can be used in conjunction with either of the other two branches as required.
- A computable applicability annotation – consists of the element <`assert`> and element <`evaluate`> which provide applicability information in a computable format which can be used to support dynamic display of the annotated content.
- Process data module applicability expression – consists of the element <`expression`> which provides an applicability expression for the logic engine with the process data module. This branch is used only within process data modules.

This three branch model is intended to aid the author in simplifying the structure and easily identifying which branch is used for what purpose. The actual applicability schema model is more complex than three branches with some elements duplicated. This more complex model enforces strict validation.

The project or the organization must have decided and documented in business rules which branches of the applicability model are to be populated from the business rules decisions specified in Chap 4.14.

### 2.1.3 Referenced applicability

2.1.3.1 General

Applicability annotations must be defined in the identification and status section and then referencing in the content section where they apply. The applicability annotations are defined using the element <applic> within the element <referencedApplicGroup> contained in the status section. Applicability annotations are applied within the content section by usage of the attribute applicRefId on the context element.

2.1.3.2 Definition

Using the element <referencedApplicGroup> provides a container for defining applicability annotations that apply to various parts of the data module. Such applicability annotations can be used to restrict the applicability for a substructure of the data module, compared to the applicability specified for the whole data module.

It is important to be aware of the difference, and relation, between the data module applicability specified by element <applic> in element <dmStatus>, and the local applicability restrictions contained in element <referencedApplicGroup> in element <dmStatus>.

This element uses element:

– <applic>, populated in accordance with Para 2.2.

**Note 1**

A referenced applicability must always be encompassed by the applicability specified for the whole data module.

**Note 2**

An applicability referenced from within the content applies to the element where it is referenced and all its subelements. It is not necessary to duplicate applicability references on the subelements. Any duplicated applicability references applied to the subelements will have no effect.

**Note 3**

Applicability annotations collected in the element <referencedApplicGroup> can be specified once while referred to many times from within the data module content.

## 2.2 Applicability model

**Description:** The element <applic> is populated by the technical author or generated by the production system during initial authoring and updating activity of the data module.

**Markup element:** <applic> (C)

**Attributes:**

– id (O), the identifier of the <listItem> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– applicConfiguration (O), the type of applicability for a given part used only in IPD data modules. This attribute can have one of the following values:
  - "allowed" applicability indicates which parts can be installed (with conditions or not) at a given function-position on a given product
  - "installed" applicability indicates what part is theoretically installed (actual or scheduled) at a given function-position on a given product
  - "built" applicability indicates what part was installed at a given function-position on a given product when it left the factory
  - "designed" applicability indicates the engineering configuration

  - "manufactured" applicability indicates the manufacturing configuration
  - "supported" applicability indicates the support configuration
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <displayText>
- <assert>
- <evaluate>
- <expression>

The element <applic> must contain one of the following options for content:

- <displayText>.
- <assert> with optional <displayText>.
- <evaluate> with optional <displayText>.
- <expression> with optional <displayText> (this option is available only in the process data module).

**Business rules decisions:**

- None identified

**Markup example:**

```
<applic>
<displayText>
...
</displayText>
</applic>
```

### 2.2.1 Human readable applicability annotation branch

**Description:** The optional element <displayText> provides a human readable and printable branch of the applicability annotation. For those projects that do not require computable applicability, the display text is the only part of the applicability annotation needed. For annotations, the repeatable simple paragraph element <simplePara> can be used. Refer to Chap 7.8 for the recommended format for the content of element <displayText>.

In projects deciding to use both the human readable branch and one of the computable branches, the applicability annotation represented in both branches must match. The project or the organization can decide to generate the human readable branch from the computable branch. (Refer to Chap 7.8).

**Markup element:** <displayText> (O)

**Attributes:**

- None

**Child elements:**

- <simplePara> (M). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Population or generation of element <displayText>

**Markup example:**

```
<applic>
<displayText><simplePara>Mountain bicycle, either:</simplePara>
<simplePara>Mountain storm Mk1 or Brook trekker
Mk9</simplePara></displayText>
</applic>
```

### 2.2.2 Computable applicability annotation branch

The computable applicability annotation branch is constructed with a set of individual tests which are grouped together to form a computable expression. Each individual test is represented with an element <assert> which specifies the product attribute or condition to test and the values to test against. Each grouping is represented with an element <evaluate> which associates the child elements together along with a logical operation to perform, either an "and" or an "or" operation. Groupings can contain other groupings and individual tests, thus allowing construction of very complicated expressions where needed.

#### 2.2.2.1 Single applicability test - assert

**Description:** The element <assert> provides for a single test for the computable branch of the applicability annotation. The assert annotation specifies the product attribute or condition to test and a set of values and/or ranges to test against. The result of evaluating an assert annotation will be a Boolean value of 'true' or 'false'.

In the case where an assert cannot be evaluated due to lack of a value to test against or the case where only a textual annotation is provided (not referencing a product attribute or condition) then the result must be considered the Boolean value "true'"

The element <assert> can be used to represent a textual applicability annotation which does not have an associated product attribute or condition, meaning there is no test to perform. Examples of textual annotations include "volcanic conditions" and "wind speed over 30 knots". The textual content of element <assert> is used to represent the annotation and the attributes applicPropertyIdent, applicPropertyType, and applicPropertyValues are not used.

**Markup element:** <assert> (O)

**Attributes:**

– applicPropertyIdent (O), for the identifier of either the product attribute (element <productAttribute> attribute id from the ACT data module) or condition (element <cond> attribute id from the CCT data module) to test. Not used if the element <assert> contains text only.
– applicPropertyType (O), indicates whether the attribute applicPropertyIdent value references a product attribute or a condition. Mandatory if attribute applicPropertyIdent is used, otherwise not used. Allowable values are:
  - "prodattr" indicates the attribute applicPropertyIdent references a product attribute
  - "condition" indicates the attribute applicPropertyIdent references a condition
– applicPropertyValues (O), for the values and/or ranges to test against. Mandatory if attribute applicPropertyIdent is used, otherwise not used. Refer to Para 2.2.4 for additional information including formatting requirements.

– applicDisplayClass (O), provides a style for formatting. The style can be used by publication systems when generating text in element <displayText> or when printing. The style can also be used by viewers when generating a display which includes an applicability annotation. Refer to Chap 7.8 for additional information.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

Assert textual applicability annotation:

```
<assert>In icy conditions</assert>
```

Assert product attribute test:

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
```

Single assert condition test:

```
<applic>
<assert applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValues="post"/>
</applic>
```

Single assert use of the attribute applicDisplayClass:

The following example illustrates an applicability annotation where the project has decided that hardware configuration related items should be displayed with a certain formatting. The project has decided to indicate which items get the special formatting by setting the attribute applicDisplayClass to the value "configitem". This decision along with the specific formatting must be documented in the project or organization business rules.

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker" applicDisplayClass="configitem"/>
```

2.2.2.2 Grouping applicability tests - evaluate

**Description:** The element <evaluate> is used to group tests together and provide the logical operation to apply to the test results. The element <evaluate> must be used whenever more than one test, element <assert>, is required. The element <evaluate> can contain other element <evaluate> and is therefore recursive. This allows for very complicated applicability annotations to be represented with a simple structure consisting of only two element types.

To process the element <evaluate>, all child elements are evaluated each providing a Boolean value of 'true' or 'false'. Then the logical "and" or "or" operation is performed on the results, providing a single Boolean result. A result of the value 'true' means the associated content is valid and a result of the value 'false' means the associated content is not valid. The method of presenting validity is a project or an organization decision. Some projects or organizations will remove invalid content while others will want to de-emphasize the invalid content in some way.

**Markup element:** <evaluate>

**Attributes:**

- andOr (M), specifies the logical operation to perform on the results of all child elements, allowable values are:
  - "and" all child element values of true results in the value 'true', otherwise 'false'
  - "or" any child element value of true results in the value 'true', otherwise 'false'
- applicDisplayClass (O), provides information that can be used to format the applicability annotation. This can be used by publishing systems when generating text in element <displayText> or by viewers when printing or displaying the content. Refer to Chap 7.8 for additional information.

**Child elements:**

- <assert> (O), to perform a single test. Refer to Para 2.2.2.1.
- <evaluate> (O), to create a sub-grouping of additional tests.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of applicDisplayClass.
- use of textual applicability annotations.

**Markup example:**

The following example illustrates an applicability annotation where two product attributes are being tested and both must be the Boolean value 'true' for the entire applicability to result in the Boolean value 'true'. The model must be "Brook trekker" and the version must be "Mk9". If either the model or version test results in the Boolean value 'false', then the entire applicability results in the Boolean value 'false'.

```
<applic>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</applic>
```

The following example illustrates an applicability annotation where the outer evaluate has a logical "or" operation which means if either of the inner evaluate annotations result in the Boolean value 'true' then the entire applicability results in the Boolean value 'true'. This applicability annotation tests for either a "Mountain storm Mk1" or a "Brook trekker Mk9".

```
<applic>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
<evaluate andOr="and">
```

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
</applic>
```

### 2.2.3 Process data module applicability expression branch

The process data module expression branch is only available in the process data module. The expression structure and authoring considerations are detailed in Chap 3.9.5.2.10.

### 2.2.4 Values and ranges (attribute `applicPropertyValues`)

The attribute `applicPropertyValues` provides a single place to define any combination of values and ranges. Two special characters are required to separate values, and these are the tilde [~] used to separate values within a range, and the vertical bar [|] used to separate values and ranges. These two characters cannot be used as part of a value, but other punctuation characters eg slash [/] and hyphen [-], can be used to express values.

If the associated product attribute declaration in the ACT data module or condition declaration in the CCT data module contains the attribute `valuePattern`, then each value must be compliant to the specified pattern. This pattern must be followed for both individual values and for values used in ranges.

Values and ranges examples:

- To represent the single value "001":
  - `applicPropertyValues="001"`
- To represent multiple values "001", "003". and "005":
  - `applicPropertyValues="001|003|005"`
- To represent multiple values "F/A-18C" and "F/A-18D":
  - `applicPropertyValues="F/A-18C|F/A-18D"`
- To represent a range of values from "001" thru "005":
  - `applicPropertyValues="001~005"`
- To represent a range of values from "F/A-18A" thru "F/A-18D":
  - `applicPropertyValues="F/A-18A~F/A-18D"`
- To represent multiple ranges of "001" thru "005" and "007" thru "010":
  - `applicPropertyValues="001~005|007~010"`
- To represent a mix of values and ranges "001" and "003" thru "005" and "007" and "010" and "015" thru "999":
  - `applicPropertyValues="001|003~005|007|010|015~999"`

**Note:**

It is recommended that projects carefully consider the use of ranges on values that are not numerical sequences. Ranges on some alphanumeric values, if used in the human readable display text, can be difficult to understand and can be misinterpreted by users.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Consistent population.** The project or the organization must decide on the population of the elements and attributes of applicability and must then enforce its consistency. Refer to Para 2.

**Population or generation of element <displayText>.** The project or the organization using the human readable branch of applicability must decide whether the element <displayText> is populated by the technical author or generated from the computable branch or some other source. Refer to Para 2.2.1.

**Use of applicDisplayClass.** The project or the organization using the computable applicability annotation branch must decide whether to use the attribute applicDisplayClass. If the attribute applicDisplayClass is used, the allowable values and desired format for each value must be documented in the project or organization business rules. Refer to Para 2.2.2.1.

**Use of textual applicability annotations.** The project or the organization using the computable applicability annotation branch must decide if textual applicability annotations are allowed in the element <assert> or if every element <assert> should reference a declared product attribute or condition. Refer to Para 2.2.2.1.

# 4 Examples

## 4.1 Referenced applicability

The following example illustrates the use of the element <referencedApplicGroup> within element <identAndStatusSection> and the use of attribute applicRefId within the content section:

```
<identAndStatusSection>
...
<referencedApplicGroup>
<applic id="app-0001">
<displayText>
<simplePara>Mountain storm Mk1</simplePara>
</displayText>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
</applic>
<applic id="app-0002">
<displayText>
<simplePara>Brook trekker Mk9</simplePara>
</displayText>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</applic>
</referencedApplicGroup>
...
</identAndStatusSection>
...
<content>
```

```
...
<crewDrill>
<title>Computer</title>
<crewDrillStep>
<challengeAndResponse>
<challenge><para>Computer Display</para></challenge>
<response>
<para>
<captionGroup cols="2" applicRefId="app-0001" changeMark="1"
reasonForUpdateRefIds="chg-0001">
<colspec colnum="1" colname="col1" colwidth="30mm"/>
<colspec colnum="2" colname="col2" colwidth="30mm"/>
<captionBody>
<captionRow>
<captionEntry colname="col1">
<caption color="co04" captionWidth="30mm">
<captionLine>ALTITUDE</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 miles</captionLine>
</caption>
</captionEntry>
</captionRow>
<captionRow><captionEntry colname="col1">
<caption color="co04" captionWidth="30mm">
<captionLine>SPEED</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 mph</captionLine>
</caption>
</captionEntry>
</captionRow>
<captionRow>
<captionEntry colname="col1">
<caption color="co04" captionWidth="30mm">
<captionLine>DISTANCE</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 miles</captionLine>
</caption>
</captionEntry>
</captionRow>
</captionBody>
</captionGroup>
<captionGroup cols="2" applicRefId="app-0002" changeMark="1"
 reasonForUpdateRefIds="chg-0002">
<colspec colnum="1" colname="col1" colwidth="30mm"/>
```

```
<colspec colnum="2" colname="col2" colwidth="30mm"/>
<captionBody>
<captionRow>
<captionEntry colname="col1">
<caption color="co02" captionWidth="30mm">
<captionLine>SPEED</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 mph</captionLine>
</caption>
</captionEntry>
</captionRow>
<captionRow>
<captionEntry colname="col1">
<caption color="co02" captionWidth="30mm">
<captionLine>DISTANCE</captionLine>
</caption>
</captionEntry>
<captionEntry colname="col2">
<caption color="co51" captionWidth="30mm">
<captionLine>0 miles</captionLine>
</caption>
</captionEntry>
</captionRow>
</captionBody>
</captionGroup>
</para>
</response>
</challengeAndResponse>
</crewDrillStep>
</crewDrill>
...
</content>
```

## 4.2 Applicability annotations

Example 1: An applicability annotation based on model, version and maintenance level criteria.

The applicability annotation indicates that the associated technical data is:

- applicable for "Mountain storm Mk1" bicycles at maintenance level 1 or 2
- applicable for "Brook trekker Mk9" bicycles

```
<applic>
<displayText><simplePara>Type: Mountain bicycle (Model: Mountain
storm Version: Mk1 Maintenance level: 1, 2) or (Model: Brook
trekker Version: Mk9)</simplePara></displayText>
<evaluate andOr="and">
<assert applicPropertyIdent="type" applicPropertyType="prodattr"
applicPropertyValues="Mountain bicycle"/>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
```

```
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
<assert applicPropertyIdent="mntlvl"
applicPropertyType="condition"
applicPropertyValues="ml01|ml02"/>
</evaluate>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
</evaluate>
</applic>
```

Example 2: An applicability annotation based on individual product information criteria (from product serial number "001" to "010").

The applicability annotation indicates that the associated technical data is:

- applicable for product numbers "001", "002" and "005" to "010" (no technical conditions or operational conditions need be considered)
- applicable under condition for product numbers "003" and "004"

```
<applic>
<displayText><simplePara>SN: 001-002, 005-010 or (SN: 003-004 SB
B: post)</simplePara></displayText>
<evaluate andOr="or">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="001~002|005~010"/>
<evaluate andOr="and">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValues="003~004"/>
<assert applicPropertyIdent="sb-b"
applicPropertyType="condition" applicPropertyValues="post"/>
</evaluate>
</evaluate>
</applic>
```

## 4.3 Tying it all together

The following example illustrates how the components of applicability work together to build an applicability annotation from the technical authoring viewpoint.

**Note**

This example illustrates a manual process for finding the information needed to build an applicability annotation. An authoring tool can automate parts of this process.

In this scenario, a technical author has been instructed to add an applicability annotation to the content of an element <`proceduralStep`> within a procedural data module. The applicability annotation is to represent the condition where serial number is between "1B070643" and "1B070699" and service bulletin "S001" is installed (post).

The technical author must first identify the product attribute or condition identifiers associated with the serial number and the service bulletin "S001". The referenced ACT data module is

located by looking in the status section of the procedural data module for the element <applicCrossRefTableRef>.

```
<applicCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00W" infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>
</applicCrossRefTableRef>
```

Within the ACT data module, the technical author looks for product attributes (element <productAttribute>) which represent the serial number and the service bulletin "S001". The child element <name> and element <descr> provide the information needed to make this decision. Within the ACT data module, the following product attribute declaration is found for the serial number:

```
<productAttribute id="serialno">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the frame</descr>
</productAttribute>
```

The technical author notes the value "serialno" of attribute id, which is needed to build the applicability annotation. No product attribute is found which represents service bulletin "S001", so the technical author must next look in the CCT data module for a condition representing service bulletin "S001". The referenced CCT data module is located by looking in the content section of the ACT data module for the element <condCrossRefTableRef>.

```
<condCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00Q" infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>
</condCrossRefTableRef>
```

Within the CCT data module, the technical author looks for conditions (element <cond>) which represent the service bulletin "S001". The child element <name> and element <descr> provide the information needed to make this decision. Within the CCT data module, the following condition declaration is found for the service bulletin "S001":

```
<cond condTypeRefId="SB" id="SB-S001">
<name>Service bulletin S001 - Chain guard</name>
<descr>Service bulletin S001 for the installation of the chain
guard</descr>
</cond>
```

The technical author notes the value "SB-S001" of attribute id, which is needed to build the applicability annotation.

The applicability annotation can now be constructed using the product attribute and condition identifiers from the ACT and CCT data modules and the known values to test for. The following applicability annotation is added to the status section element <referencedApplicGroup> of the procedural data module:

```
<referencedApplicGroup>
...
<applic id="appl-006">
<evaluate andOr="and">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070699"/>
<assert applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValues="post"/>
</evaluate>
</applic>
...
</referencedApplicGroup>
```

Finally, the applicability annotation is applied to the appropriate content within the procedural data module:

```
<proceduralStep applicRefId="appl-006">
...
</proceduralStep>
```

# Chapter 3.9.5.3.1

## *Applicability - Applicability cross-reference table*

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## 1 General

The Applicability Cross-reference Table (ACT) data module is used to declare product attributes. A product attribute is a property of the Product that has an effect on the applicability of technical data. Product attributes are properties of the Product that are typically set at the time of manufacture of a product instance and will usually not change throughout the service life of a product instance. Examples of product attributes are model, series, and serial number.

The ACT data module serves as the central point of reference for applicability declarations. It provides references to the Conditions Cross-reference Table (CCT) and Products Cross-reference Table (PCT) data modules. By referencing the ACT data module in the status section,

all other data modules will be able to access all declarations of product attributes and conditions as well as actual values for product instances.

Chap 4.14 and subchapters provide an overview of applicability. It is recommended that these chapters have been read and the concepts understood before reading this chapter.

# 2 Schema basic rules

There are three components of the ACT data module element <applicCrossRefTable>:

- Product attributes - element <productAttributeList> (M), to define the product attributes
- Reference to the CCT data module - element <condCrossRefTableRef> (O)
- Reference to the PCT data module - element <productCrossRefTableRef> (O)

## 2.1 Product attributes

**Description:** The element <productAttributeList> contains a list of attributes of the Product. The values for product attributes will typically not change throughout the service life of product instance.

**Markup element:** <productAttributeList> (M)

**Attributes:**

- None

**Child elements:**

- <productAttribute>.(M). Refer to Para 2.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<productAttributeList>
<productAttribute ...>
...
</productAttribute>
</productAttributeList>
```

### 2.1.1 Product attribute

**Description:** The element <productAttribute> is used to declare a single attribute of the Product, such as "serial number" or "model".

**Markup element:** <productAttribute> (M)

**Attributes:**

- id (O), the identifier of the <productAttribute> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- valuePattern (O), a pattern specifying the allowable structure for each value in the attribute applicPropertyValues in the element <enumeration>. The pattern follows the XML schema regular expression rules as specified in REC-xmlschema-2-20041-

28 W3C Recommendation: XML Schema Part 2: Datatypes Second Edition (2004 Second Edition).

**Child elements:**

- <name> (M). Refer to Para 2.1.1.1.
- <displayName> (O). Refer to Para 2.1.1.2.
- <descr> (M). Refer to Para 2.1.1.3.
- <enumeration> (O). Refer to Para 2.1.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<productAttribute id="serialNumber">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the bicycle frame</descr>
</productAttribute>
```

2.1.1.1 Name

**Description:** The element <name> is the name of the product attribute. This value can assist the technical author in selection of the appropriate product attribute when building an applicability annotation.

**Markup element:** <name> (M)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<name>Serial number</name>
```

2.1.1.2 Display name

**Description:** The element <displayName> is used to define text which can be used to help automated generation the human readable display text on an applicability annotation (see Chap 7.8).

**Markup element:** <displayName> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

– None identified

**Markup example:**

```
<displayName>SN</displayName>
```

2.1.1.3 Description

**Description:** The element <descr> is used to contain further clarification of the meaning of the product attribute. This value can be used to assist the technical author in selection of the appropriate product attribute when building an applicability annotation.

**Markup element:** <descr> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<descr>Serial number etched on the bicycle frame</descr>
```

2.1.1.4 Enumeration

**Description:** The element <enumeration> provides the allowable values for the product attribute. The allowable values can be used to assist the technical author in creating applicability annotations.

The element <enumeration> is optional and repeatable. If there are multiple values and ranges to define, several methods can be employed, including the following:

– single element <enumeration> with attribute applicPropertyValues representing the entire set of values and ranges
– multiple element <enumeration> with attribute applicPropertyValues representing a single value or range

**Markup element:** <enumeration> (O)

**Attributes:**

– applicPropertyValues (M) defines the values and ranges of values that are allowed for this product attribute. If the parent element <productAttribute> includes the attribute valuePattern, then individual values used in the attribute applicPropertyValues must be compliant to the specified pattern. Refer to Chap 3.9.5.3 for more information on the usage of this attribute.

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– The project or the organization must decide a consistent method of defining multiple values and ranges.

**Markup example:**

```
<enumeration applicPropertyValues="Mk1|Mk9"/>
```

## 2.2 CCT reference

**Description:** The element <condCrossRefTableRef> provides a reference to the CCT data module for this project.

**Markup element:** <condCrossRefTableRef> (O)

**Attributes:**

– None

**Child elements:**

– <dmRef> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<condCrossRefTableRef>
<dmRef>
...
</dmRef>
</condCrossRefTableRef>
```

## 2.3 PCT reference

**Description:** The element <productCrossRefTableRef> provides a reference to the PCT data module for this project.

**Markup element:** <productCrossRefTableRef> (O)

**Attributes:**

– None

**Child elements:**

– <dmRef> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<productCrossRefTableRef>
<dmRef>
...
</dmRef>
</productCrossRefTableRef>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of `valuePattern`, `enumeration` and open text**. A project or an organization defining product attributes must decide whether to specify the allowable values for a product attribute achieved by using a `valuePattern`, enumeration, both or to allow open text by not using `valuePattern` and enumeration. Refer to Para 2.1.1.

**Use of display text**. A project or an organization defining product attributes must decide whether to fill the display text. Refer to Para 2.1.1.2.

**Method of defining multiple values or ranges.** A project or an organization defining product attributes which contain multiple enumeration values or ranges must decide whether to use a single element <`enumeration`> containing the entire set or to use multiple elements <`enumeration`> which each contain only one value or range. Refer to Para 2.1.1.4.

# 4 Examples

Example 1: Declaration of a product attribute representing the serial number of the bicycle.

There is neither an attribute `valuePattern` or element <`enumeration`> defined, so the allowable values are not restricted. The optional element <`displayName`> is included which provides a hint when generating a human readable form of an applicability annotation to identify serial numbers with “SN”. For example, to represent serial numbers 1B070622 thru 1B070799: "SN 1B070622-1B070799".

```
<productAttribute id="serialNumber">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the bicycle frame
</descr>
</productAttribute>
```

Example 2: Declaration of a product attribute representing the version of the bicycle.

The attribute `valuePattern` restricts the allowable values to the characters "Mk" followed by either "1" or "9". The element <`enumeration`> restricts the allowable values to either "Mk1" or "Mk9". In this example the attribute `valuePattern` and element <`enumeration`> are overlapping. Only one is needed, although the overlap is not harmful. The element <`displayName`> is included and is empty which provides a hint that no text is needed when generating a human readable form of an applicability annotation. For example, to represent a model of "Brook trekker" (with a displayName of "Model") and a version of "Mk1": "Model Brook trekker Mk1".

```
<productAttribute id="version" valuePattern="Mk(1|9)">
<name>Version</name>
<displayName></displayName>
<descr>Version of the bike</descr>
<enumeration applicPropertyValues="Mk1|Mk9"/>
</productAttribute>
```

Example 3: Declaration of a product attribute representing the version rank of the bicycle.

The attribute `valuePattern` restricts the allowable values to a single digit. The element <`enumeration`> further restricts the allowable values to "1" thru "3". This illustrates a case where both the attribute `valuePattern` and element <`enumeration`> contribute to limiting the allowable values.

```
<productAttribute id="versrank" valuePattern="\d">
<name>Version rank</name>
<displayName>series</displayName>
```

```
<descr>Version rank</descr>
<enumeration applicPropertyValues="1~3"/>
</productAttribute>
```

Example 4: Content section from the ACT for the bicycle sample data modules and combines the above examples.

Four product attributes are declared as well as references to the PCT and CCT data modules.

```
<applicCrossRefTable>
<productAttributeList>
<productAttribute id="serialno">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the bicycle frame</descr>
</productAttribute>
<productAttribute id="model" valuePattern=".*">
<name>Model</name>
<displayName></displayName>
<descr>Model of the bike</descr>
<enumeration applicPropertyValues="Brook trekker|Mountain
storm"/>
</productAttribute>
<productAttribute id="version" valuePattern="Mk(1|9)">
<name>Model</name>
<displayName></displayName>
<descr>Model of the bike</descr>
<enumeration applicPropertyValues="Mk1|Mk9"/>
</productAttribute>
<productAttribute id="versrank" valuePattern="\d">
<name>Version rank</name>
<displayName>series</displayName>
<descr>Version rank</descr>
<enumeration applicPropertyValues="1~3"/>
</productAttribute>
</productAttributeList>
<condCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" sub-subsystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00Q" infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>
</condCrossRefTableRef>
<productCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" sub-subsystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00P" infoCodeVariant="A" itemLocationCode="D"/>
</dmRefIdent>
</dmRef>
</productCrossRefTableRef>
</applicCrossRefTable>
```

# Chapter 3.9.5.3.2

## *Applicability - Conditions cross-reference table*

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| Chap 3.9.5.3 | Data modules - Applicability |
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## 1 General

The Conditions Cross-reference Table (CCT) data module is used to declare any condition that can affect applicability of data. Conditions can be technical, operational, environmental, or any other type that can affect technical data. Technical conditions are typically tied to the configuration of the Product, such as service bulletins or modifications. The state of technical conditions can change throughout the service life of a product instance. Examples of operational and environmental conditions are location of maintenance, availability of tools, regulatory rules, temperature, wind speed and sandy conditions.

The CCT data module is divided into three sections; a definition of common types of conditions, a definition of specific conditions, and an optional incorporation status list for technical conditions.

Chap 4.14 and subchapters provide an overview of applicability. It is recommended that these chapters have been read and the concepts understood before reading this chapter.

# 2 Schema basic rules

There are three components of the CCT data module element <condCrossRefTable>:

- Condition type list - element <condTypeList> (M), to define common types of conditions
- Condition list - element <condList> (M), to define specific conditions
- Incorporation status list - element <incorporation> (O), to document incorporated technical conditions

## 2.1 Condition types list

**Description:** The element <condTypeList> contains a list of common types of conditions which will be used as a basis for defining specific conditions.

**Markup element:** <condTypeList> (M)

**Attributes:**

- None

**Child elements:**

- <condType> (M). Refer to Para 2.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<condTypeList>
<condType ...>
...
</condType>
</condTypeList>
```

### 2.1.1 Condition type

**Description:** The element <condType> is used to define a single condition type of the Product.

**Markup element:** <condType> (M)

**Attributes:**

- id (O), the identifier of the <condType> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- valuePattern (O), a pattern specifying the allowable structure for each value in the attribute applicPropertyValues in the element <enumeration>. The pattern follows the XML schema regular expression rules as specified in REC-xmlschema-2-20041-28 W3C Recommendation: XML Schema Part 2: Datatypes Second Edition (2004 Second Edition).

**Child elements:**

- <name> (M). Refer to Para 2.2.1.1.
- <descr> (M). Refer to Para 2.2.1.3.
- <enumeration> (O). Refer to Para 2.1.1.3.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Use of attribute valuePattern

**Markup example:**

```
<condType id="SB">
<name>Service bulletin</name>
<descr>Generic service bulletin type</descr>
<enumeration applicPropertyValues="Pre|Post"/>
</condType>
```

2.1.1.1 Name

**Description:** The element <name> is the name of the condition type. This value can assist the technical author in selection of the appropriate condition type when defining a condition.

**Markup element:** <name> (M)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<name>Service bulletin</name>
```

2.1.1.2 Description

**Description:** The element <descr> is used to contain further clarification of the meaning of the condition type. This value can be used to assist the technical author in selection of the appropriate condition type when defining a condition.

**Markup element:** <descr> (O)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<descr>Generic service bulletin type</descr>
```

2.1.1.3 Enumeration

**Description:** The element <enumeration> provides the allowable values for the condition type. The allowable values can be used to assist the technical author in creating applicability annotations.

The element <enumeration> is mandatory and repeatable. If there are multiple values and ranges to define, several methods can be employed, including the following:

- single element <enumeration> with attribute applicPropertyValues representing the entire set of values and ranges
- multiple element <enumeration> with attribute applicPropertyValues representing a single value or range

**Markup element:** <enumeration> (M)

**Attributes:**

- applicPropertyValues (M) defines the values and ranges of values that are allowed for this condition type. If the parent element <condType> includes the attribute valuePattern, then individual values used in the attribute applicPropertyValues must be compliant to the specified pattern. Refer to Chap 3.9.5.3 for more information on the usage of this attribute.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- The project must decide a consistent method of defining multiple values and ranges.

**Markup example:**

```
<enumeration applicPropertyValues="Pre|Post"/>
```

## 2.2 Conditions list

**Description:** The element <condList> contains a list of specific conditions which have an effect on the applicability of technical data.

**Markup element:** <condList> (M)

**Attributes:**

- None

**Child elements:**

- <cond> (M). Refer to Para 2.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<condList>
<cond ...>
...
</cond>
</condList>
```

### 2.2.1 Condition

**Description:** The element <condType> is used to declare a single condition of the Product.

**Markup element:** <productAttribute> (M)

**Attributes:**

- id (O), the identifier of the <productAttribute> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- conditionTypeRefid (M), identification of the generic type of condition that this specific condition is based on. This uses the ID/(IDREF) mechanism to reference the id of a <condType>.

**Child elements:**

- <name> (M). Refer to Para 2.2.1.1.
- <displayName> (O). Refer to Para 2.2.1.2.
- <descr> (M). Refer to Para 2.2.1.3.
- <refs> (O). Refer to Para 2.2.1.4.

**Business rules decisions:**

- None identified

**Markup example:**

```
<cond condTypeRefId="SB" id="SB-S001">
<name>Service bulletin S001 - Chain guard</name>
<descr>Service bulletin S001 for the installation of the chain
guard</descr>
</cond>
```

#### 2.2.1.1 Name

**Description:** The element <name> is used for the name of the condition. This value can assist the technical author in selection of the appropriate product attribute when building an applicability annotation.

**Markup element:** <name> (M)

**Attributes:**

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<name>Service bulletin S001 - Chain guard</name>
```

2.2.1.2 Display name

**Description:** The element <displayName> is used to define text which can be used to help automated generation the human readable display text on an applicability annotation (see Chap 7.8). This element contains no attributes or elements.

**Markup element:** <displayName> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of display name

**Markup example:**

```
<displayName>SB-S001 (Chain guard)</displayName>
```

2.2.1.3 Description

**Description:** The element <descr> is used to contain further clarification of the meaning of the condition. This value can be used to assist the technical author in selection of the appropriate product attribute when building an applicability annotation.

**Markup element:** <descr> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

```
<descr>Service bulletin S001 for the installation of the chain
guard</descr>
```

2.2.1.4 References

The element <refs> provides the standard referencing mechanism to associate additional material with the condition. For example, a service bulletin condition may include a reference to the service bulletin publication which incorporates the service bulletin. Refer to Chap 3.9.5.2.1.2.

## 2.3 Incorporation status list

**Description:** The element <incorporation> gives the incorporation status of technical conditions in the documentation.

**Markup element:** <incorporation> (O)

**Attributes:**

– None

**Child elements:**

– <condIncorporation> (C). Refer to Para 2.3.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<incorporation>
<condIncorporation>
...
</condIncorporation>
</incorporation>
```

### 2.3.1 Condition incorporation

**Description:** The element <condIncorporation> represents a technical condition that has or is planned to be incorporated into the technical data. It can reference a declared condition (element <cond>) and consists of a list of documents affected by the technical condition.

**Markup element:** <condIncorporation> (O)

**Attributes:**

– condRefId (O), reference to a declared condition (element <cond>) which this element represents using the ID/IDREF mechanism.

**Child elements:**

– <documentIncorporation> (C). Refer to Para 2.3.1.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<condIncorporation>
<documentIncorporation>
...
</documentIncorporation>
</condIncorporation>
```

#### 2.3.1.1 Document incorporation

**Description:** The element <documentIncorporation> is used to list the data modules and publications that this technical condition affects.

**Markup element:** <documentIncorporation> (C)

**Attributes:**

– id (O), the identifier of the <documentIncorporation> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`refs`> (O). Refer to Para 2.3.1.1.1.
- <`incorporationStatus`> (C). Refer to Para 2.3.1.1.2.

**Business rules decisions:**

- None identified

**Markup example:**

```
<documentIncorporation>
<incorporationStatus incorporationStatus="incorporated"/>
</documentIncorporation>
```

*2.3.1.1.1 References*

The element <`refs`> is used to reference publications and data modules associated with this technical condition. It is to be populated in accordance with Chap 3.9.5.2.1.2.

*2.3.1.1.2 Incorporation status*

**Description:** The element <`incorporationStatus`> is used to define the status of the incorporation of a technical condition.

**Markup element:** <`incorporationStatus`> (C)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`incorporationStatus`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `incorporationStatus` (M), the incorporation status, allowable values are:
  - "`noeffect`" for a technical condition which has no impact on the data module or publication content
  - "`inprogress`" for a technical condition which is partially incorporated into the data module or publication content
  - "`incorporated`" for a technical condition which is completely incorporated into the data module or publication content
- `year` (O), `month` (O), and `day` (O), the date of the incorporation. These attributes are mandatory if the attribute `incorporationStatus` has the value of "`incorporated`".
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of valuePattern**. A project or an organization defining conditions must decide whether to further specify the allowable values for a condition type using the attribute `valuePattern` in addition to the mandatory element <`enumeration`>. Refer to Para 2.1.1.1.

**Method of defining multiple values or ranges.** A project or an organization defining product attributes which contain multiple enumeration values or ranges must decide whether to use a single element <enumeration> containing the entire set or to use multiple elements <enumeration> which each contain only one value or range. Refer to Para 2.1.1.3.

**Use of display text**. A project or an organization defining conditions must decide whether to fill the display text. Refer to Para 2.2.1.2.

# 4 Examples

Example 1: Definition of a generic service bulletin condition type.

The type is given an identifier of "SB" and the allowable values for a service bulletin are defined to be "Pre" and "Post".

```
<condType id="SB">
<name>Service bulletin</name>
<descr>Generic service bulletin type</descr>
<enumeration applicPropertyValues="Pre|Post"/>
</condType>
```

Example 2: Declaration of a condition specifically for the service bulletin called "S001" for installing a chain guard on the bicycle.

The condition is given an identifier of "SB-S001", it is of condition type "SB", referring to the above example, which means it inherits the allowable values of "Pre" and "Post".

```
<cond condTypeRefId="SB" id="SB-S001">
<name>Service bulletin S001 - Chain guard</name>
<descr>Service bulletin S001 for the installation of the chain
guard</descr>
</cond>
```

Example 3: Incorporation status for the above declared technical condition.

It provides a reference to the condition with identifier of "SB-S001", references the data module with was affected and provides the status of "incorporated" and the effective date.

```
<condIncorporation condRefId="SB-S001">
<documentIncorporation>
<refs><dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="2" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="520" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></refs>
<incorporationStatus incorporationStatus="incorporated"
year="2007" month="07" day="31"/>
</documentIncorporation>
</condIncorporation>
```

Example 4: Complete content section of a CCT data module by combining the three examples from this paragraph above.

```
<condCrossRefTable>
<condTypeList>
<condType id="SB">
```

```
<name>Service bulletin</name>
<descr>Generic service bulletin type</descr>
<enumeration applicPropertyValues="Pre|Post"/>
</condType>
</condTypeList>
<condList>
<cond condTypeRefId="SB" id="SB-S001">
<name>Service bulletin S001 - Chain guard</name>
<descr>Service bulletin S001 for the installation of the chain
guard</descr>
</cond>
</condList>
<incorporation>
<condIncorporation condRefId="SB-S001">
<documentIncorporation>
<refs><dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="DA0" subSystemCode="2" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="520" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef></refs>
<incorporationStatus incorporationStatus="incorporated"
year="2007" month="07" day="31"/>
</documentIncorporation>
</condIncorporation>
</incorporation>
</condCrossRefTable>
```

# Chapter 3.9.5.3.3

## *Applicability - Products cross-reference table*

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## 1 General

The Products Cross-reference Table (PCT) data module is a repository for defining product instances and associating values to product attributes and conditions for each product instance. A product instance is an actual physical product, for example a Brook trekker Mk9 bicycle with serial number 1B070643.

Chap 4.14 and subchapters provide an overview of applicability. It is recommended that these chapters have been read and the concepts understood before reading this chapter.

## 2 PCT schema basic rules

There is one component of the PCT data module content element, <`productCrossRefTable`>:

– List of product instances - element <`product`> (M)

### 2.1 Product

**Description:** The element <`product`> identifies an individual product instance.

**Markup element:** <`product`> (M)

**Attributes:**

- `id` (O), the identifier of the <`product`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.

**Child elements:**

- <`assign`> (O). Refer to Para 2.1.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<product>
<assign .../>
</product>
```

### 2.1.1 Assign

**Description:** The element <`assign`> associates a value with a product attribute or condition. It contains the following **attributes:**

**Markup element:** <`assign`> (M)

**Attributes:**

- `applicPropertyIdent` (O), for the identifier of either the product attribute (element <`productAttribute`> attribute `id` from the Applicability Cross-reference Table (ACT) data module) or condition (element <`cond`> attribute `id` from the Conditions Cross-reference Table (CCT) data module)
- `applicPropertyType` (O), indicates whether the attribute `applicPropertyIdent` value references a product attribute or a condition

  Allowable values are:

  - "`prodattr`" indicates the attribute `applicPropertyIdent` references a product attribute
  - "`condition`" indicates the attribute `applicPropertyIdent` references a condition
- `applicPropertyValue` (M), for the value to assign to the referenced product attribute or condition. The value cannot contain the characters tilde [~] or vertical bar [|] as these characters will be interpreted as separators when used as a value in the attribute `applicPropertyValues` elsewhere in the applicability model

**Child elements:**

- None

**Business rules decisions:**

- None identified

**Markup example:**

```
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070643"/>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Product attributes and conditions to include.** A project or an organization using the PCT must decide which product attributes and conditions to include in the PCT. Conditions that represent operational or environmental properties will usually not be included in the PCT as they are not associated with a product instance. Refer to Para 2.

# 4 Examples

The following markup example illustrates the definition of three product instances.

```
<productCrossRefTable>
<product>
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070643"/>
<assign applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValue="Brook
trekker"/>
<assign applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValue="Mk9"/>
<assign applicPropertyIdent="versrank"
applicPropertyType="prodattr" applicPropertyValue="2"/>
<assign applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValue="Pre"/>
</product>
<product>
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070644"/>
<assign applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValue="Brook
trekker"/>
<assign applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValue="Mk9"/>
<assign applicPropertyIdent="versrank"
applicPropertyType="prodattr" applicPropertyValue="1"/>
<assign applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValue="Post"/>
</product>
<product>
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070701"/>
<assign applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValue="Mountain
storm"/>
<assign applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValue="Mk1"/>
<assign applicPropertyIdent="versrank"
applicPropertyType="prodattr" applicPropertyValue="1"/>
<assign applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValue="Pre"/>
</product>
</productCrossRefTable>
```

# Chapter 3.9.6

## *Authoring - Attributes*

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# 1 General

## 1.1 Scope

This chapter regards attributes that specific enumerated sets of predefined allowable values. Other attributes, eg attributes used to contain non-specific character strings, are not concerned herein.

## 1.2 Purpose

The chapter introduces different classes of attributes and gives the principles for how these are populated. Specifically, the chapter describes how to code project configurable attributes.

# 2 Attribute principles

## 2.1 Attribute classes

In the Schemas, supplied with this specification, there are three classes of attributes with predefined allowable sets of values:

These classes are characterized as follows:

– Class 1 - Specific (for a project)

  These attributes are used to represent information of project related character. They reflect facts and circumstances that do not have any relevance for the general function of the

specification. To some extent these attributes can be tailored to meet the needs of a specific project etc.

**Note**

In order to avoid ambiguities, it is absolutely crucial to consider the entire environment where the attributes will be involved and to make sure that tailoring isn't in conflict with the overall interoperability requirements as agreed within the project.

– Class 2 - Generic (within scope of the spec)

  These attributes represent characteristics and properties of general interest and relevance within the scope of the specification. They carry facts and circumstances that are essential to the function of the specification and its application. Therefore they must be applied strictly in accordance with the specification where their intended use is described.

– Class 3 - Public (inherited from other Schema, etc)

  These attributes are incorporated due to reuse of structures, elements and attributes created in contexts outside S1000D. An example would be the "align" attribute of the (CALS) table structure.

## 2.2 General coding principles

Under the interoperability constraint, attributes of class 1 can be tailored to specific projects as needed. Chap 3.9.6.1 and Chap 3.9.6.2 list these attributes, including their default ranges of allowable values, and the S1000D default interpretation of these values. Interpretations are provided in English. In some cases it can be of interest to translate the interpretations into another language than English. If so, such information must be shared within the project concerned.

**Note**

At no time must a project allocate values outside the ranges given in the subchapters.

Attributes belonging to classes 2 and 3 are not available for project specific use.

## 2.3 Attributes available for tailoring

The attributes that are available for tailoring are defined in the following subchapters:

– Chap 3.9.6.1 – Attributes - Project configurable values
– Chap 3.9.6.2 – Attributes - Fixed values

# Chapter 3.9.6.1

## *Attributes - Project configurable values*

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# 1 General

This chapter describes the group of attributes for which the set of allowable values to some extent can be adjusted to the specific needs of a project. The attributes are listed and their respective sets of allowable coded values are defined.

Other attributes, eg attributes used to contain non-specific character strings, are not concerned herein.

# 2 Attributes available for tailoring

The tables below specify those attributes available for project tailoring. For each attribute there is a description of what range of values is allocated to that attribute (allowable values).

For advice on how to technically configure attribute value sets to the project specific needs, refer to Chap 7.3.1.5.

It must be recognized that all tailoring of attribute values must be agreed within a project and documented in the project or organization business rules. Furthermore, agreed application of an interpretation of attribute values must be exchanged and agreed between all parties concerned.

The attributes available for tailoring are:

- Access point type - attribute `accessPointTypeValue`
- Type of acronym or abbreviation - attribute `acronymType`
- Caption for Dialog cancel function - attribute `cancelCaption`
- National caveat - attribute `caveat`
- Check list category - attribute `checkListCategory`
- Caption color - attribute `color`
- Priority level of a comment - attribute `commentPriorityCode`
- Commercial security classification - attribute `commercialClassification`
- Type of crew member required for drill or procedural step - attribute `crewMemberType`

- Crew step condition - attribute `crewStepCondition`
- IPD item description code - attribute `descrForItemCode`
- Type of aircrew drill - attribute `drillType`
- Type of emphasis - attribute `emphasisType`
- Maintenance function - attribute `function`
- Type of equipment install location - attribute `installationLocationType`
- Item characteristic - attribute `itemCharacteristic`
- Origin of an equipment or harness or wire - attribute `itemOriginator`
- Limit type - attribute `limitUnitType`
- Prefix of <`randomList`> items - attribute `listItemPrefix`
- Lowest authorized level - attribute `lowestLevel`
- Maintenance level code - attribute `maintLevelCode`
- Part characteristic - attribute `partCharacteristic`
- Publication module entry type - attribute `pmEntryType`
- Quantity type - attribute `quantityType`
- Required condition category - attribute `reqCondCategory`
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- Caption for Dialog reset function - attribute `resetCaption`
- Type of response to a comment - attribute `responseType`
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- Paragraph significant data type - attribute `significantParaDataType`
- Personnel skill level - attribute `skillLevelCode`
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- Task code - attribute `taskCode`
- Unit of measurement for the threshold interval - attribute `thresholdUnitOfMeasure`
- Update reason type for reason for update - attribute `updateReasonType`
- Style/class of verbatim text - attribute `verbatimStyle`

*Table 2 `accessPointTypeValue` - Access point*

| Allowable values | S1000D interpretation |
|---|---|
| "`accpnl01`" | Access is a door |
| "`accpnl02`" | Access is a panel |
| "`accpnl03`" | Access is an electrical panel |
| "`accpnl04`" - "`accpnl50`" | Not available for projects |
| "`accpnl51`" - "`accpnl99`" | Available for projects |

*Table 3* `acronymType` *- Type of acronym or abbreviation*

| Allowable values | S1000D interpretation |
|---|---|
| "at01"<br>(Default value) | Acronym<br>(Candidate for list of abbreviations) |
| "at02" | Term<br>(Candidate for list of terms) |
| "at03" | Symbol<br>(Candidate for list of symbols) |
| "at04" | Spec<br>(Candidate for list of applicable specs) |
| "at05" - "at50" | Not available for projects |
| "at51" - "at99" | Available for projects |

*Table 4* `cancelCaption` *- Caption for dialog cancel function*

| Allowable values | S1000D interpretation |
|---|---|
| "ca01" | Sets the caption to "CANCEL" |
| "ca02" | Sets the caption to "ABORT" |
| "ca03" | Not available for projects |
| "ca04" | Sets the caption to "END" |
| "ca05" | Sets the caption to "QUIT" |
| "ca06" - "ca50" | Not available for projects |
| "ca51" - "ca99" | Available for projects |

*Table 5* `caveat` *- National caveat*

| Allowable values | S1000D interpretation |
|---|---|
| "cv01" - "cv50" | Not available for projects |
| "cv51" - "cv99" | Available for projects |

*Table 6* `checkListCategory` *- Check list category*

| Allowable values | S1000D interpretation |
|---|---|
| "clc01"<br>(Default value) | Preventive maintenance inspection form |
| "clc02" | Preventive Maintenance Checks and Services |
| "clc03" | Schematic |

| Allowable values | S1000D interpretation |
|---|---|
| "clc04" - "clc50" | Not available for projects |
| "clc51" - "clc99" | Available for projects |

*Table 7* `color` *- Caption color*

| Allowable values | S1000D interpretation |
|---|---|
| "co00" | None |
| "co01" | Green |
| "co02" | Amber |
| "co03" | Yellow |
| "co04" | Red |
| "co05" | Not available for projects |
| "co06" | Not available for projects |
| "co07" | White |
| "co08" | Grey |
| "co09" (Default value) | Clear |
| "co10" - "co50" | Not available for projects |
| "co51" - "co99" | Available for projects |

*Table 8* `commentPriorityCode` *- Priority level of a comment*

| Allowable values | S1000D interpretation |
|---|---|
| "cp01" | Routine |
| "cp02" | Emergency |
| "cp03" | Safety critical |
| "cp04" - "cp50" | Not available for projects |
| "cp51" - "cp99" | Available for projects |

*Table 9* `commercialClassification` *- Commercial security classification*

| Allowable values | S1000D interpretation |
|---|---|
| "cc01" - "cc50" | Not available for projects |

| Allowable values | S1000D interpretation |
|---|---|
| "cc51" - "cc99" | Available for projects |

*Table 10* `crewMemberType` *- Type of crew member required for drill or procedural step*

| Allowable values | S1000D interpretation |
|---|---|
| "cm01" | All |
| "cm02" | Pilot |
| "cm03" | Co-pilot |
| "cm04" | Navigator |
| "cm05" | Engineer |
| "cm06" | Ground crew |
| "cm07" | Load master |
| "cm08" | Cabin supervisor |
| "cm09" - "cm50" | Not available for projects |
| "cm51" - "cm99" | Available for projects |

*Table 11* `crewStepCondition` *- Crew step condition*

| Allowable values | S1000D interpretation |
|---|---|
| "csc01" | Equipment is installed or available |
| "csc02" | A detailed procedure for the step is located in the performance section of the condensed checklist |
| "csc03" | Performance of the step is mandatory for all through-flights used for combat/tactical operations |
| "csc04" | A step that is mandatory for night flights |
| "csc05" | A task or step required by the operator's manual |
| "csc06" - "csc50" | Not available for projects |
| "csc51" - "csc99" | Available for projects |

*Table 12* `descrForItemCode` *- IPD item description code*

| Allowable values | S1000D interpretation |
|---|---|
| "dic01" | Support Equipment |
| "dic02" | Break Down |

| Allowable values | S1000D interpretation |
|---|---|
| "dic03" | Break Down Reassurance |
| "dic04" | Consumables |
| "dic05" | Category 1 Container |
| "dic06" | Engine Related Accessories |
| "dic07" | Standard Electrical Hardware Items |
| "dic08" | Standard Mechanical Hardware Items |
| "dic09" | Hardware |
| "dic10" | Line Replaceable Item |
| "dic11" | Anesthetics/Medical Chemicals |
| "dic12" | Module |
| "dic13" | Ammunition with Dangerous Substances |
| "dic14" | Modification Leaflet |
| "dic15" | Medical Supplies |
| "dic16" | Modification Set |
| "dic17" | None of the Other Codes Applies |
| "dic18" | Role Equipment |
| "dic19" | Raw Materials |
| "dic20" | Split Design Module |
| "dic21" | Software REMARKS |
| "dic22" | Special Tool |
| "dic23" | Part |
| "dic24" | Basic Issue Item |
| "dic25" | Components of End Item |
| "dic26" | Tool |
| "dic27" | Additional Authorization List Item |
| "dic28" - "dic50" | Not available for projects |
| "dic51" - "dic99" | Available for projects |

*Table 13* `drillType` *- Type of aircrew drill*

| Allowable values | S1000D interpretation |
|---|---|
| "dt00" (Default value) | None |
| "dt01" | Green |
| "dt02" | Amber |
| "dt03" | Yellow |
| "dt04" | Red |
| "dt05" | Orange |
| "dt06" | Blue |
| "dt07" - "dt50" | Not available for projects |
| "dt51" - "dt99" | Available for projects |

*Table 14* `emphasisType` *- Type of emphasis*

| Allowable values | S1000D interpretation |
|---|---|
| "em01" (Default value) | Bold |
| "em02" | Italic (only for legacy data. Refer to Chap 3.9.1) |
| "em03" | Underline (only for legacy data. Refer to Chap 3.9.1) |
| "em04" | Overline (only for marking vectors) |
| "em05" | Strikethrough (not to be used to mark deleted text) |
| "em06" - "em50" | Not available for projects |
| "em51" - "em99" | Available for projects |

*Table 15* `function` *- Maintenance function*

| Allowable values | S1000D interpretation |
|---|---|
| "ft00" | None |
| "ft01" | Inspect |
| "ft02" | Test |
| "ft03" | Service |
| "ft04" | Adjust |
| "ft05" | Align |

| Allowable values | S1000D interpretation |
|---|---|
| "ft06" | Calibrate |
| "ft07" | Remove/Install |
| "ft08" | Replace |
| "ft09" | Repair |
| "ft10" | Overhaul |
| "ft11" | Rebuild |
| "ft12" - "ft50" | Not available for projects |
| "ft51" - "ft99" | Available for projects |

*Table 16* `installationLocationType` - *Type of install location*

| Allowable values | S1000D interpretation |
|---|---|
| "instloctyp01" | Zone |
| "instloctyp02" | Section |
| "instloctyp03" | Station |
| "instloctyp04" | Water line |
| "instloctyp05" | Buttock line |
| "instloctyp06" - "instloctyp50" | Not available for projects |
| "instloctyp51" - "instloctyp99" | Available for projects |

*Table 17* `itemCharacteristic` - *Item characteristic*

| Allowable values | S1000D interpretation |
|---|---|
| "ic01" | Step related to hardness critical process |
| "ic02" | Step related to electrostatic discharge |
| "ic03" | Step with a quality assurance effect |
| "ic04" - "ic50" | Not available for projects |
| "ic51" - "ic99" | Available for projects |

*Table 18* `itemOriginator` *- Origin of equipment/harness/wire*

| Allowable values | S1000D interpretation |
|---|---|
| "orig01" | Manufacturer |
| "orig02" | Vendor |
| "orig03" | Partner |
| "orig04" - "orig50" | Not available for projects |
| "orig51" - "orig99" | Available for projects |

*Table 19* `limitUnitType` *- Limit type*

| Allowable values | S1000D interpretation |
|---|---|
| "lt01" | Time between overhaul |
| "lt02" | Hard time |
| "lt03" | Since last maintenance |
| "lt04" | Out time limit |
| "lt05" | On condition |
| "lt06" | Check maintenance |
| "lt07" | Functional check |
| "lt08" - "lt50" | Not available for projects |
| "lt51" - "lt99" | Available for projects |

*Table 20* `listItemPrefix` *- Prefix for list items of random/unordered lists*

| Allowable values | S1000D interpretation |
|---|---|
| "pf01" | Simple<br>(No prefix, only indent) |
| "pf02"<br>(Default value) | Unorder [-], [•], [-]<br>(Depending on list level, prefix with short dash for first level, bullet for second, and short dash for third level - ISOpub: bull, dash) |
| "pf03" | Dash [-]<br>(short dash - ISOpub: dash) |
| "pf04" | Disc [⊙]<br>(filled circle in circle - ISOamsb: ocir) |
| "pf05" | Circle [○]<br>(outline - ISOpub: cir) |

| Allowable values | S1000D interpretation |
|---|---|
| "pf06" | Square [□]<br>(outline - ISOtech: square) |
| "pf07" | Bullet [•]<br>(outline - ISOpub: bull |
| "pf08" - "pf50" | Not available for projects |
| "pf51" - "pf99" | Available for projects |

**Note**

For a basic (standard) S1000D implementation, use "pf02".

*Table 21* `lowestLevel` - *Lowest authorized level*

| Allowable values | S1000D interpretation |
|---|---|
| "la01"<br>(default value) | None |
| "la02" | Field (Service) level |
| "la03" | Field/ASB maintenance can remove, replace, and use the item. |
| "la04" | Below depot sustainment maintenance can remove, replace, and use the item. |
| "la05" | Specialized repair activity/TASMG can remove, replace, and use the item. |
| "la06" | Afloat and ashore intermediate maintenance can remove, replace, and use the item. |
| "la07" | Contractor facility can remove, replace, and use the item. |
| "la08" | Item is not authorized to be removed, replace, or used at any maintenance level |
| "la09" | Depot can remove, replace, and use the item. |
| "la07" - "la50" | Not available for projects |
| "la51" - "la99" | Available for projects |

*Table 22* `maintLevelCode` - *Maintenance Level Code*

| Allowable values | S1000D interpretation |
|---|---|
| "ml01" | Level 1 |
| "ml02" | Level 2 |
| "ml03" | Level 3 |

| Allowable values | S1000D interpretation |
|---|---|
| "ml04" | Level 4 |
| "ml05" | Level 5 |
| "ml06" - "ml50" | Not available for projects |
| "ml51" - "ml99" | Available for projects |

*Table 23* partCharacteristic - *Part characteristic*

| Allowable values | S1000D interpretation |
|---|---|
| "pc01" | A hardness critical item |
| "pc02" | Flight safety and critical aircraft part |
| "pc03" | Mandatory replacement part |
| "pc04" | Critical safety item |
| "pc05" | Test equipment |
| "pc06" | Part with electrostatic discharge sensitivity |
| "pc07" - "pc50" | Not available for projects |
| "pc51" - "pc99" | Available for projects |

*Table 24* pmEntryType - *Publication module entry type*

| Allowable values | S1000D interpretation |
|---|---|
| "pmt01" - "pmt50" | Not available for projects |
| "pmt51" - "pmt99" | Available for projects |

*Table 25* quantityType - *Quantity data type*

| Allowable values | S1000D interpretation |
|---|---|
| "qty01" | Length |
| "qty02" | Price |
| "qty03" | Temperature |
| "qty04" | Time |
| "qty05" | Torque value |
| "qty06" | Voltage |
| "qty07" | Volume |

| Allowable values | S1000D interpretation |
|---|---|
| "qty08" | Mass |
| "qty09" - "qty50" | Not available for projects |
| "qty51" - "qty99" | Available for projects |

*Table 26* `reqCondCategory` *- Required condition category*

| Allowable values | S1000D interpretation |
|---|---|
| "rcc01" | Normal |
| "rcc02" | Special environmental conditions such as reduced lighting, ventilation, and temperature. |
| "rcc03" - "rcc50" | Not available for projects |
| "rcc51" - "rcc99" | Available for projects |

*Table 27* `reqTechInfoCategory` *- Required technical information category*

| Allowable values | S1000D interpretation |
|---|---|
| "ti01" | Publication module (PM) |
| "ti02" | Data module (DM) |
| "ti03" | Drawing |
| "ti04" | Electrical diagram |
| "ti05" | Schematic diagram |
| "ti06" | Safety sheet |
| "ti07" - "ti50" | Not available for projects |
| "ti51" - "ti99" | Available for projects |

*Table 28* `resetCaption` *- Caption for dialog reset caption*

| Allowable values | S1000D interpretation |
|---|---|
| "re01" | Sets the caption to "RESET" |
| "re02" | Sets the caption to "CLEAR" |
| "re03" - "re50" | Not available for projects |
| "re51" - "re99" | Available for projects |

*Table 29* `responseType` *- Type of response to a comment*

| Allowable values | S1000D interpretation |
|---|---|
| "rt01" | Accepted |
| "rt02" | Pending |
| "rt03" | Partly accepted |
| "rt04" | Rejected |
| "rt05" - "rt50" | Not available for projects |
| "rt51" - "rt99" | Available for projects |

*Table 30* `securityClassification` *- Security classification*

| Allowable values | S1000D interpretation (see note) |
|---|---|
| "01" | 1 (lowest level of security classification, eg Unclassified) |
| "02" | 2 (next higher level of security classification, eg Restricted) |
| "03" | 3 (next higher level of security classification, eg Confidential) |
| "04" | 4 (next higher level of security classification, eg Secret) |
| "05" | 5 (next higher level of security classification, eg Top secret) |
| "06" | 6 (another level of security classification) |
| "07" | 7 (another level of security classification) |
| "08" | 8 (another level of security classification) |
| "09" | 9 (another level of security classification) |
| "10" - "50" | Not available for projects |
| "51" - "99" | Available for projects |

**Note**

Security classification is likely to be developed and applied on a national basis (see Chap 3.6). The S1000D interpretation above is to be regarded as a suggestion that reasonably well synthesizes current practices.

*Table 31* `significantParaDataType` *- Paragraph significant data type*

| Allowable values | S1000D interpretation |
|---|---|
| "psd01" | Ammunition |
| "psd02" | Instruction disposition |
| "psd03" | Lubricant |

| Allowable values | S1000D interpretation |
|---|---|
| "psd04" | Maintenance level |
| "psd05" | Manufacturer code |
| "psd06" | Manufacturers recommendation |
| "psd07" | Modification code |
| "psd08" | Qualification code |
| "psd09" | Training level |
| "psd10" | Control or Indicator value |
| "psd11" - "psd50" | Not available for projects |
| "psd51" - "psd99" | Available for projects |

*Table 32 skillLevelCode - Personnel skill level*

| Allowable values | S1000D interpretation |
|---|---|
| "sk01" | Basic |
| "sk02" | Intermediate |
| "sk03" | Advanced |
| "sk04" - "sk50" | Not available for projects |
| "sk51" - "sk99" | Available for projects |

*Table 33 skillType - Personnel skill category*

| Allowable values | S1000D interpretation (including civil aviation abbreviation) |
|---|---|
| "st01" | Airframe (AIRPL) |
| "st02" | Electrical (ELEC) |
| "st03" | Avionic (AVION) |
| "st04" | Engine (ENGIN) |
| "st05" - "st50" | Not available for projects |
| "st51" - "st99" | Available for projects |

*Table 34* `sourceCriticality` *- Source criticality*

| Allowable values | S1000D interpretation |
|---|---|
| "sc01" - "sc50" | Not available for projects |
| "sc51" - "sc99" | Available for projects |

*Table 35* `sourceTypeCode` *- Source type code*

| Allowable values | S1000D interpretation |
|---|---|
| "stc01" - "stc50" | Not available for projects |
| "stc51" - "stc99" | Available for projects |

*Table 36* `submitCaption` *- Caption for dialog submit function*

| Allowable values | S1000D interpretation |
|---|---|
| "ok01" | Sets the caption to "OK" |
| "ok02" | Sets the caption to "SUBMIT" |
| "ok03" | Not available for projects |
| "ok04" | Sets the caption to "CONTINUE" |
| "ok05" | Sets the caption to "EXIT" |
| "ok06" - "ok50" | Not available for projects |
| "ok51" - "ok99" | Available for projects |

*Table 37* `supervisorLevelCode` *- Supervisor level*

| Allowable values | S1000D interpretation |
|---|---|
| "sl01" | Low |
| "sl02" | Low intermediate |
| "sl03" | High intermediate |
| "sl04" | High |
| "sl05" - "sl50" | Not available for projects |
| "sl51" - "sl99" | Available for projects |

*Table 38* `taskCode` *- Task code*

| Allowable values | S1000D interpretation (including Civil Aviation abbreviation) |
|---|---|
| "taskcd01" | Detailed inspection (DET) |
| "taskcd02" | Discard (DIS) |
| "taskcd03" | Functional Check (FNC) |
| "taskcd04" | General visual inspection (GVI) |
| "taskcd05" | Lubrication (LUB) |
| "taskcd06" | Operational check (OPC) |
| "taskcd07" | Restoration (RST) |
| "taskcd08" | Servicing (SVC) |
| "taskcd09" | Visual check (VCK) |
| "taskcd10" - "taskcd50" | Not available for projects |
| "taskcd51" - "taskcd99" | Available for projects |

*Table 39* `thresholdUnitOfMeasure` *- Unit of measurement for the threshold interval*

| Allowable values | S1000D interpretation |
|---|---|
| "th01" | Flight hours |
| "th02" | Flight cycles |
| "th03" | Months |
| "th04" | Weeks |
| "th05" | Years |
| "th06" | Days |
| "th07" | Supersonic cycles |
| "th08" | Pressure cycles |
| "th09" | Engine cycles |
| "th10" | Engine change |
| "th11" | Shop visits |
| "th12" | Auxiliary power unit change |
| "th13" | Landing gear change |

| Allowable values | S1000D interpretation |
|---|---|
| "th14" | Wheel change |
| "th15" | Engine start |
| "th16" | APU hours |
| "th17" | Engine hours |
| "th18" | Elapsed hours |
| "th19" | Landings |
| "th20" | Operating cycles |
| "th21" | Operating hours |
| "th22" | Supersonic hours |
| "th23" | "A" check |
| "th24" | "B" check |
| "th25" | "C" check |
| "th26" | "D" check |
| "th27" | Daily |
| "th28" | "E" check |
| "th29" | Overnight |
| "th30" | Preflight |
| "th31" | Routine check |
| "th32" | Structural "C" check |
| "th33 | Service check |
| "th34" | Transit |
| "th35" - "th50" | Not available for projects |
| "th51" - "th99" | Available for projects |

*Table 40* `updateReasonType` *- Update reason type for reason for update*

| Allowable values | S1000D interpretation |
|---|---|
| "urt01" | Editorial change<br>(authored/technical content changed, but technically changes are deemed insignificant) |

| Allowable values | S1000D interpretation |
|---|---|
| "urt02" | Technical change<br>(authored/technical content has changed, changes are significant and should be reviewed) |
| "urt03" | Markup change<br>(changes are solely related to XML markup) |
| "urt04" | Applicability change<br>(only the applicability has changed) |
| "urt05" | Unique identifier of the referencing structure has changed |
| "urt06" - "urt50" | Not available for projects |
| "urt51" - "urt99" | Available for projects |

*Table 41* `verbatimStyle` *- Verbatim style*

| Allowable values | S1000D interpretation |
|---|---|
| "vs01" | Generic verbatim |
| "vs02" | Filename |
| "vs03" - "vs10" | Not available for projects |
| "vs11" | XML/SGML markup |
| "vs12" | XML/SGML element name |
| "vs13" | XML/SGML attribute name |
| "vs14" | XML/SGML attribute value |
| "vs15" | XML/SGML entity name |
| "vs16" | XML/SGML processing instruction |
| "vs17" - "vs20" | Not available for projects |
| "vs21" | Program prompt |
| "vs22" | User input |
| "vs23" | Computer output |
| "vs24" | Program listing |
| "vs25" | Program variable name |
| "vs26" | Program variable value |
| "vs27" | Constant |
| "vs28" | Class name |

| Allowable values | S1000D interpretation |
|---|---|
| "vs29" | Parameter name |
| "vs30" - "vs50" | Not available for projects |
| "vs51" - "vs99" | Available for projects |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Application of predefined attribute values**. The project or the organization must decide to what extent the various predefined sets of attribute values will be utilized. Refer to Chap 3.9.6.2.

**Application of project specific values**. The project or the organization must decide if any project specific definitions of attribute values needed. If needed, the project definitions must be established and made known to anyone who will need the definitions to be able to interpret the produced information properly. Refer to Para 2.

# Chapter 3.9.6.2

## *Attributes - Fixed values*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 7.3.1.5 | Data module Schema - Configuration of attributes |
| ISBN 92-67-10185-4 | ISO Standards Handbook: Quantities and units. 3rd ed., International organization for Standardization, Geneva, 1993, 345 p. |

## 1 General

This chapter describes how to code project configurable attributes that have as their basis a set of fixed values.

The description regards attributes that are supposed to apply specified sets of predefined allowable values. Other attributes, eg attributes containing not pre-defined character strings, are not concerned herein.

## 2 Attributes available for tailoring

The tables below specifies the set of fixed value, and the values available for project tailoring, that applies to the attribute concerned.

For advice on how to technically configure attribute value sets to the project specific needs, refer to Chap 7.3.1.5.

It must be recognized that all tailoring of attribute values must be agreed within a project and documented in the project business rules. Furthermore, agreed application of an interpretation of attribute values must be exchanged and agreed between all parties concerned.

The quantity unit of measurement attribute available for tailoring is:

**Attributes:**

– quantityUnitOfMeasure.

*Table 2* `quantityUnitOfMeasure` *- Quantity data unit of measure*

| Allowable values | S1000D interpretation |
|---|---|
| "%" | percent |
| "(dyne/cm)4/gcm3" | dynes/centimeter fourth/gram cm cubed |
| "(N/m)4/kg.m3" | Newton/meter fourth/kilogram meter cubed |
| "1/a" | per annum |
| "1/angstrom" | per angstrom |
| "1/bar" | per bar |
| "1/bbl" | per barrel |
| "1/cm" | per centimeter |
| "1/d" | per day |
| "1/degC" | per degree Celsius |
| "1/degF" | per degree Fahrenheit |
| "1/degR" | per degree Rankine |
| "1/ft" | per foot |
| "1/ft2" | per square foot |
| "1/ft3" | per cubic foot |
| "1/g" | per gram |
| "1/galUK" | per UK gallon |
| "1/galUS" | per US gallon |
| "1/H" | inverse henry |
| "1/h" | per hour |
| "1/in" | per inch |
| "1/K" | per Kelvin |
| "1/kg" | per kilogram |
| "1/km2" | per square kilometer |
| "1/kPa" | per kilopascal |
| "1/L" | per liter |
| "1/lbf" | per pound force |
| "1/lbm" | per pound |

| Allowable values | S1000D interpretation |
|---|---|
| "1/m" | per meter |
| "1/m2" | per square meter |
| "1/m3" | per cubic meter |
| "1/mi" | per mile |
| "1/mi2" | per square mile |
| "1/min" | per minute |
| "1/mm" | per millimeter |
| "1/N" | per Newton |
| "1/nm" | per nanometer |
| "1/Pa" | per Pascal |
| "1/pPa" | per pico pascal |
| "1/psi" | per pounds/square inch |
| "1/s" | per second |
| "1/upsi" | per micro pounds per square inch |
| "1/uV" | per microvolt |
| "1/V" | per Volt |
| "1/wk" | per week |
| "1/yd" | per yard |
| "1000ft3" | thousand cubic feet |
| "1000ft3/bbl" | thousand cubic feet per barrel |
| "1000ft3/d" | thousand cubic feet per day |
| "1000ft3/d.ft" | thousand cubic feet per day per foot |
| "1000ft3/psi.d" | thousand cubic feet per day per psi |
| "1000m3/d" | thousand cubic meters per day |
| "1000m3/d.m" | thousand cubic meter per day per meter |
| "1000m3/h" | thousand cubic meters per hour |
| "1000m3/h.m" | thousand cubic meters per hour per meter |
| "1000m4/d" | thousand (cubic meter per day)-meter |
| "100ka" | 100000 years |

| Allowable values | S1000D interpretation |
|---|---|
| "10Mg/m3" | ten thousand kilograms per cubic meter |
| "A" | ampere |
| "a" | annum |
| "A.h" | Ampere hour |
| "A.m2" | amperes meters squared |
| "A/cm2" | ampere per square centimeter |
| "A/ft2" | ampere per square foot |
| "A/m" | amperes/meter |
| "A/m2" | amperes/square meter |
| "A/mm" | Ampere/millimeter |
| "A/mm2" | Ampere/square millimeter |
| "acre" | acre |
| "acre.ft" | acre foot |
| "acre.ft/MMstb" | acre feet/million stbs, 60 deg F |
| "ag" | attogram |
| "aJ" | attojoule |
| "angstrom" | Angstrom |
| "at" | Technical atmosphere |
| "atm" | Atmosphere |
| "atm/ft" | Atmospheres per ft |
| "atm/h" | atmosphere per hour |
| "atm/hm" | Atmospheres per hundred meter |
| "atm/m" | Atmospheres/meter |
| "B" | bel |
| "b" | barn |
| "b/cm3" | barns/cubic centimeter |
| "b/elec" | barns/electron |
| "B/m" | bels/meter |
| "B/O" | bels/octave |

| Allowable values | S1000D interpretation |
|---|---|
| "bar" | bar |
| "bar/h" | bar per hour |
| "bar/km" | bar per kilometer |
| "bar/m" | bar per meter |
| "bar2" | bar squared |
| "bar2/cP" | bar squared per centipoise |
| "bbl" | barrel |
| "bbl/100bbl" | barrel per hundred barrel |
| "bbl/acre" | barrels/acre |
| "bbl/acre.ft" | barrel/acre foot |
| "bbl/bbl" | barrel/barrel |
| "bbl/cP.d.psi" | barrels/centiPoise day psi |
| "bbl/d" | barrel/day |
| "bbl/d.acre.ft" | barrels/day acre foot |
| "bbl/d.ft" | barrels/day foot |
| "bbl/d.ft.psi" | barrels/day foot pounds/sq in |
| "bbl/d.psi" | barrel/day pounds/square inch |
| "bbl/d2" | barrels/day per day |
| "bbl/ft" | barrel/foot |
| "bbl/ft3" | barrel per cubic foot |
| "bbl/hr" | barrel/hour |
| "bbl/hr2" | barrels/hour/hour |
| "bbl/in" | barrel/inch |
| "bbl/k(ft3)" | barrel per thousand cubic feet |
| "bbl/kPa.d" | barrel per day per kilopascal |
| "bbl/M(ft3)" | barrel per million cubic feet |
| "bbl/mi" | barrel/mile |
| "bbl/min" | barrel per minute |
| "bbl/MMscf(60F)" | barrels/million std cubic feet, 60 degF |

| Allowable values | S1000D interpretation |
|---|---|
| "bbl/psi.d" | barrel per day per psi |
| "bbl/stb(60F)" | barrels/stock tank barrel, 60 deg F |
| "bbl/tonUK" | barrel per U.K. ton |
| "bbl/tonUS" | barrel per U.S. ton |
| "bcf" | billion cubic feet |
| "Bd" | baud |
| "bit" | bit |
| "Bq" | becquerel |
| "Bq/kg" | becquerel per kilogram |
| "Btu" | British thermal unit |
| "Btu(million)/hr" | million Btus/hour |
| "Btu.in/hr.ft2.F" | Btus/hour foot squared deg F per inch |
| "Btu/bbl" | British thermal units/barrel |
| "Btu/bhp.hr" | Btus/brake-horsepower hour |
| "Btu/ft3" | British thermal units/cubic foot |
| "Btu/galUK" | British thermal units/U.K. gallon |
| "Btu/galUS" | British thermal units/U.S. gallon |
| "Btu/hr" | British thermal unit/hour |
| "Btu/hr.ft.degF" | British thermal units/hour foot deg F |
| "Btu/hr.ft2" | Btus/hour per square foot |
| "Btu/hr.ft2.degF" | Btus/hour foot squared deg F |
| "Btu/hr.ft2.degR" | Btus/hour foot squared deg R |
| "Btu/hr.ft3" | British thermal units/hour cubic foot |
| "Btu/hr.ft3.degF" | Btus/hour foot cubed deg F |
| "Btu/hr.m2.degC" | Btus/hour meter squared deg C |
| "Btu/lbm" | British thermal units/pound mass |
| "Btu/lbm.degF" | British thermal units/pound mass deg F |
| "Btu/lbm.degR" | British thermal units/pound mass deg R |
| "Btu/min" | British thermal units/minute |

| Allowable values | S1000D interpretation |
|---|---|
| "Btu/mol(lbm)" | British thermal units/pound mass mol |
| "Btu/mol(lbm).F" | Btus/pound mass mol deg F |
| "Btu/s" | British thermal units/second |
| "Btu/s.ft2" | British thermal units/second square foot |
| "Btu/s.ft2.degF" | Btus/second per square foot deg F |
| "Btu/s.ft3" | Btus/second per cubic foot |
| "Btu/s.ft3.degF" | Btus/second per cubic foot deg F |
| "byte" | byte |
| "C" | coulomb |
| "c" | cycle |
| "C.m" | coulomb meters |
| "C/cm2" | Coulombs/square centimeter |
| "C/cm3" | Coulombs/cubic centimeter |
| "C/g" | coulomb per gram |
| "C/kg" | coulomb per kilogram |
| "C/m2" | coulombs/square meter |
| "C/m3" | coulombs/cubic meter |
| "C/mm2" | Coulombs/square millimeter |
| "C/mm3" | Coulombs/cubic millimeter |
| "c/s" | cycles/second |
| "cal" | calorie |
| "cal/cm3" | calories/cubic centimeter |
| "cal/g" | calories/gram |
| "cal/g.K" | calories/gram degree Kelvin |
| "cal/h.cm.degC" | calories/hour centimeter degree Celsius |
| "cal/h.cm2" | calories/hour centimeter squared |
| "cal/h.cm2.degC" | calories/hour square centimeter deg C |
| "cal/h.cm3" | calories/hour cubic centimeter |
| "cal/kg" | calories/kilogram |

| Allowable values | S1000D interpretation |
|---|---|
| "cal/lbm" | calories/pound mass |
| "cal/mL" | calories/milliliter |
| "cal/mm3" | calories/cubic millimeter |
| "cal/mol(g).degC" | calories/gram mol degree celsius |
| "cal/s.cm.degC" | calories/second centimeter deg C |
| "cal/s.cm2.degC" | calories/second square centimeter deg C |
| "cal/s.cm3" | calories/second cubic centimeter |
| "ccgr" | centesimal second |
| "cd" | candela |
| "cd/m2" | candelas/square meter |
| "cEuc" | centiEuclid |
| "cgr" | centesimal minute |
| "ch" | ch |
| "ch.h" | ch hours |
| "chBnA" | Benoit chain (1895 A) |
| "chBnB" | Benoit chain (1895 B) |
| "chCla" | Clarke chain |
| "chSe" | Sears chain |
| "Chu" | chus |
| "chUS" | US Survey chain |
| "Ci" | curie |
| "cL" | centiliter |
| "cm" | centimeter |
| "cm/a" | centimeter per year |
| "cm/s" | centimeter/second |
| "cm/s2" | centimeter/second squared |
| "cm2" | square centimeter |
| "cm2/g" | centimeters squared/gram |
| "cm2/s" | centimeters squared/second |

| Allowable values | S1000D interpretation |
|---|---|
| "cm3" | cubic centimeter |
| "cm3/30min" | cubic centimeter per thirty minutes |
| "cm3/cm3" | cubic centimeters/ cubic centimeters |
| "cm3/g" | cubic centimeters/gram |
| "cm3/h" | cubic centimeter per hour |
| "cm3/m3" | cubic centimeter/cubic meter |
| "cm3/min" | cubic centimeter per minute |
| "cm3/s" | cubic centimeter per second |
| "cm4" | centimeters fourth |
| "cmH2O(4degC)" | cm of water at 4 degC. |
| "cP" | centipoise |
| "cs" | ten milli second |
| "cSt" | centiStoke |
| "ct" | carat |
| "cu" | capture unit |
| "cu ft" | cubic feet |
| "cu in" | cubic inch |
| "cu yd" | cubic yard |
| "cubem" | cubic mile |
| "curie" | curie |
| "CV" | cheval vapeur |
| "CV.h" | CV hours |
| "cwtUK" | UK hundredweight |
| "cwtUS" | US hundredweight |
| "D" | darcy |
| "d" | day |
| "D.ft" | darcy foot |
| "D.m" | darcy meter |
| "d/bbl" | day per barrel |

| Allowable values | S1000D interpretation |
|---|---|
| "d/ft3" | days/cubic foot |
| "d/k(ft3)" | day per thousand cubic feet |
| "d/m3" | days/cubic meter |
| "daN" | decanewtons |
| "daN.m" | decanewton meters |
| "dAPI" | API gravity |
| "dB" | decibel |
| "dB/100m" | decibels/100meter |
| "dB/ft" | decibels/foot |
| "dB/km" | decibels/kilometer |
| "dB/m" | decibels/meter |
| "dB/O" | decibels/octave |
| "ddegC" | change in degrees Celsius |
| "ddegF" | change in degrees Fahrenheit |
| "ddegK" | change in degrees Kelvin |
| "ddegR" | change in degrees Rankine |
| "dega" | degree of an angle |
| "dega/100ft" | degrees of an angle/100 feet |
| "dega/30ft" | degrees of an angle per thirty feet |
| "dega/30m" | degrees of an angle/30 meters |
| "dega/ft" | degrees of an angle/foot |
| "dega/ft(100)" | degrees of an angle/100 feet |
| "dega/h" | degrees of an angle per hour |
| "dega/m" | degrees of an angle/meter |
| "dega/m(30)" | degrees of an angle/30 meters |
| "dega/min" | degrees of an angle/minute |
| "dega/s" | degrees of an angle per second |
| "degC" | degrees Celsius |
| "degC.m2.h/kcal" | degrees C square meters hours/kilocal |

| Allowable values | S1000D interpretation |
|---|---|
| "degC/100m" | degrees Celsius per hundred meter |
| "degC/ft" | degrees Celsius per foot |
| "degC/h" | degrees Celsius per hour |
| "degC/km" | degrees Celsius/kilometer |
| "degC/m" | degrees Celsius/meter |
| "degC/min" | degrees Celsius per minute |
| "degC/s" | degrees Celsius per second |
| "degF" | degree Fahrenheit |
| "degF.ft2.h/Btu" | degrees F square feet hours/Btu |
| "degF/100ft" | degrees Fahrenheit/100 feet. |
| "degF/ft" | degrees Fahrenheit/foot |
| "degF/ft(100)" | degrees Fahrenheit/100 feet. |
| "degF/h" | degrees Fahrenheit per hour |
| "degF/m" | degrees Fahrenheit per meter |
| "degF/min" | degrees Fahrenheit per minute |
| "degF/s" | degrees Fahrenheit per second |
| "degR" | degrees Rankine |
| "dL" | deciliter |
| "dm" | decimeter |
| "dm/s" | decimeter per second |
| "dm3" | cubic decimeter |
| "dm3/100km" | cubic decimeters/100 kilometers |
| "dm3/kg" | cubic decimeters/kilogram |
| "dm3/km(100)" | cubic decimeters/100 kilometers |
| "dm3/kW.h" | cubic decimeters/kilowatt hour |
| "dm3/m" | cubic decimeters/meter |
| "dm3/m3" | cubic decimeters/cubic meter |
| "dm3/MJ" | cubic decimeters/megajoule |
| "dm3/mol(kg)" | cubic decimeters/kilogram mole |

| Allowable values | S1000D interpretation |
|---|---|
| "dm3/s" | cubic decimeters/second |
| "dm3/s2" | cubic decimeters/second/second |
| "dm3/t" | cubic decimeters/ton |
| "dN.m" | decinewton meters |
| "dyne" | dynes |
| "dyne.cm2" | dyne centimeter squared |
| "dyne.s/cm2" | dyne seconds/square centimeter |
| "dyne/cm" | dynes/centimeter |
| "dyne/cm2" | dynes/square centimeter |
| "ehp" | electric horsepower |
| "EJ" | exajoule |
| "EJ/a" | exajoules/year |
| "eq" | equivalent |
| "eq/kg" | equivalent per kilogram |
| "eq/L" | equivalents/ Liter |
| "eq/m3" | equivalents per cubic meter |
| "erg" | ergs |
| "erg/a" | ergs/year |
| "erg/cm2" | ergs/square centimeter |
| "erg/cm3" | ergs/cubic centimeter |
| "erg/g" | ergs/gram |
| "erg/kg" | ergs/kilogram |
| "erg/m3" | ergs/cubic meter |
| "Euc" | euclid |
| "eV" | electron volts |
| "F" | farad |
| "F/m" | farads/meter |
| "fathom" | fathoms |
| "fC" | femtocoulomb |

| Allowable values | S1000D interpretation |
|---|---|
| "fl ozUK" | UK fluid ounce |
| "fl ozUS" | US fluid ounces |
| "flops" | flops |
| "flozUK" | UK fluid ounce |
| "flozUS" | US fluid ounces |
| "fm" | femtometer |
| "footcandle" | footcandles |
| "footcandle.s" | footcandle seconds |
| "ft" | foot |
| "ft.lbf" | foot pounds force |
| "ft.lbf/bbl" | foot pounds force/barrel |
| "ft.lbf/galUS" | foot pounds force/US gallon |
| "ft.lbf/lbm" | foot pounds force/pound mass |
| "ft.lbf/min" | foot pounds force/minute |
| "ft.lbf/s" | foot pounds force/second |
| "ft.lbm" | foot-pound mass |
| "ft/100ft" | feet per 100 feet |
| "ft/bbl" | feet/barrel |
| "ft/d" | feet/day |
| "ft/degF" | feet/degree Fahrenheit |
| "ft/ft" | feet per feet |
| "ft/ft3" | feet/cubic foot |
| "ft/galUS" | feet/US gallon |
| "ft/h" | feet/hour |
| "ft/in" | feet/inch |
| "ft/m" | feet/meter |
| "ft/mi" | feet/mile |
| "ft/min" | feet/minute |
| "ft/ms" | foot per millisecond |

| Allowable values | S1000D interpretation |
|---|---|
| "ft/s" | feet/second |
| "ft/s2" | feet/second squared |
| "ft/us" | foot per microsecond |
| "ft2" | square foot |
| "ft2/h" | square feet/hour |
| "ft2/in3" | square feet/cubic inch |
| "ft2/s" | square feet/second |
| "ft3" | cubic feet |
| "ft3(std,60F)" | cubic feet at standard conditions |
| "ft3/bbl" | cubic feet/barrel |
| "ft3/d" | cubic feet/day |
| "ft3/d.ft.psi" | cubic feet/day foot psi |
| "ft3/d2" | cubic feet/day/day |
| "ft3/ft" | cubic feet/foot |
| "ft3/ft3" | cubic feet/cubic foot |
| "ft3/h" | cubic feet/hour |
| "ft3/h2" | cubic feet/hour/hour |
| "ft3/kg" | cubic feet per kilogram |
| "ft3/lbm" | cubic feet/pound mass |
| "ft3/min" | cubic feet/minute |
| "ft3/min.ft2" | cubic feet/min square foot |
| "ft3/min2" | cubic feet/minute/minute |
| "ft3/mol(lbm)" | cubic feet/mole (pound mass) |
| "ft3/s" | cubic feet/second |
| "ft3/s.ft2" | cubic feet/second square foot |
| "ft3/s2" | cubic feet/second/second |
| "ft3/sack94" | cubic feet per 94 pound sack |
| "ft3/scf(60F)" | cubic feet/std cubic foot, 60 deg F |
| "ftBnA" | British Foot (Benoit 1895 A) |

| Allowable values | S1000D interpretation |
|---|---|
| "ftBnB" | British Foot (Benoit 1895 B) |
| "ftBr(65)" | British Foot 1865 |
| "ftCla" | Imperial Foot |
| "ftGC" | Gold Coast Foot |
| "ftInd" | Indian Foot |
| "ftInd(37)" | Indian Foot, 1937 |
| "ftInd(62)" | Indian Foot, 1962 |
| "ftInd(75)" | Indian Foot, 1975 |
| "ftMA" | Modified American Foot |
| "ftSe" | Sears Foot |
| "ftUS" | US Survey Foot |
| "g" | gram |
| "g.ft/cm3.s" | gram feet/cubic centimeter second |
| "g/cm3" | grams/cubic centimeter |
| "g/cm4" | grams/centimeter fourth |
| "g/dm3" | grams/cubic decimeter |
| "g/galUK" | grams/UK gallon |
| "g/galUS" | grams/US gallon |
| "g/kg" | grams/kilogram |
| "g/L" | grams/liter |
| "g/m3" | grams/cubic meter |
| "g/s" | grams/second |
| "Ga" | gigayears |
| "Gal" | galileo |
| "gal/sack" | US gallons/94 lb sack |
| "galUK" | UK gallon |
| "galUK/d" | UK gallons per day |
| "galUK/ft3" | UK gallons/cubic foot |
| "galUK/hr" | UK gallons/hour |

| Allowable values | S1000D interpretation |
|---|---|
| "galUK/hr.ft" | UK gallons/hour foot |
| "galUK/hr.ft2" | UK gallons/hour square foot |
| "galUK/hr.in" | UK gallons/hour inch |
| "galUK/hr.in2" | UK gallons/hour square inch |
| "galUK/hr2" | UK gallons/hour/hour |
| "galUK/kgalUK" | UK gallons per thousand UK gallons |
| "galUK/lbm" | UK gallons/pound mass |
| "galUK/Mbbl" | UK gallons/1000 barrels |
| "galUK/mi" | UK gallons/mile |
| "galUK/min" | UK gallons/minute |
| "galUK/min.ft" | UK gallons/minute foot |
| "galUK/min.ft2" | UK gallons/minute square foot |
| "galUK/min2" | UK gallons/minute/minute |
| "galUS" | US gallons |
| "galUS/10bbl" | US gallons per ten barrels |
| "galUS/bbl" | US gallons/barrels |
| "galUS/d" | US gallons per day |
| "galUS/ft" | US gallons/foot |
| "galUS/ft3" | US gallons/cubic foot |
| "galUS/hr" | US gallons/hour |
| "galUS/hr.ft" | US gallons/foot hour |
| "galUS/hr.ft2" | US gallons/hour square foot |
| "galUS/hr.in" | US gallons/hour inch |
| "galUS/hr.in2" | US gallons/hour square inch |
| "galUS/hr2" | US gallons/hour/hour |
| "galUS/kgalUS" | US gallons per thousand US gallons |
| "galUS/lbm" | US gallons/pound mass |
| "galUS/Mbbl" | US gallons/1000 barrels |
| "galUS/mi" | US gallons/mile |

| Allowable values | S1000D interpretation |
|---|---|
| "galUS/min" | US gallons/minute |
| "galUS/min.ft" | US gallons/minute foot |
| "galUS/min.ft2" | US gallons/minute square foot |
| "galUS/min2" | US gallons/minute/minute |
| "galUS/Mscf(60F)" | US gals/1000 std cubic feet, 60 deg F |
| "galUS/sack94" | US gallons/94 lb sack |
| "galUS/tonUK" | US gallons/UK ton |
| "galUS/tonUS" | US gallons/US ton |
| "gamma" | gamma |
| "gAPI" | API gamma ray units |
| "gauss" | gauss |
| "GBq" | gigabecquerel |
| "GeV" | billions of electron volts |
| "gf" | gram force |
| "GHz" | gigahertz |
| "GJ" | gigajoule |
| "gn" | gravity |
| "Gohm" | gigaohm |
| "gon" | gons |
| "GPa" | gigapascal |
| "GPa/cm" | gigapascal per centimeter |
| "GPa2" | gigapascal squared |
| "gr" | grad |
| "Grad" | gigaradian |
| "grain" | grain |
| "grain/100ft3" | grains/100 cubic feet |
| "grain/ft3" | grains/cubic foot |
| "grain/ft3(100)" | grains/100 cubic feet |
| "grain/galUS" | grains/US gallon |

| Allowable values | S1000D interpretation |
|---|---|
| "GS" | gigasiemens |
| "Gsm3" | giga standard cubic meters 15C |
| "gu" | gas unit |
| "GW" | gigawatt |
| "GW.h" | gigawatt hour |
| "Gy" | gray |
| "H" | henry |
| "h" | hour |
| "h/ft3" | hours/cubic foot |
| "h/kft" | hour per thousand foot |
| "h/km" | hour per kilometer |
| "H/m" | henries/meter |
| "h/m3" | hour per cubic meter |
| "ha" | hectare |
| "ha.m" | hectare meters |
| "hbar" | hectobar |
| "hhp" | hydraulic horsepower |
| "hhp/in2" | (hydraulic) horsepower per square inch |
| "hL" | hectoliter |
| "hp" | horsepower |
| "hPa" | hectopascals |
| "hp.hr" | horsepower hour |
| "hp.hr/bbl" | horsepower hours/barrel |
| "hp.hr/lbm" | horsepower hours/pound mass |
| "hp/ft3" | horsepower/cubic foot |
| "hp/in2" | horsepower per square inch |
| "hs" | hundred seconds |
| "Hz" | hertz |
| "in" | inch |

| Allowable values | S1000D interpretation |
|---|---|
| "in/10" | tenth of an inch |
| "in/16" | 16th of an inch |
| "in/32" | 32nd of an inch |
| "in/64" | 64th of an inch |
| "in/a" | inches/year |
| "in/in.degF" | inches/inch degree Fahrenheit |
| "in/min" | inches/minute |
| "in/s" | inches/second |
| "in2" | square inches |
| "in2/ft2" | square inches/square foot |
| "in2/in2" | square inches/square inch |
| "in2/s" | square inches/second |
| "in3" | cubic inches |
| "in3/ft" | cubic inches/foot |
| "in4" | inches to the fourth |
| "inH2O(39.2F)" | inches of water at 39.2 deg F |
| "inH2O(60F)" | inches of water at 60 deg F |
| "inHg(32F)" | inches of mercury at 32 deg F |
| "inHg(60F)" | inches of mercury at 60 deg F |
| "inUS" | US Survey inch |
| "J" | joule |
| "J/cm2" | joules/square centimeter |
| "J/dm3" | joules/cubic decimeter |
| "J/g" | joules/gram |
| "J/g.K" | joules/gram degree Kelvin |
| "J/K" | joules per delta kelvin |
| "J/kg" | joules/kilogram |
| "J/kg.K" | joules/kilogram degree kelvin |
| "J/m" | joules/meter |

| Allowable values | S1000D interpretation |
|---|---|
| "J/m2" | joules/square meter |
| "J/m3" | joules/cubic meter |
| "J/mol" | joules/mole |
| "J/mol.K" | joules/mole degree kelvin |
| "J/s.m2.degC" | joules/second square meter deg C |
| "K" | kelvin |
| "K.m2/kW" | degrees Kelvin square meters/kilowatt |
| "K.m2/W" | kelvin meters squared/watt |
| "K/m" | degrees kelvin/meter |
| "K/s" | kelvin per second |
| "K/W" | delta kelvin per watt |
| "kA" | kiloampere |
| "kbbl/d" | thousand barrels per day |
| "kbyte" | kilobyte |
| "kC" | kilocoulombs |
| "kcal" | kilocalories |
| "kcal.m/cm2" | kilocalorie meters/square centimeter |
| "kcal/cm3" | kilocalories/cubic centimeter |
| "kcal/g" | kilocalories/gram |
| "kcal/h" | kilocalories/hour |
| "kcal/h.m.degC" | kilocalories/hour meter degree Celsius |
| "kcal/h.m2.degC" | kilocalorie/hour square meter deg C |
| "kcal/kg" | kilocalories/kilogram |
| "kcal/kg.degC" | kilocalories/kilogram degree Celsius |
| "kcal/m3" | kilocalroies/cubic meter |
| "kcal/mol(g)" | kilocalories/mole (gram) |
| "kcd" | kilocandela |
| "kdyne" | kilkodynes |
| "kEuc/s" | thousand per second |

| Allowable values | S1000D interpretation |
|---|---|
| "keV" | kiloelectron volts |
| "kft.lbf" | thousand foot pounds force |
| "kft/h" | thousand feet per hour |
| "kft/s" | thousand feet per second |
| "kg" | kilogram |
| "kg.m" | meter-kilogram |
| "kg.m/cm2" | kilogram meters/square centimeter |
| "kg.m/s" | kilogram meters/second |
| "kg.m2" | kilogram meters squared |
| "kg/d" | kilogram per day |
| "kg/dm3" | kilograms/cubic decimeter |
| "kg/dm4" | kilograms/decimeter fourth |
| "kg/h" | kilograms/hour |
| "kg/J" | kilograms/joule |
| "kg/kg" | kilograms/kilogram |
| "kg/kW.h" | kilograms/kilowatt hour |
| "kg/L" | kilogram per liter |
| "kg/m" | kilograms/meter |
| "kg/m.s" | kilograms/meter second |
| "kg/m2" | kilograms/square meter |
| "kg/m2.s" | kilograms/square meter seconds |
| "kg/m3" | kilograms/cubic meter |
| "kg/m4" | kilogram/meter fourth |
| "kg/min" | kilogram per min |
| "kg/MJ" | kilograms/megajoule |
| "kg/s" | kilograms/second |
| "kg/sack94" | kilogram per 94 pound sack |
| "kgf" | kilogram force |
| "kgf.m" | kilogram force meters |

| Allowable values | S1000D interpretation |
|---|---|
| "kgf.m/cm2" | kilogram force meters/square centimeter |
| "kgf.m/m" | kilograms force meters/meter |
| "kgf.m2" | kilogram force meters squared |
| "kgf.s/m2" | kilograms force seconds/square meter |
| "kgf/cm" | kilograms force/centimeter |
| "kgf/cm2" | kilogram per square centimeter |
| "kgf/kgf" | kilogram force per kilogram force |
| "kgf/mm2" | kilogram force/square millimeter |
| "kHz" | kilohertz |
| "kJ" | kilojoules |
| "kJ.m/h.m2.K" | kilojoule meters/hour sq meter deg K |
| "kJ/dm3" | kilojoules/cubic decimeter |
| "kJ/h.m2.K" | kilojoules/hour square meter deg K |
| "kJ/kg" | kilojoule/kilogram |
| "kJ/kg.K" | kilojoules/kilogram degree Kelvin |
| "kJ/m3" | kilojoule/cubic meter |
| "kJ/mol(kg)" | kilojoule/mole (kilogram) |
| "kJ/mol(kg).K" | kilojoules/mole (kilogram) deg K |
| "klbf" | thousand pounds force |
| "klbm" | thousand pounds mass |
| "klbm/in" | thousand pounds mass per inch |
| "klx" | kilolux |
| "km" | kilometer |
| "km/cm" | kilometer/ centimeter |
| "km/dm3" | kilometers/cubic decimeter |
| "km/h" | kilometers/hour |
| "km/L" | kilometers/liter |
| "km/s" | kilometer per second |
| "km2" | square kilometers |

| Allowable values | S1000D interpretation |
|---|---|
| "km3" | cubic kilometers |
| "kmol" | kilomole |
| "kN" | kilonewtons |
| "kN.m" | kilonewton meters |
| "kN.m2" | kilonewton meters squared |
| "kN/m" | kilonewtons/meter |
| "kN/m2" | kilonewtons/square meter |
| "knot" | knots |
| "kohm" | kilohm |
| "kohm.m" | kilo ohm meter |
| "kPa" | kilopascals |
| "kPa.s/m" | kilopascal seconds/meter |
| "kPa/100m" | kilopascal per hundred meter |
| "kPa/h" | kilopascal per hour |
| "kPa/m" | kilopascals/meter |
| "kPa/min" | kilopascal per min |
| "kPa2" | kilopascal squared |
| "kPa2/cP" | kilopascal squared per centipoise |
| "kPa2/kcP" | kilopascal squared per thousand centipoise |
| "kpsi" | thousand pounds per square inch |
| "kpsi2" | thousand pound per square inch, squared |
| "krad" | kiloradian |
| "kS" | kilosiemens |
| "ksm3" | kilo standard cubic meters 15C |
| "ksm3/d" | thousand std cubic meters/ day |
| "ksm3/sm3" | 1000 std cubic meters/ std cubic meter |
| "kV" | kilovolt |
| "kW" | kilowatts |
| "kW.h" | kilowatt hours |

| Allowable values | S1000D interpretation |
|---|---|
| "kW.h/dm3" | kilowatt hours/decimeter |
| "kW.h/kg" | kilowatt hours/kilogram |
| "kW.h/kg.degC" | kilowatt hours/kilogram degree C |
| "kW.h/m3" | kilowatt hours/cubic meters |
| "kW/cm2" | kilowatts/square centimeter |
| "kW/m2" | kilowatts/square meter |
| "kW/m2.K" | kilowatts/square meter degree Kelvin |
| "kW/m3" | kilowatts/cubic meter |
| "kW/m3.K" | killowatts/cubic meter degree Kelvin |
| "L" | liter |
| "L/100kg" | liter per hundred kilogram |
| "L/100km" | liters/100 kilometers |
| "L/10bbl" | liter per ten barrel |
| "L/bar.min" | liters per minute per bar |
| "L/h" | liter per hour |
| "L/kg" | liter per kilogram |
| "L/km(100)" | liters/100 kilometers |
| "L/m" | liters/meter |
| "L/m3" | liters/cubic meter |
| "L/min" | liter per minute |
| "L/mol(g)" | liters/mole (gram) |
| "L/mol(kg)" | liters/mole (kilogram) |
| "L/s" | liters/second |
| "L/s2" | liters/second/second |
| "L/t" | liters/tonne |
| "L/tonUK" | liter per UK ton |
| "lbf" | pounds force |
| "lbf.ft" | foot pounds force |
| "lbf.ft/bbl" | foot pounds force/barrel |

| Allowable values | S1000D interpretation |
|---|---|
| "lbf.ft/in" | pounds force feet/inch |
| "lbf.ft/in2" | foot pounds force/square inch |
| "lbf.ft/lbm" | foot pounds force/pound mass |
| "lbf.in" | inch pounds force |
| "lbf.in/in" | pounds force inches/inch |
| "lbf.in2" | pounds force inches squared |
| "lbf.s/ft2" | pounds force seconds/square foot |
| "lbf.s/in2" | pounds force seconds/square inch |
| "lbf/100ft" | pounds force per hundred foot |
| "lbf/100ft2" | pounds force/100 square foot |
| "lbf/30m" | pounds force per thirty meters |
| "lbf/ft" | pounds force per foot |
| "lbf/ft2" | pounds force/square foot |
| "lbf/ft2(100)" | pounds force/100 square foot |
| "lbf/ft3" | pounds force/cubic foot |
| "lbf/galUS" | pounds force/US gallon |
| "lbf/in" | pounds force/inch |
| "lbf/in2" | pounds force/square inch |
| "lbf/lbf" | pound force per pound force |
| "lbm" | pounds mass |
| "lbm(million)/yr" | million pounds mass/year |
| "lbm.ft/s" | foot pounds mass/second |
| "lbm.ft2" | pounds mass square feet |
| "lbm.ft2/s2" | pounds mass square feet/second squared |
| "lbm/1000galUK" | pounds mass/1000 UK gallons |
| "lbm/1000galUS" | pounds mass/1000 US gallons |
| "lbm/100ft2" | pounds mass per hundred square foot |
| "lbm/10bbl" | pounds mass per 10 barrel |
| "lbm/bbl" | pounds mass/barrel |

| Allowable values | S1000D interpretation |
|---|---|
| "lbm/d" | pound mass per day |
| "lbm/ft" | pounds mass/foot |
| "lbm/ft.h" | pounds mass/foot hour |
| "lbm/ft.s" | pounds mass/foot second |
| "lbm/ft2" | pounds mass/square foot |
| "lbm/ft3" | pounds mass/cubic foot |
| "lbm/ft4" | pounds mass/foot fourth |
| "lbm/galUK" | pounds mass/UK gallon |
| "lbm/galUK(1000)" | pounds mass/1000 UK gallons |
| "lbm/galUK.ft" | pounds mass/UK gallon foot |
| "lbm/galUS" | pounds mass/US gallon |
| "lbm/galUS(1000)" | pounds mass/1000 US gallons |
| "lbm/galUS.ft" | pounds mass/US gallon foot |
| "lbm/h" | pounds mass/hour |
| "lbm/h.ft" | pounds mass/hour foot |
| "lbm/h.ft2" | pounds mass/hour square foot |
| "lbm/hp.h" | pounds mass/horsepower hour |
| "lbm/in3" | pounds mass/cubic inch |
| "lbm/Mbbl" | pounds mass/1000 barrels |
| "lbm/min" | pounds mass/minute |
| "lbm/s" | pounds mass/second |
| "lbm/s.ft" | pounds mass/second foot |
| "lbm/s.ft2" | pounds mass/second square foot |
| "lkBnA" | British link 1895 A |
| "lkBnB" | British link 1895 B |
| "lkCla" | Clarke link |
| "lkSe" | Sears link |
| "lkUS" | US Survey link |
| "lm" | lumen |

| Allowable values | S1000D interpretation |
|---|---|
| "lm.s" | lumen second |
| "lm/m2" | lumens/square meter |
| "lm/W" | lumens/watt |
| "lx" | lux |
| "lx.s" | lux seconds |
| "m" | meter |
| "M(ft3)" | million cubic feet |
| "M(ft3)/acre.ft" | million cubic feet per acre-foot |
| "M(ft3)/d" | million cubic feet per day |
| "M(m3)" | million cubic meters |
| "M(m3)/d" | million cubic meters per day |
| "m/30m" | meters per thirty meters |
| "m/cm" | meters/ centimeter |
| "m/d" | meters/day |
| "m/h" | meters/hour |
| "m/K" | meters/degree kelvin |
| "m/km" | meters/kilometer |
| "m/m" | meters/meter |
| "m/m.K" | meters/meter Kelvin |
| "m/m3" | meters/cubic meter |
| "m/min" | meter per minute |
| "m/ms" | meters/millisecond |
| "m/s" | meters/second |
| "m/s2" | meters/second squared |
| "m2" | square meters |
| "m2/cm3" | square meters/cubic centimeter |
| "m2/d.kPa" | square meters/day kiloPascal |
| "m2/g" | square meters/gram |
| "m2/h" | square meters/hour |

| Allowable values | S1000D interpretation |
|---|---|
| "m2/kg" | square meters/kilogram |
| "m2/m2" | square meters/square meter |
| "m2/m3" | square meters/cubic meter |
| "m2/mol" | square meters/mol |
| "m2/Pa.s" | square meters/second Pascal |
| "m2/s" | square meters/second |
| "m3" | cubic meters |
| "m3(std,0C)" | cubic meters at std condition (0 deg C) |
| "m3(std,15C)" | cubic meters at std condition (15 deg C) |
| "m3/bar.d" | cubic meter per day per bar |
| "m3/bar.h" | cubic meter per hour per bar |
| "m3/bar.min" | cubic meter per minute per bar |
| "m3/cP.d.kPa" | cubic meters/centiPoise day kiloPascal |
| "m3/cP.Pa.s" | cubic meters/centiPoise Pascal second |
| "m3/d" | cubic meters/day |
| "m3/d.kPa" | cubic meters/day kilopascal |
| "m3/d.m" | cubic meter per day per meter |
| "m3/d2" | cubic meters/day/day |
| "m3/g" | cubic meters/gram |
| "m3/h" | cubic meters/hour |
| "m3/h.m" | cubic meter per hour per meter |
| "m3/ha.m" | cubic meters/hectare meter |
| "m3/J" | cubic meters/joule |
| "m3/kg" | cubic meters/kilogram |
| "m3/km" | cubic meters/kilometer |
| "m3/kPa.d" | cubic meter per day per kilopascal |
| "m3/kPa.h" | (cubic meters per hour) per kilopascal |
| "m3/kW.h" | cubic meters/kilowatt hour |
| "m3/m" | cubic meters/meter |

| Allowable values | S1000D interpretation |
|---|---|
| "m3/m2" | cubic meter per square meter |
| "m3/m3" | cubic meters/cubic meter |
| "m3/min" | cubic meter per minute |
| "m3/mol" | cubic meters/mole |
| "m3/mol(kg)" | cubic meters/mole (kilogram) |
| "m3/Pa.s" | cubic meters/second pascal |
| "m3/Pa/s" | (cubic meters/second) per pascal |
| "m3/Pa2.s2" | cubic meters/pascal second squared |
| "m3/psi.d" | cubic meter per day per (pound per square inch) |
| "m3/s" | cubic meters/second |
| "m3/s.ft" | cubic meter per second per foot |
| "m3/s.m" | cubic meters/second meter |
| "m3/s.m2" | cubic meters/second square meter |
| "m3/s2" | cubic meters/seconds squared |
| "m3/scm(0C)" | cubic meters/std cubic meters, 0 deg C |
| "m3/scm(15C)" | cubic meters/std cubic meters, 15 deg C |
| "m3/t" | cubic meters/tonne |
| "m3/tonUK" | cubic meters per UK ton |
| "m3/tonUS" | cubic meters per US ton |
| "m4" | meters fourth |
| "m4/s" | meters fourth/second |
| "mA" | milliamp |
| "Ma" | megayears |
| "MA" | megaampere |
| "mA/cm2" | milliampere per square centimeter |
| "mA/ft2" | milliampere per square foot |
| "mbar" | millibar |
| "Mbbl" | thousand barrels |
| "Mbbl.ft/d" | thousand barrel feet/day |

| Allowable values | S1000D interpretation |
|---|---|
| "Mbbl/d" | thousand barrels/day |
| "MBq" | megabecquerel |
| "MBtu/hr" | million Btus/hour |
| "Mbyte" | megabyte |
| "mC" | millicoulomb |
| "mC/m2" | millicoulombs/square meter |
| "Mcf" | thousand cubic feet |
| "mCi" | millicurie |
| "mcurie" | millicurie |
| "mD" | millidarcy |
| "mD.ft" | millidarcy foot |
| "mD.ft2/lbf.s" | millidarcy sq feet/pound force second |
| "mD.in2/lbf.s" | millidarcy sq inches/pound force second |
| "mD.m" | millidarcy meters |
| "mD/cP" | millidarcies/centipoise |
| "mD/Pa.s" | millidarcies/Pascal second |
| "meq" | milliequivalent |
| "meq/100g" | milliequivalents/ hectogram |
| "meq/cm3" | milliequivalents/ cubic centimeter |
| "meq/g" | milliequivalents/ gram |
| "mEuc" | milliEuclid |
| "MeV" | millions of electron volts |
| "Mflops" | megaflops |
| "Mg" | megagram |
| "mg" | milligram |
| "Mg/a" | megagrams/year |
| "Mg/d" | megagrams/day |
| "mg/dm3" | milligrams/cubic decimeter |
| "mg/galUS" | milligrams/US gallon |

| Allowable values | S1000D interpretation |
|---|---|
| "Mg/h" | megagrams/hour |
| "Mg/in" | thousand kilograms per inch |
| "mg/J" | milligrams/joule |
| "mg/kg" | milligrams/kilogram |
| "mg/L" | milligram per liter |
| "Mg/m2" | megagrams/square meter |
| "mg/m3" | milligrams/cubic meter |
| "Mg/m3" | thousand kilograms per cubic meter |
| "mGal" | milligalileo |
| "mgauss" | milligauss |
| "mGer" | German legal meter |
| "Mgf" | thousand kilograms force |
| "mgn" | milligravity |
| "mGy" | milligray |
| "mH" | millihenries |
| "mho" | mhos |
| "mho/m" | mhos/meter |
| "MHz" | megahertz |
| "mHz" | millihertz |
| "mi" | mile |
| "mi/galUK" | miles/UK gallon |
| "mi/galUS" | miles/US gallon |
| "mi/h" | miles/hour |
| "mi/in" | miles/inch |
| "mi2" | square miles |
| "mi3" | cubic mile |
| "mil" | mil, a thousandth of an inch |
| "mil/yr" | mils/year |
| "mila" | mil_6400 |

| Allowable values | S1000D interpretation |
|---|---|
| "min" | minutes |
| "min/ft" | minute per foot |
| "min/m" | minute per meter |
| "mina" | minutes angular |
| "miUS" | U.S. Survey mile |
| "miUS2" | U.S. Survey square mile |
| "MJ" | megajoules |
| "mJ" | millijoules |
| "MJ/a" | megajoules/year |
| "mJ/cm2" | millijoules/square centimeter |
| "MJ/kg" | megajoules/kilogram |
| "MJ/m" | megajoules/meter |
| "mJ/m2" | millijoules/square meter |
| "MJ/m3" | megajoules/cubic meter |
| "MJ/mol(kg)" | megajoules/mole (kilogram) |
| "mK/m" | millidegrees Kelvin/meter |
| "mL" | milliliter |
| "mL/galUK" | milliliters/UK gallon |
| "mL/galUS" | milliliters/US gallon |
| "mL/mL" | milliliter per milliliter |
| "Mlbm/yr" | million pounds mass/year |
| "mm" | millimeters |
| "Mm" | megameter |
| "mm/a" | millimeters/year |
| "mm/mm.K" | millimeters/millimeter degree Kelvin |
| "mm/s" | millimeters/second |
| "mm2" | square millimeters |
| "mm2/mm2" | square millimeters/square millimeter |
| "mm2/s" | square millimeters/second |

| Allowable values | S1000D interpretation |
|---|---|
| "mm3" | cubic millimeters |
| "mm3/J" | cubic millimeters/joule |
| "MMbbl" | million barrels |
| "MMbbl/acre.ft" | million barrels/acre foot |
| "MMcf" | million cubic feet |
| "mmHg(0C)" | millimeters of Mercury at 0 deg C |
| "mmho/m" | millimhos/meter |
| "mmol" | millimole |
| "MMscf(60F)" | million standard cubic feet at 60 deg F |
| "MMscf(60F)/d" | million standard cubic feet/day |
| "MMscf60/stb60" | million std cu ft/ stock tank barrel |
| "MMscm(15C)" | million standard cubic meters 15C |
| "MMscm(15C)/d" | million std cubic meters, 15 degC/day |
| "MMstb(60F)" | million stock tank barrels 60 deg F |
| "MMstb(60F)/d" | million stock tank barrels, 60 deg F/day |
| "MMstb/acre" | million stock tank barrels 60 deg F/acre |
| "MMstb/acre.ft" | million stbs, 60 deg F/acre foot |
| "MN" | meganewtons |
| "mN" | millinewtons |
| "mN.m2" | millinewton meters squared |
| "mN/km" | millinewtons/kilometer |
| "mN/m" | millinewtons/meter |
| "Mohm" | megaohm |
| "mohm" | milliohm |
| "mohm/m" | milliohm per meter |
| "mol" | mole |
| "mol(g)" | mole (gram) |
| "mol(kg)" | mole (kilogram) |
| "mol(kg)/h" | moles (kilogram)/hour |

| Allowable values | S1000D interpretation |
|---|---|
| "mol(kg)/m3" | moles (kilogram)/cubic meter |
| "mol(kg)/s" | moles (kilogram)/second |
| "mol(lbm)" | moles (pounds mass) |
| "mol(lbm)/ft3" | moles (pounds mass)/cubic foot |
| "mol(lbm)/galUK" | moles (pounds mass)/UK gallon |
| "mol(lbm)/galUS" | moles (pounds mass)/US gallon |
| "mol(lbm)/h" | moles (pounds mass)/hour |
| "mol(lbm)/h.ft2" | moles (pounds mass)/hour square foot |
| "mol(lbm)/s" | moles (pounds mass)/second |
| "mol(lbm)/s.ft2" | moles (pounds mass)/second square foot |
| "mol/m2" | moles/square meter |
| "mol/m2.s" | moles/square meter second |
| "mol/m3" | moles/cubic meter |
| "mol/s" | moles/second |
| "mPa" | millipascal |
| "MPa" | megapascals |
| "mPa.s" | millipascal seconds |
| "MPa.s/m" | megapascal seconds/meter (megarayl) |
| "MPa/h" | megapascal per hour |
| "MPa/m" | megapascal per meter |
| "Mpsi" | mega pounds per square inch |
| "mrad" | milliradian |
| "Mrad" | megaradian |
| "mrem" | milli-rem |
| "mrem/h" | milli-rems per hour |
| "mS" | millisiemen |
| "ms" | milliseconds |
| "ms/2" | half a millisecond |
| "ms/cm" | milliseconds/centimeter |

| Allowable values | S1000D interpretation |
|---|---|
| "ms/ft" | millisecond per foot |
| "ms/in" | milliseconds/inch |
| "mS/m" | millisiemens/meter |
| "ms/m" | millisecond per meter |
| "ms/s" | milliseconds/second |
| "Mscf(60F)" | thousand cubic feet at 60 deg F |
| "Mscf(60F)/d" | thousand standard cubic feet/day |
| "Mscf60/stb60" | thousand std cu ft/ stock tank barrel |
| "Mscm(15C)/d" | thousand std cubic meters, 15 degC/day |
| "mseca" | milliseconds angular |
| "Msm3" | mega standard cubic meters 15C |
| "Mstb(60F)" | thousand stock tank barrels 60 F |
| "Mstb(60F)/d" | thousand stock tank barrels,60 deg F/day |
| "mSv" | millisievert |
| "mSv/h" | millisieverts per hour |
| "mT" | milliteslas |
| "MV" | megavolt |
| "mV" | millivolts |
| "mV/ft" | millivolt per foot |
| "mV/m" | millivolt per meter |
| "MW" | megawatts |
| "mW" | milliwatt |
| "MW.h" | megawatt hours |
| "MW.h/kg" | megawatt hours/kilogram |
| "MW.h/m3" | megawatt hours/cubic meter |
| "mW/m2" | milliwatts/square meters |
| "mWb" | milliwebers |
| "MY" | megayears |
| "N" | newton |

| Allowable values | S1000D interpretation |
|---|---|
| "N.m" | newton meter |
| "N.m/m" | newton meters/meter |
| "N.m2" | newton square meters |
| "N.s/m2" | newton seconds/meter squared |
| "N/30m" | newton per thirty meters |
| "N/m" | newtons/meter |
| "N/m2" | newtons/square meter |
| "N/m3" | newtons/cubic meter |
| "N/mm2" | newtons/square millimeter |
| "N4/kg.m7" | newtons fourth meters/kilogram |
| "nA" | nanoampere |
| "nAPI" | API neutron units |
| "nautmi" | nautical mile |
| "nC" | nanocoulomb |
| "nCi" | naanocurie |
| "ncurie" | nanocurie |
| "nEuc" | nanoeuclid |
| "nH" | nanohenry |
| "nJ" | nanojoules |
| "nm" | nanometers |
| "nm/s" | nanometer per second |
| "nohm" | nanohm |
| "ns" | nanoseconds |
| "ns/ft" | nanoseconds/foot |
| "ns/m" | nanoseconds/meter |
| "nT" | nanoteslas |
| "nW" | nanowatts |
| "O" | octave |
| "Oe" | oersted |

| Allowable values | S1000D interpretation |
|---|---|
| "ohm" | ohm |
| "ohm.cm" | ohm centimeters |
| "ohm.m" | ohm meter |
| "ohm/km" | ohm per kilometer |
| "ohm/m" | ohm per meter |
| "oz(av)" | avoirdupois ounces |
| "oz(troy)" | troy ounces |
| "ozf" | ounce force |
| "ozm" | ounce mass |
| "P" | poise |
| "Pa" | pascal |
| "pA" | picoampere |
| "Pa(g)" | pascal gauge |
| "Pa.s" | pascal seconds |
| "Pa.s/m3" | pascal seconds/cubic meter |
| "Pa.s/m6" | pascal second /cubic meter squared |
| "Pa.s2/m3" | pascal seconds squared/ cubic meter |
| "Pa/h" | pascal per hour |
| "Pa/m" | pascals/meter |
| "Pa/m3" | pascals/cubic meter |
| "Pa/s" | pascal/ second |
| "Pa2" | pascal squared |
| "pC" | picocoulomb |
| "pCi" | picocurie |
| "pCi/g" | picocurie per gram |
| "pcurie" | picocurie |
| "pdl" | poundals |
| "pdl.cm2" | poundal centimeter squared |
| "pdl.ft" | foot poundal |

| Allowable values | S1000D interpretation |
|---|---|
| "pdl/cm" | poundals/centimeter |
| "permil" | per mille |
| "pF" | picrofarads |
| "pH" | pH |
| "pm" | picometer |
| "pPa" | picopascal |
| "ppdk" | parts per ten thousand |
| "ppk" | parts per thousand |
| "ppm" | parts per million |
| "ppm/degC" | part per million per degree Celsius |
| "ppm/degF" | part per million per degree Fahrenheit |
| "ps" | picosecond |
| "pS" | picosiemens |
| "psf" | pounds/square foot |
| "psi" | pounds/square inch |
| "psi.d/bbl" | pounds per square inch days/barrel |
| "psi.s" | pound per square inch second |
| "psi/100ft" | pounds/square inch per 100 feet |
| "psi/ft" | pounds/square inch per foot |
| "psi/ft(100)" | pounds/square inch per 100 feet |
| "psi/h" | pound per square inch per hour |
| "psi/kft" | pounds/square inch per thousand feet |
| "psi/m" | pound per square inch per meter |
| "psi/min" | pound per square inch per minute |
| "psi2" | pound per square inch squared |
| "psi2.d/cP.ft3" | psi squared days/ centipoise cubic foot |
| "psi2.d/cp.ft3" | psi squared days/ centipoise cubic foot |
| "psi2.d2/cP.ft6" | (psi days/cubic foot)squared/centipoise |
| "psi2.d2/cp.ft6" | (psi days/cubic foot)squared/centipoise |

| Allowable values | S1000D interpretation |
|---|---|
| "psi2/cP" | pounds/square inch squared/ centipoise |
| "psia" | pounds/square inch absolute |
| "psig" | pounds/square inch gauge |
| "ptUK" | UK pint |
| "ptUK/hp.hr" | UK pints/horsepower hour |
| "ptUK/Mbbl" | UK pints/1000 barrels |
| "ptUS" | US pints |
| "ptUS/10bbl" | US pint per ten barrel |
| "qtUK" | UK quarts |
| "qtUS" | US quarts |
| "quad" | quads |
| "quad/yr" | quads/year |
| "rad" | radian |
| "rad/ft" | radians per foot |
| "rad/ft3" | radians per cubic foot |
| "rad/m" | radians/meter |
| "rad/m3" | radians per cubic meter |
| "rad/s" | radians/second |
| "rad/s2" | radians/second squared |
| "rd" | rad |
| "rem" | rem |
| "rem/h" | rems per hour |
| "rev/min" | revolutions/minute |
| "rev/s" | revolutions/second |
| "rpm" | revolutions/minute |
| "rpm/s" | revolutions/minute per second |
| "S" | siemens |
| "s" | second |
| "s/cm" | seconds/centimeter |

| Allowable values | S1000D interpretation |
|---|---|
| "s/ft" | seconds/foot |
| "s/ft3" | second per cubic foot |
| "s/in" | seconds/inch |
| "s/L" | second per liter |
| "S/m" | siemens/meter |
| "s/m" | seconds/meter |
| "s/m3" | seconds/cubic meter |
| "s/qtUK" | second per UK quart |
| "s/qtUS" | second per US quart |
| "sack94" | sacks |
| "scf(60F)" | std cubic feet at 60 deg F |
| "scf(60F)/bbl" | std cubic feet at 60 deg F/barrel |
| "scf(60F)/d" | standard cubic feet/day |
| "scf(60F)/ft2" | std cubic feet at 60 deg F/square foot |
| "scf(60F)/ft3" | std cubic feet at 60 deg Ft/cubic foot |
| "scm(0C)" | standard cubic meters at 0 deg Celsius |
| "scm(0C)/m2" | std cubic meters, 0 deg C/square meter |
| "scm(0C)/m3" | std cubic meters, 0 deg C/cubic meter |
| "scm(15C)" | standard cubic meters at 15 deg Celsius |
| "scm(15C)/d" | std cubic meters at 15 deg C/day |
| "scm(15C)/m2" | std cubic meters, 15 deg C/square meter |
| "scm(15C)/m3" | std cubic meters, 15 deg C/cubic meter |
| "scm(15C)/s" | std cubic meters, 15 deg C/second |
| "scm15/stb60" | std cubic meters / stock tank barrel |
| "seca" | seconds angular |
| "sigma" | capture unit |
| "sm3/ksm3" | std cubic meters/ 1000 std cubic meter |
| "sm3/sm3" | std cubic meters/ std cubic meters |
| "sq ft" | square feet |

| Allowable values | S1000D interpretation |
|---|---|
| "sq in" | square inches |
| "sq mi" | square miles |
| "sq yd" | square yards |
| "sr" | steradian |
| "stb(60F)" | stock tank barrel at 60 deg F |
| "stb(60F)/acre" | stock tank barrels, 60 deg F/acre |
| "stb(60F)/bbl" | stock tank barrels, 60 deg F/barrel |
| "stb(60F)/d" | stock tank barrels, 60 deg F/day |
| "stb60/MMscf60" | stock tank barrels/ million std cu ft |
| "stb60/MMscm15" | stock tank barrels/ million std cu mts |
| "stb60/Mscf60" | stock tank barrels/ 1000 std cu ft |
| "stb60/Mscm15" | stock tank barrels/ 1000 std cu meters |
| "stb60/scm15" | stock tank barrels/ std cu meters |
| "Sv" | sievert |
| "Sv/h" | sieverts per hour |
| "Sv/s" | sievert per second |
| "T" | tesla |
| "t" | tonne |
| "t/a" | tonnes/year |
| "t/d" | tonnes/day |
| "t/h" | tonnes/hour |
| "t/min" | tonnes per minute |
| "talbot" | talbot |
| "TBq" | terabecquerel |
| "tcf" | trillion cubic feet |
| "TeV" | tera electron volts |
| "therm" | therms |
| "therm/ft3" | therms/cubic foot |
| "therm/galUK" | therms/UK gallon |

| Allowable values | S1000D interpretation |
|---|---|
| "therm/lbm" | therms/pound mass |
| "TJ" | terajoules |
| "TJ/a" | terajoules/year |
| "Tohm" | teraohm |
| "ton of refrig" | tons of refrigeration |
| "tonfUK" | UK tons force |
| "tonfUK.ft2" | UK ton feet squared |
| "tonfUK/ft" | UK tons force/foot |
| "tonfUK/ft2" | UK tons force/square foot |
| "tonfUS" | US tons force |
| "tonfUS.ft" | US tons force feet |
| "tonfUS.ft2" | US tons force feet squared |
| "tonfUS.mi" | US tons force miles |
| "tonfUS.mi/bbl" | US ton force miles/barrel |
| "tonfUS.mi/ft" | US tons force miles/foot |
| "tonfUS/ft" | US tons force/foot |
| "tonfUS/ft2" | US tons force/square foot |
| "tonfUS/in2" | US tons force/square inch |
| "tonUK" | UK tons |
| "tonUK/a" | UK tons/year |
| "tonUK/d" | UK tons/day |
| "tonUK/h" | UK tons/hour |
| "tonUK/min" | UK tons/minute |
| "tonUS" | US tons |
| "tonUS/a" | US tons/year |
| "tonUS/d" | US tons/day |
| "tonUS/ft2" | US tons/square foot |
| "tonUS/h" | US tons/hour |
| "tonUS/min" | US tons/minute |

| Allowable values | S1000D interpretation |
|---|---|
| "torr" | torr |
| "TW" | terawatts |
| "TW.h" | terrawatt hours |
| "uA" | microampere |
| "uA/cm2" | microampere per square centimeter |
| "uA/in2" | microampere per square inch |
| "ubar" | microbars |
| "uC" | microcoulomb |
| "ucal/s.cm2" | microcalories/second square centimeter |
| "uCi" | microcurie |
| "ucurie" | microcurie |
| "uEuc" | microEuclids |
| "uF" | microfarads |
| "uF/m" | microfarads/meter |
| "ug" | micrograms |
| "ug/cm3" | micrograms/cubic centimeter |
| "uH" | microhenry |
| "uH/m" | microhenries/meter |
| "uHz" | microhertz |
| "uJ" | microjoules |
| "um" | microns |
| "um/s" | micrometer per second |
| "um2" | square microns |
| "um2.m" | square micron meters |
| "umHg(0C)" | microns of Mercury at 0 deg C |
| "umol" | micromole |
| "uN" | micronewtons |
| "unitless" | unitless |
| "uohm" | microohm |

| Allowable values | S1000D interpretation |
|---|---|
| "uohm/ft" | microhm per foot |
| "uohm/m" | microhm per meter |
| "uPa" | micropascal |
| "upsi" | micropounds/square inch |
| "urad" | microradian |
| "uS" | microsiemens |
| "us" | microsecond |
| "us/ft" | microseconds/foot |
| "us/m" | microseconds/meter |
| "uT" | microteslas |
| "uV" | microvolts |
| "uV/ft" | microvolt per foot |
| "uV/m" | microvolt per meter |
| "uW" | microwatts |
| "uW/m3" | microwatts/cubic meter |
| "uWb" | microwebers |
| "V" | volt |
| "V/B" | volts/Bel |
| "V/dB" | volts/decibel |
| "V/m" | volts/meter |
| "volpercent" | volume percent |
| "volppm" | volume parts per million |
| "W" | watt |
| "W/cm2" | watts/square centimeter |
| "W/K" | Watts per delta kelvin |
| "W/kW" | watts/kilowatt |
| "W/m.K" | watts/meter kelvin |
| "W/m2" | watts/square meter |
| "W/m2.K" | watts/square meter kelvin |

| Allowable values | S1000D interpretation |
|---|---|
| "W/m2.sr" | watts/square meter steradian |
| "W/m3" | watts/cubic meter |
| "W/m3.K" | watts/cubic meter kelvin |
| "W/mm2" | watts per square millimeter |
| "W/sr" | watts/steradian |
| "W/W" | watts/watt |
| "Wb" | weber |
| "Wb.m" | weber meters |
| "Wb/m" | webers/meter |
| "Wb/mm" | webers/millimeter |
| "wk" | weeks |
| "wtpercent" | weight percent |
| "wtppm" | weight parts per million |
| "yd" | yards |
| "yd2" | square yards |
| "yd3" | cubic yard |
| "ydBnA" | Benoits yard (1895 A) |
| "ydBnB" | Benoits yard (1895 B) |
| "ydCla" | Clarkes yard |
| "ydIm" | imperial yard |
| "ydInd" | Indian yard |
| "ydInd(37)" | Indian yard (1937) |
| "ydInd(62)" | Indian yard (1962) |
| "ydInd(75)" | Indian yard (1975) |
| "ydSe" | Sears yard |
| "yr(100k)" | 100000 years |
| "qtyuom01" - "qtyuom50" | Not available for projects |
| "qtyuom51" - "qtyuom99" | Available for projects |

**Note**

An XML document of the S1000D units of measure is provided as part of the S1000D™ suite of information and is available for download from the S1000D web site. For each unit, this document includes the name, the type or types of quantity (which is not the same as the "Quantity data type") that the unit represents, the annotation to be used in the markup (= "Allowable value"), and the relationship to a base unit (for derived units).

**Note 2**

For Système International d'Unites (SI) units, it is highly recommended that the unit of measure is displayed in accordance with the International Standards Organisation (ISO) 1000:1992 and ISO 31-0:1992 thru ISO 31-13:1992 standards. These standards are available together in book form as ISO Standards Handbook: Quantities and units. 3rd ed., International Organization for Standardization, Geneva, 1993, 345 p., ISBN 92-67-10185-4.

**Note 3**

The common symbols for Volts Alternating Current (AC) and Volts DC must be presented as "V AC" and “V DC”.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the fixed attribute values**. The project or the organization must decide which fixed attribute values will be used. Refer to Para 2.

**Use of project specific values**. The project or the organization must decide if any project specific additions of attribute values are needed. If needed, the project definitions must be established and made known to anyone who will need the definitions to be able to interpret the produced information properly. Refer to Para 2.

# Chapter 3.9.7

## *Authoring - Human performance technology and training*

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## 1 General

This chapter deals with the writing of data modules to be used for training information. The scope and depth of the information reflects the associated maintenance data modules and the level of training information to be supplied. This latter aspect is based on the level of maintenance to be conducted and the complexity of the Product.

# 2 Training

## 2.1 Writing for maintenance

Maintenance information data modules are written to a scope and depth that reflect the project requirements, the skill level of the maintainer and the activity to be conducted. These data modules tend to be written to detail the procedure to be conducted in the least ambiguous format and define the sequence to be followed.

## 2.2 Writing for training

Training information, by its very nature, is written from a supporting context, it is presented in some cases as an addition to the maintenance information to allow further breakdown of the elements of the task so that learning can be achieved. The style of writing training information reflects the requirement to transfer knowledge to the student, as opposed to maintenance which is written to instruct the maintainer to carry out a procedure. In other cases it is used to establish an initial knowledge of the Product to aid understanding prior to maintenance activities being conducted.

### 2.2.1 Scope of training information

Five training types exist to allow training information to be presented these are:

2.2.1.1 The lesson planning topic type

The lesson planning topic type describes learning needs and goals, instructional design models, task analyses, learning taxonomies and other information necessary to the lesson planning process.

2.2.1.2 The learning overview topic type

The learning overview topic type identifies the learning objectives, includes other information helpful to the learner, such prerequisites, duration, intended audience, and can include information and strategies that seeks to gain attention and stimulate recall of prior learning.

2.2.1.3 The learning summary topic type

The learning summary topic type recaps and provides context for the learning objectives, provides guidance to reinforce learning and long-term memory, and may pose questions to enhance encoding and verification of the learning content.

2.2.1.4 The learning content topic type

The learning content topic type provides the learning content itself, and enables direct use of content from Darwin Information Typing Architecture (DITA) task, concept, and reference topics, as well as additional content of any topic type that supports specific objectives declared in the Learning Overview topic type. A Learning Content topic comprises a set of self-contained content about a single terminal learning objective supported by zero or more enabling learning objectives.

2.2.1.5 The learning assessment topic type

The learning assessment topic type presents or interactions that measure progress, encourage recollection, and stimulate reinforcement of the learning content and can be presented before the content as a pre-assessment or as a post-assessment test.

Data modules using these schema are coded using the learn event code. Refer to Chap 4.3.10.

## 2.3 Harmonizing issues

When a project has a requirement to produce training information in data modules, they must ensure that there is consistency and coherence within the project. This means that the creation and management of the training data modules are an integral part of the project technical information. This will involve these data modules being included in project aspects such as business rules, data module requirements list etc. and must identify aspects such as Training Needs Analysis (TNA) as information drivers.

### 2.3.1 Effects on maintenance and training information production

To ensure that there is consistency and coherence, the project must align, at the earliest possible stages, any information requirements for training and maintenance. This will allow the project to identify any information requirement dependencies. This aspect must also take into consideration how the information will be used by the end user.

The activity of verification, whether it is maintenance or training data module verification, must ensure that the data modules work together as a coherent group, prior to the publishing activity.

### 2.3.2 Granularity

Often training information needs to be produced at a much finer level of granularity than maintenance data modules might normally be written to. In order to achieve the best fit for granularity, it is essential that the requirements of granularity, for both training and maintenance information are addressed before any data modules are produced. This will establish an environment were the maintenance data modules used within a training course are used as created; allowing them to be used as the trainee will use them in a maintenance environment.

It should be noted that training data modules must be written with maintenance data modules as the "driver" for the task being taught.

## 2.4 Presentation issues

This aspect will be dependent on the project infrastructure and how it delivers technical data. Chap 6.4 details functionality required from a technical data viewpoint. If a project wishes to integrate its IETP with a LMS or an Electronic Performance Support System (EPSS), functionality that enables this interaction must be contracted for. The functionality must also take cognizance of how the training activation is to be conducted, eg a named maintainer would have a training profile inherent within the IETP to ensure training was invoked at the appropriate time and appropriate to the maintainer's profile.

## 2.5 Linking

When producing training information as data modules, linking can be achieved either at the data module level or at deeper levels.

### 2.5.1 Linking at the data module level

Linking at data module level is achieved using the element <dmRef> as defined in Chap 3.9.5.2.1.2.

### 2.5.2 Linking at deeper levels

The linking at deeper levels applies only from training information to maintenance information. This is only to be used when maintenance data modules cannot be broken down to meet the granularity requirements of training.

There can be situations where, for example, because of safety reasons, maintenance data modules cannot be broken down to the exact level of granularity required by training. When linking into lower levels within a maintenance data module, care must be taken not to compromise any safety related information at a higher level. The mechanism for this is described at Chap 3.9.5.2.1.2.

## 2.6 Scope of information

The scope of information required for training is described at Chap 5.2.1.19.

## 2.7 Preplanning

### 2.7.1 Introduction

Preplanning for a project aims to leverage the potential economies of integrating technical data and technical training data into S1000D, and encompasses three major areas:

– scope guidance. Refer to Para 2.7.1.1.

- business issues guidance. Refer to Para 2.7.1.2.
- process guidance. Refer to Para 2.7.1.3.

Preplanning addresses some of the organizational, project management, and business issues that require advance consideration in order to minimize problems later in the project. Preplanning also serves to focus the project planning toward the long-term cost savings of an integrated approach.

The following sections identify possible guidance areas:

2.7.1.1 Scope guidance

- major components of Scope
- requirements: List types of technical publications and training required to support the intended purpose of the system
- requirements: Describe the end-users requirements of the documentation and training
- requirements: Understand the performance environment
- presentation: Identify the general format of the presentation(s)
- presentation: Identify media used for presentation(s) of training content (media choices may need to work for both training and tech data in different presentation environments)
- presentation: Identify factors that will affect the context(s) of instruction and technical documentation
- presentation: Identify content to be covered
- presentation: Identify project access to sources
- requirements: Identify organizational and environmental constraints that can influence design decisions
- establish relationship between SCO and S1000D content.

2.7.1.2 Business issues guidance

- who pays for each activity?
- who owns content?
- who can use the content?
- who must pay for content?
- when an update to one requires an update to the other, who pays for it?

2.7.1.3 Process guidance

This is relative to stages of: identify content, design and develop, authorize, publish/disseminate, and use).

- all stages: Obey the fundamental rule that constraints can direct a project but that multiple options exist
- all stages: Assign roles in the process
- all stages: Describe the process
- identify content: Search existing training content. Some organizations are implementing guidelines that require the registry of training materials along with policies that require new projects to identify suitable existing materials in order to maximize reuse and minimize cost).
- identify content: Integrate for efficiency
- identify content: Establish synergy with other deliverables such as Parts data
- design and develop: Determine linking and embedding approach
- design and develop: Establish a common data module coding strategy that satisfies the granularity Design and develop: Determine grain size
- design and develop: Use a consistent language style
- design and develop: Address safety issues
- design and develop: Choose a data flow model for instructional content sourced from technical publications
- design and develop: Decide how to insert content

- publish: Make general project decisions about the publication process and the dissemination flow for both instructional and tech data products to identify conflicts and redundancies.
- design and develop: Identify requirements of both training and maintenance
- design and develop: Establish link-back to storyboards
- design and develop: Analyze analysis for commonality
- design and develop: Establish synergy with logistic database.

# 3 Business Rules decision points

Business rules decisions include, but are not limited to, the following:

**Scope information.** The project or the organization must decide on the scope of the information provided. Refer to Para 2.2.1.

**Presentation.** The project or the organization must make decisions concerning presentation issues. Refer to Para 2.4.

**Scope of preplanning.** The project or the organization must determine the scope of the preplanning guidance. Refer to Para 2.7.

# Chapter 4

## *Information management*

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# Chapter 4.1

## *Information management - Introduction*

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## 1 General

Information management is comprised of the addressing, storage and handling of information objects such as data modules, illustrations and publications that enables the production and use of common technical publications within a project.

This chapter provides an overview of the chapters that give the rules for information management in an S1000D project.

## 2 Content

Chap 4.2 gives an overview of the CSDB concept, the information objects and the standards that are used.

Chap 4.3 describes the details of the coding of data modules and Chap 4.4 describes the details of the coding of illustrations or associated data. The data module lists used for planning, management and control of the CSDB content are described in Chap 4.5. The handling of comments on data modules and publications are contained in Chap 4.6. Version control of data modules are described in Chap 4.7, and the interchange of data modules is described in Chap 4.8.

Chap 4.9 introduces the publication module and the SCO reference Model (SCORM) content package built from the data modules of the CSDB together with the methods of coding, building and updating of publications.

Chap 4.10 contains a description of recording and exchange of business rules within projects.

Chap 4.11 gives an explanation of the concept and management of the process data module. The issue of occurrences of multiple instances of data modules is contained in Chap 4.12. Chap 4.13 deals with optimization and reuse and Chap 4.14 explains the concept and management of applicability.

The internal structures of the information objects are described in Chap 7 which deals with information processing.

# Chapter 4.2

## *Information management - Common source database*

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## 1 General

The key element in information management is the CSDB. It is an information store and management tool for all objects required to produce the technical publications within projects.

The major objectives for a CSDB are:

- support the technical publication process
- support the controlled authoring
- support the QA process
- support the data exchange with partners, suppliers and customers
- support delivery of technical publications on various media independent from the source storage format

## 2 Concepts

The central object in the CSDB is the data module. It is the smallest self-contained information unit within a technical publication. Data modules control and contain text, illustrations, multimedia, and data. They have defined neutral structures based on international standards. Illustrations, multimedia, and other data are not directly stored inside the data modules, but referenced.

Careful planning of the breakdown of technical information into data modules is important to ensure efficient data use and reuse. It is recommended that chains of references be avoided.

# 3 CSDB design

S1000D does not specify the design and implementation rules for a CSDB. It only specifies the data structure of the information objects, which is independent from any software implementation.

# Chapter 4.2.1

## *Common source database - Information objects*

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| Chap 4.9 | Information management - Publication and SCORM content package management |
| Chap 7.5 | Information processing - Information interchange |

## 1 General

The information objects to be stored and managed in the CSDB are the following addressable and exchangeable units:

- data modules as described in Chap 3.9.5
- illustrations, multimedia and other data associated with and called up by data modules as defined in Chap 3.9.2
- data module lists as described in Chap 4.5
- comments as described in Chap 4.6
- publication modules as described in Chap 4.9
- data dispatch notes as described in Chap 7.5

## 2 XML objects

The S1000D information objects, listed above with the exception of illustrations, multimedia and other data must be produced in XML.

# Chapter 4.2.2

## *Common source database - Related standards for the CSDB*

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## 1 General

CSDB information objects are based on the standards identified in this chapter.

## 2 Related standards

Within this specification the information objects are based on the following standards:

| | |
|---|---|
| REC-xml-20060816 | W3C Recommendation: Extensible Markup Language (XML) 1.0 (Fourth Edition) |
| MIL-PRF-28002 | Raster Graphics Representation in Binary Format, Requirements for: CCITT Gr 4 (Comité Consultatif International du Téléphonique et Télégraphique, Groupe 4)<br>**Note**<br>CCITT has changed its name to "International Telecommunications Union Telecommunication Standardization Sector", or "ITU-T" |
| REC-webcgm20-20070130 | W3C Recommendation: WebCGM 2.0 |
| ISO/IEC 8632 | Information technology - Computer Graphics Metafile for the storage and transfer of picture description information (CGM) |

| | |
|---|---|
| ISO/IEC 10918 | Information technology - Digital compression and coding of continuous-tone still images (JPEG) |
| CompuServe GIF 89a | Graphics Interchange Format, version 89a, 1990 |
| Adobe TIFF 6.0 | Tagged Image File Format, Revision 6.0, June 1992 |
| REC-PNG-20031110 | W3C Recommendation: Portable Network Graphics (PNG) Specification (Second Edition) |
| ISO/IEC 15948:2003 (E) | Information technology - Computer graphics and image processing - Portable Network Graphics (PNG): Functional specification |
| PDF Reference | Adobe Portable Document Format, version 1.3 or later |

# Chapter 4.3

## *Information management - Data module code*

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| Chap 4.3.9 | Data module code - Learn code |
| Chap 4.3.10 | Data module code - Learn event code |
| Chap 4.3.11 | Data module code - Summary |

# 1 General

The data module code is the standardized and structured identifier of a data module. It is contained in the identification section of the data module. The data module code is part of the unique identifier of the data module. The data module code is used to manage data modules in the CSDB, to retrieve them or to gain access to them in an electronic environment.

The element <dmCode> is used to store the data module code (refer to Chap 3.9.5.1).

A summary of the data module code is given Chap 4.3.11.

# 2 Definitions

## 2.1 Alphanumeric

The code abbreviation is "**Y**".

The permissible characters are:

– "0" ….."9"
– "A"….."Z" in uppercase. It is recommended that the use of "I" and "O" is avoided.

## 2.2 Numeric

The code abbreviation is "**X**".

The permissible characters are:

– "0" ….."9"

## 2.3 Numeric sequential

The code abbreviation is "**N**".

The permissible characters for sequential numbering are:

– "0" ….."9"

## 2.4 Alpha

The code abbreviation is "**A**".

The permissible characters are:

– "A"….."Z" in uppercase. It is recommended that the use of "I" and "O" is avoided.

# 3 Data module code structure

The data module code comprises up to 41 alphanumeric characters and is built up as shown in Fig 1. The minimum length is 17 alphanumeric characters as given in Fig 2.

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*Fig 1 Generic structure of the data module code*

A single project can require the use of multiple model identifiers in data module codes, which can contain an SNS with the same characters but with a different definition. The additional optional character, called the materiel item category code, within the SNS, shown in Fig 1, is used to indicate the different SNS. To avoid a complete renumbering of the data modules where multiple SNS are used it is allowable for the materiel item category code to be used where applicable. This means that it is not required to populate the data module code elements to a consistent length in such projects.

## 3.1 Data module code partitions

Breakdown details for the three partitions "hardware identification", "information type" and "learn type" are given in Table 2, Table 3 and Table 4.

*Table 2 Hardware identification*

| Breakdown | Length |
|---|---|
| Model identification code | 2 thru 14 alphanumeric characters |
| System difference code | 1 thru 4 alphanumeric characters |
| SNS | 1 (optional materiel item category code) plus 6 or 8 alphanumeric characters |
| – System | – 1 (optional materiel item category code) plus 2 alphanumeric characters |
| – Subsystem + sub-subsystem | – 2 (1+1) alphanumeric characters |

| Breakdown | Length |
|---|---|
| – Unit or assembly | – 2 or 4 alphanumeric characters |
| Disassembly code | 2 alphanumeric characters |
| Disassembly code variant | 1 thru 3 alphanumeric characters |

*Table 3 Information type*

| Breakdown | Length |
|---|---|
| Information code | 3 alphanumeric characters |
| Information code variant | 1 alphanumeric character |
| Item location code | 1 alphanumeric character |

*Table 4 Learn type*

| Breakdown | Length |
|---|---|
| Learn code | 3 alphanumeric characters |
| Learn event code | 1 alpha character |

The learn type information applies to Human Performance Technology (HTP) or training data modules and is optional.

Chap 4.3.1 to Chap 4.3.8 describe the 17 alphanumeric character data module code without learn type information and the 41 alphanumeric characters data module code with learn type information as given in Fig 2. The minimum length of the data module code without learn type information is 17 alphanumeric characters, the minimum length of the data module code with learn type information is 21 alphanumeric characters. The maximum length of the data module code without learn type information is 37 alphanumeric characters, the maximum length of the data module code with learn type information is 41 alphanumeric characters data module code.

Learn type information is described in Chap 4.3.9 and Chap 4.3.10.

**DMC: 17 characters**

**DMC: 41 characters**

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*Fig 2 Data module code for Product*

## 3.2 Use of hyphens

The data module code must be presented with hyphens [-] in the positions as shown in Fig 2 and without spaces in between. The hyphens delimit the contents of the codes, as shown, but are not included within the population of the data module code attributes. This rule applies also to cases where the data module code is given as a single string.

**Note**

For ease of reading, spaces are used in coding examples in this specification.

# Chapter 4.3.1

## *Data module code - Model identification code*

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## 1 General

The model identification code is identified in the data module code by the highlighted characters:

**YY** - Y - YY - YY - YY - YYY - YYYY - Y (17 characters)

thru

**YYYYYYYYYYYYYY** - YYYY - YYY - YY - YYYY - YYYYY - YYYY - Y - YYYA (41 characters)

The attribute `modelIdentCode` of the element <`dmCode`> is used to store the model identification code (refer to Chap 3.9.5.1)

The model identification code is variable with a minimum of two and a maximum of 14 alphanumeric characters.

## 2 Model identification code

### 2.1 General

The model identification code identifies the Product to which the data applies and is the point of reference for all applicability information. The model identification code includes all related

model variants. The variable length of the model identification code enables a coupling between a Product or project name (eg a 10 character End Item Acronym Code, (EIAC)) and a Product or project variant (eg a one thru four character "end item Usable On Code", (UOC)) from a logistics database (eg Logistics Support Analysis Record, (LSAR)).

The decision on how to use the model identification code in this way is a project or organization decision and must be documented in the project or organization business rules.

Projects must apply to North Atlantic Treaty Organization (NATO) Maintenance and Supply Agency (NAMSA) for the allocation of the model identification code and must specify the number of model identification codes the user wishes to reserve for models or variants. If applicable, the project or the organization must ensure that the model identification codes are harmonized between the users of S1000D and S2000M.

In order to control the available sequences and prevent duplications, the model identification codes must be registered with:

NAMSA-Headquarters (HQ)

Administrator, ASD S2000M

L-8302 CAPELLEN

Luxembourg

Telephone: +352 3063 6707

Fax: +352 3063 4707

Email: Spec2000M@namsa.nato.int

When applying for a code, indicate the name and title of the requester, company name and postal address, telephone, fax number and e-mail address. If not self-evident, please indicate the type of Product (aircraft, engine, missile, radar, ship, tank, vehicle, etc) for which the code is being requested. If the name of the system is not in English, please provide also an English translation. In principle the project or the organization can propose a code.

By maintaining a central database, NAMSA will ensure the global uniqueness of the model identification codes. A new model identification code will be taken into use at the discretion of the project whenever a new type/model or variant is thought to need specific identification.

When this is necessary, the project or the organization will establish their own arrangements for cross-indexing. It is suggested that if this requirement can be foreseen, the project or the organization can allocate the first model identification code of a block to be the common or baseline.

The allocation of a model identification code for a project does not imply that all data modules and publications applicable to the project have to use the same code. Data modules on the platform level as shown in Fig 1 can contain interface data modules to reference to other model identification codes. Therefore individual data modules and publications modules can be used on several projects. This allows the use of existing data without change or recoding. The model identification code in itself has no significance outside the project.

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*Fig 1 Multiple model identification code within a project*

## 2.2 Allocated model identification code

A list of all allocated model identification code can be found at www.namsa.nato.int. The list is common for both S1000D and S2000M.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Allocation of model identification code.** The project or the organization must decide on which model identification codes to use for the project. Refer to Para 2.

**Use of one ore several model identification codes.** The project or the organization must decide whether to allow the use one or several model identification codes. Refer to Para 2.

# Chapter 4.3.2

## *Data module code - System difference code*

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## 1 General

The system difference code is identified in the data module code by the highlighted characters:

YY - **Y** - YY - YY - YY - YYY - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - **YYYY** - YYY - YY - YYYY - YYYYY - YYYY - Y - YYYA (41 characters)

The attribute `systemDiffCode` of the element <`dmCode`> is used to store the system difference code (refer to Chap 3.9.5.1).

The system difference code is variable between one thru four characters each of which can be alphanumeric.

## 2 System difference code

The system different code identifies alternative versions of the system and subsystem/sub-subsystem identified by the SNS without affecting the type, model or variant identity.

The variable length of the system difference code enables eg a relationship between the system difference codes and the one thru four alphanumeric characters of the "system level Usable On Code (UOC)" from a logistics database (eg Logistic Support Analysis Record, LSAR).

When set to one character it is important to positively identify the system/subsystem variant and the applicability of the related information. The initial or basic installation is coded to the project defined default and coded successively as variants are specified. "A" is always used for the first configuration, "B" the second and so on.

An example of how the system difference code would differentiate two navigation systems is shown in Fig 1.

Example:

There can be more than one system variant available eg system 34 (Navigation), sub-subsystem 41 (Navigation radar). This can be used to identify the independent positioning determining installation in the air vehicle. However it may be that there are several types of Navigation radar available.

## 2.1 Specific use of the system difference code

For data modules valid for several configurations, the project or the organization must define the assignment of the system difference code.

For projects assigning a UOC to each configuration, they can assign as many system difference code values as actual combinations of configurations.

*Table 2 Example for UOC assignment*

| Configuration | UOC |
|---|---|
| Conf 1 | A |
| Conf 2 | B |
| Conf 3 | C |

*Table 3 Example for system difference code assignment*

| Combinations of configuration | System difference code |
|---|---|
| Conf 1 | A0 |
| Conf 2 | B0 |
| Conf 3 | C0 |
| Conf 1 + Conf 2 | A1 |
| Conf 1 + Conf 3 | A2 |
| Conf 1 + Conf 2 + Conf 3 | A3 |
| Conf 2 + Conf 3 | B1 |

In these examples, the system difference code value "A3" defined for the combination of all the configurations can be used in the data module code for all valid configurations.

## Variant A

YY-**A**-34-41-00-YXA-XXXA-A

Consisting of:
YY-**A**-34-41-10-YXA-XXXA-A
YY-**A**-34-41-20-YXA-XXXA-A
YY-**A**-34-41-30-YXA-XXXA-A
YY-**A**-34-41-40-YXA-XXXA-A

## Variant B

YY-**B**-34-41-00-YXA-XXXA-A

Consisting of:
YY-**B**-34-41-10-YXA-XXXA-A
YY-**B**-34-41-20-YXA-XXXA-A
YY-**B**-34-41-30-YXA-XXXA-A
YY-**B**-34-41-40-YXA-XXXA-A
YY-**B**-34-41-50-YXA-XXXA-A
YY-**B**-34-41-60-YXA-XXXA-A
YY-**B**-34-41-70-YXA-XXXA-A

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*Fig 1 System difference code*

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Allocation of system difference code**. The project or the organization must define the system difference code values to be used. Refer to Para 2.

**UOC as system difference code**. The project or the organization must decide whether to use UOC as the system difference code or not. Refer to Para 2.

# Chapter 4.3.3

## *Data module code - Standard numbering system*

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| Chap 8.2.5 | Maintained SNS - Air vehicle, engines and equipment |
| Chap 8.2.6 | Maintained SNS - Tactical missiles |
| Chap 8.2.7 | Maintained SNS - General surface vehicles |
| Chap 8.2.8 | Maintained SNS - General sea vehicles |
| ASD 2000M | International specification 2000M for materiel management - Integrated data process for military equipment |

# 1 General

SNS is applicable in the data module code to the characters identified as follows:

YY - Y - **YY - YY - YY** - YYY - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - **YYY - YY - YYYY** - YYYYY - YYYY - Y - YYYA (41 characters)

# 2 Standard numbering system

## 2.1 General

The SNS specified for publications and database information consists of three groups of characters. This system is designed to provide standardization in the arrangement or addressing of the Product.

The characters are typically numeric. However they can be extended when more than 99 identifiers are needed. The extension must commence "A1" to "A9", "B1" to "B9" and so on until "Z9" continuing with "AA" to "AZ", "BA" to "BZ" and so on until "ZZ".

Chap 8.2 contains maintained SNS for air vehicles, land and sea systems and additional examples. It allocates and provides definitions for the system, subsystem and in some cases for the sub-subsystem.

Users of the specification can allocate a project specific SNS at their own discretion. Each project or organization must define the SNS structure being used in its business rules. The same SNS numbering scheme must apply across the project disciplines.

In some of the information sets given in Chap 5 a specific use of the SNS elements is defined, eg refer to Chap 5.2.1.6 Maintenance planning.

## 2.2 SNS structure

### 2.2.1 System

The system is identified in the data module code by the highlighted characters:

YY - Y - **YY** - YY - YY - YYY - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - **YYY** - YY - YYYY - YYYYY - YYYY - Y - YYYA (41 characters)

The attribute `systemCode` of the element <`dmCode`> is used to contain the system, refer to Chap 3.9.5.1.

The system represents the general systems and the basic structure of the Product and is populated with two or three alphanumeric characters.

The system is identified by two alphanumeric characters. In case a project or an organization requires the indication of the type of SNS used, an additional single alphanumeric character can be placed in front of the SNS as part of the attribute `systemCode`. This character is called the material item category code.

### 2.2.2 Materiel item category code

The material item category code is used to indicate different SNS coding structures that are applicable to an individual project at the system, subsystem and sub-subsystem level within the SNS. The material item category code is also used to differentiate between different definitions within the same SNS.

The example below shows where a civil aircraft includes a military aircraft system with the same SNS and the military definition is to be used for System 42. These data modules can then be uniquely identified within the CSDB. This differentiation is established when identifying the data module requirements.

Civil aircraft system: YYYYYYYYYYYYYY - YYYY - **J**42 - YY - YY - YYYYY - YYYY - Y

Military aircraft system: YYYYYYYYYYYYYY - YYYY - **E**42 - YY - YY - YYYYY - YYYY - Y

The following list is the allocation of the material item category code.

- "A" - Generic SNS. Refer to Chap 8.2.1.
- "B" - Support and training equipment SNS. Refer to Chap 8.2.2.
- "C" - Ordnance SNS. Refer to Chap 8.2.3.
- "D" - General communications SNS. Refer to Chap 8.2.4.
- "E" - Air vehicle, engines and equipment SNS. Refer to Chap 8.2.5.
- "F" - Tactical missiles SNS. Refer to Chap 8.2.6.
- "G" - General surface vehicles SNS. Refer to Chap 8.2.7.
- "H" - General sea vehicles SNS. Refer to Chap 8.2.8.
- "J" - Civil aircraft deviations from E.
- "K" thru "S" - Not available for projects.
- "T" thru "Z" - Available for projects.
- "0" thru "9" - Available for projects.

**Note**

Refer to Chap 1.3 for the definitions of “Not available for projects” and “Available for projects”.

The project or the organization must decide on the use of the material item category code and define it in the business rules.

### 2.2.3 Subsystem/sub-subsystem

Subsystem/sub-subsystem describes the further breakdown of system. The subsystem/sub-subsystem is identified in the data module code by the highlighted characters:

YY - Y - YY - **YY** - YY - YYY - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - **YY** - YYYY - YYYYY - YYYY - Y- YYYA (41 characters)

The subsystem and sub-subsystem parts of the data module code are stored in the markup as follows (refer to Chap 3.9.5.1):

– subsystem: attribute subSystemCode of the element <dmCode>
– sub-subsystem: attribute subSubSystemCode of the element <dmCode>

Each attribute is populated with a single alphanumeric character.

The specification contains only allocations for the first attribute unless provision has been made in the detailed specification of the information sets. The definitions for sub-subsystems are allocated by the project/manufacturer, depending on the complexity and are to be provided in the project or organization business rules. Refer to Fig 1.

**Note**

When the sub-subsystem is zero, eg 26-20-00, the two digits "20" represent the subsystem as a whole.

### 2.2.4 Unit or assembly

The unit or assembly is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - **YY** - YYY - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - **YYYY** - YYYYY - YYYY - Y- YYYA (41 characters)

The attribute assyCode of the element <dmCode> is used to store the unit or assembly (refer to Chap 3.9.5.1).

Unit or assembly is populated with two or four alphanumeric characters. It is a sequential number starting from 01 or 0001. The use of four characters provides identification for units in complex systems. An extension to four characters must not be used to give a further hierarchical breakdown. Refer to Fig 1.

**Business rules decisions:**

The project or the organization must decide whether to use two or four characters for the attribute assyCode.

ICN-AE-A-040303-0-C0419-00004-A-03-1

*Fig 1 SNS structure*

## 2.3 Use of SNS for parts data modules

### 2.3.1 Chapterized parts data modules

For chapterized illustrated parts data modules the SNS is allocated as described in Para 2.3.2.

Certain items which are required to be contained in separate figures (eg raw materials, rivets, consumables) should be listed in subsystem/sub-subsystem "01" or "99" for each system. For projects using S2000M refer to section 1A-3.

### 2.3.2 Non-chapterized parts data modules

For non-chapterized illustrated parts data modules the SNS must be coded with the following specific rules, refer to Fig 2. Refer also Chap 5.3.1.3 for further details.

ICN-AE-A-040303-0-C0419-00005-A-03-1

*Fig 2 SNS for non-chapterized IPD data modules*

The responsible partner company code must be defined by the project or the organization.

**Note**

For non-chapterized illustrated parts data modules only this structure of the SNS is allowed.

# 3 Business rule decisions

Business rules decisions include, but are not limited, to the following:

**SNS structure**. The project or the organization must define the SNS structure used. Refer to Para 2.2.

**Use of material item category code**. The project or the organization must decide on the use of the material item category code. Refer to Para 2.2.2.

**Number of characters in assembly code**. The project or the organization must decide whether to use two or four characters for unit or assembly. Refer to Para 2.2.4.

# Chapter 4.3.4

## *Data module code - Disassembly code*

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*Table 1 References*

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| Chap 3.8 | Information generation - Disassembly principles |
| Chap 5.3.1.3 | Common requirements - Illustrated parts data |

## 1 General

The disassembly code is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - **YY**Y - YYYY – Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - **YY**YYY - YYYY - Y - YYYA (41 characters)

The attribute `disassyCode` of the element <`dmCode`> is used to identify the breakdown condition of an assembly to which maintenance information applies.

The disassembly code consists of two alphanumeric characters.

## 2 Disassembly code

In case there are more than 99 identifiers required, the range for the disassembly code can be extended and must commence A1 to A9, then B1 to B9 and so on until Z9.

The disassembly code identifies the breakdown condition of an assembly to which maintenance information applies. The generic disassembly principles are explained in Chap 3.8.

The disassembly code is also used for sequential numbering of IPD modules as described in Chap 5.3.1.3. In this case "YY" = "NN" is a sequential number starting from "01", if more than one data module is needed for the same SNS.

**Note**

The disassembly code is the IPD figure number, when the data module is generated from an ASD S2000M database. IPD figure number is equivalent to figure number in S2000M and is part of the CSN. S2000M allows "NN" to use an alpha character in the first position.

# Chapter 4.3.5

## *Data module code - Disassembly code variant*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

The disassembly code variant is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YY**Y** - YYYY - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YY**YYY** - YYYY - Y - YYYA (41 characters)

The attribute `disassyCodeVariant` of the element <`dmCode`> designates alternative items of equipment or components differing slightly in design.

The disassembly code variant is populated with one, two or three alphanumeric characters.

## 2 Disassembly code variant

The disassembly code variant designates alternative items of equipment or components differing slightly in design, but not enough to warrant a change of the system difference code.

The variable length of the disassembly code variant allows the use of the "Alternate Logistic Control number (ALC)" or the "Alternate Indentured Product Code (AIPC)" from LSA records. Whenever possible, the disassembly code variant starts with an alphabetic character. The decision on how to use the disassembly code variant in this way is a project or organization decision and has to be documented in the project or organization business rules.

**Note**

The DCV is the IPD figure number variant, when the data module is generated from an ASD S2000M provisioning database. The IPD figure number variant is equivalent to figure

number variant in S2000M and is a part of the Catalogue Sequence Number (CSN). The IPD figure number variant starts with the figure "0" for the initial data module with a given SNS-number. When there is a need to produce variants (modified items) or to "insert" new data modules, the disassembly code variant is used the standard way now starting with "A" or "AAA" for the first variant.

# 3 Business rules decisions

Business rules decisions include, but are not limited, to the following:

**Use of system difference code**. The project or the organization must decide whether to use one, two or three characters for the disassembly code variant.

# Chapter 4.3.6

## *Data module code - Information code*

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|---|---|
| Chap 3.9.5.1 | Data modules - Identification and status section |
| Chap 8.4 | SNS information and learn codes - Information codes |

## 1 General

The information code is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YYY - **YYY**Y - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YYYYY - **YYY**Y - Y - YY YA (41 characters)

The attribute `infoCode` of the element <`dmCode`> is used to store the information code (refer to Chap 3.9.5.1).

The information code is populated with three alphanumeric characters.

## 2 Information code

The information code identifies the type of information within a data module. The information codes and rules for the allocation of alphanumeric characters in the information codes are also given in Chap 8.4.

# Chapter 4.3.7

## *Data module code - Information code variant*

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*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 3.9.5.1 | Data modules - Identification and status section |

## 1 General

The information code variant is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YYY - YYY**Y** - Y (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YYYYY - YYY**Y** - Y - YYYA (41 characters)

The attribute `infoCodeVariant` of the element <`dmCode`> is used to store the information code variant (refer to Chap 3.9.5.1).

The information code variant is populated with one alphanumeric character.

## 2 Information code variant

The information code variant identifies any variation in the activity defined by the information code.

Recommendation: The default information code variant is always coded "A", successive variants are coded B, C, etc. The use of numeric values must be specified in the project or organization business rules.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of numeric values** The project or the organization must decide whether to use numeric values in addition to alphabetic values in the information code variant. Refer to Para 2.

# Chapter 4.3.8

## *Data module code - Item location code*

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| Chap 3.9.5.2.1.2 | Common constructs - Referencing |
| Chap 3.9.7 | Authoring - Human performance technology and training |
| Chap 4.3.9 | Data module code - Learn code |
| Chap 4.3.10 | Data module code - Learn event code |
| Chap 5.2.1.19 | Common information sets - Training |

## 1 General

The item location code is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YYY - YYYY - **Y** (17 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YYYYY - YYYY - **Y** - YYYA (41 characters)

The attribute `itemLocationCode` of the element <`dmCode`> is used to store the item location code (refer to Chap 3.9.5.1).

The item location code is populated with one alphanumeric character.

# 2 Item location code

## 2.1 General

The item location code indentifies the situation to which the information is applicable, eg where the maintenance task will be carried out in terms of a Product. These are identified as follows:

The item location code is defined as follows:

- "A" - Information related to items installed on the Product
- "B" - Information related to items installed on a major assembly removed from the Product
- "C" - Information related to items on the bench. In this context, it does not matter, for example, whether an item has been removed from the Product.
- "D" - Information related to all three locations A, B, and C. No other combinations are allowed
- "T" - For those projects that either have legacy training data modules or have no requirement to be SCORM conformant or no need to use the learn code and learn event code, "T" is used to indentify that the data module contains training information
- "Z" is used by this specification as a generic item location code

## 2.2 Training information

The data modules with item location code "T" are used in conjunction with maintenance data modules with item location code "A", "B", "C" or "D" as assets in a learning session for projects that have no requirement to use the learn type information (refer to Chap 4.3.9 and Chap 4.3.10) or to be SCORM conformant.

Refer to Chap 3.9.5.2.1.2 for guidance on deeper linking.

Refer to Chap 3.9.7 for guidance on authoring, and Chap 5.2.1.19 for guidance on training information sets.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Allocation of the item location code "T"**. The project or the organization must decide to use the item location code "T" or to use the learn type information. Refer to Para 2.2

# 4 Examples

ICN-AE-A-040308-0-C0419-00006-A-02-1

*Fig 1 Item location codes - Example 1*

1 YY-A-7X-YY-YY-**00A**-XXXA-**A**
Set of data modules,
Component on engine and
engine on vehicle

2 YY-A-7X-YY-YY-**00A**-XXXA-**B**
Set of data modules,
Component on engine

3 YY-A-7X-YY-YY-**00A**-XXXA-**C**
Set of data modules,
Component removed whole

4 YY-A-7X-YY-YY-**01A**-XXXA-**C**
Set of data modules,
first assembly requiring maintenance actions

ICN-AE-A-040308-0-C0419-00007-A-02-1

*Fig 2 Item location codes - Example 2*

# Chapter 4.3.9

## *Data module code - Learn code*

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| Chap 4.3.10 | Data module code - Learn event code |
| Chap 8.5 | SNS information and learn codes - Learn codes |
| Chap 8.5.1 | Learn codes - Human performance technology codes |
| Chap 8.5.2 | Learn codes - Training codes |

## 1 General

The learn code is an optional code that is applied only to human performance technology and training data modules for those projects that have a requirement to be SCORM conformant or wish to use the functionality brought about by the learn code. The code describes the type of human performance technology or training information that is in the content of the data module. Each learn code represents a category of human performance technology or training information. When used, the learn code must be used with a learn event code. Refer to Chap 4.3.10.

There are two types of learn codes:

- human performance technology
- training

The learn code is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YYY - YYYY - Y -**YYY**A (21 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YYYYY - YYYY - Y - **YYY**A (41 characters)

The attribute `learnCode` of the element <`dmCode`> is used to store the learn code (refer to Chap 8.5).

The learn code is populated with three alphanumeric characters.

# 2 Learn code

The first character of the learn code must be set to either "H" for human performance technology codes or "T" for training codes.

## 2.1 Human performance technology

For human performance technology data modules, the last two characters define the specific learn code for the human performance technology information contained in the data module. Refer to Chap 8.5.1.

## 2.2 Training content

For training data modules, the last two characters define the specific learn code for the training information contained in the data module. Refer to Chap 8.5.2.

# Chapter 4.3.10

## *Data module code - Learn event code*

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|---|---|
| Chap 3.9.5.1 | Data modules - Identification and status section |
| Chap 3.9.5.2.13 | Content section - Learning data module |
| Chap 4.3.9 | Data module code - Learn code |

## 1 General

The learn event code is an optional code that is applied only to human performance technology or training data modules for those projects that have a requirement to be SCORM conformant or wish to use the functionality brought about by the learn event code. Whenever a learn code is used, the learn event code must be used. Refer to Chap 4.3.9.

There are five branches in the learn Schema associated with the learn event code. Refer to Chap 3.9.5.2.13.

The learn Schema accommodates five types of learning information types:

- Learning plan
- Learning overview
- Learning content
- Learning summary
- Learning assessment

The learn event code is identified in the data module code by the highlighted characters:

YY - Y - YY - YY - YY - YYY - YYYY - Y - YYY**A** (21 characters)

thru

YYYYYYYYYYYYYY - YYYY - YYY - YY - YYYY - YYYYY - YYYY - Y - YYY**A** (41 characters)

The attribute `learnEventCode` of element <`dmCode`> is used to store the learn event code (refer to Chap 3.9.5.1).

The learn event code is populated with one alpha character. Refer to Table 2.

## 2 Coding

The learn event code describes which branch of the learn Schema is being used.

*Table 2 Learn event code allocation*

| Learn information type | Learn event code |
|---|---|
| Learning plan | A |
| Learning overview | B |
| Learning content | C |
| Learning summary | D |
| Learning assessment | E |

# Chapter 4.3.11

## *Data module code - Summary*

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*Table 1 References*

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| None | |

## 1 General

This chapter gives a summary of the data module coding in form of examples.

## 2 Examples

### 2.1 Data module code example for air vehicles

Fig 1 presents as an example a 17 characters data module code for an air vehicle and it contains detailed information about the relationship between the data module code elements. These relationships are generic and do not depend on the SNS used.

ICN-AE-A-040309-0-C0419-00012-A-005-01

*Fig 1 Data module code - Example for air vehicles*

## 2.2 Data module code example for sea vehicles

Fig 2 presents as an example a 37 characters data module code for a sea vehicle and shows the use of a maximum length version of the data module code without learn type information.

ICN-D1253-S1000D00001-001-01

*Fig 2 Data module code - Example for sea vehicles*

## 2.3 Data module code example for training and human performance technology data module

Fig 3 presents as an example a 21 characters data module code for an air vehicle and shows the use of the learn type information.

ICN-1654N-S1000D00001-001-01

*Fig 3 Data module code - Example for training data module*

# Chapter 4.4

## *Information management - Information control number*

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| Chap 4.3 | Information management - Data module code |
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| Chap 4.3.2 | Data module code - System difference code |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

Each illustration sheet, multimedia object or other data attached to a data module must be identified by an ICN. This chapter specifies the coding required for the control number. In a CSDB, the ICN is the unique identifier of an illustration sheet, multimedia object, or attached data, and is used to establish the relationship to one or more data modules. The ICN is independent of the file format.

The unique ICN can be based on:

– a company/organization code - CAGE code based

or on

– a project code - model identification code based

The security classification, the last part of the ICN, is not part of the unique identifier. For details see Para 2.1.4.

The ICN addresses an illustration sheet, multimedia object, or other attached data including its update status independent of the status of a data module or publication where it is used within a figure. The ICN is contained in the following markup elements:

```
<graphic infoEntityIdent="ICN-…">
```

```
<symbol infoEntityIdent="ICN-…">
```

```
<multimediaObject infoEntityIdent="ICN-…">
```

For human readability and due to the variable length of the subfields, the ICN must be written with hyphens [-] and with the term "ICN" exactly as shown in Fig 1 and Fig 2. An exception is the content of element `<entityControlNumber>` within data dispatch notes, where the prefix "ICN-", is not included.

If specified to appear on the illustration reproduction area, the ICN must be located within the lower right-hand corner.

ICN for symbols must not be presented.

The allocation of an ICN with a certain model identification code, system difference code, SNS and responsible partner company does not imply that the addressed illustrations, symbols, multimedia objects, or other data must be re-identified when it is usable in several data modules or publication modules. This allows the reuse of data without recoding.

The permissible characters are the same as for the data module code given in Chap 4.3.

# 2 Information control numbering methods

## 2.1 ICN - CAGE code based

The CAGE code based ICN comprises five parts, including the prefix "ICN-", and is built as follows, refer to Fig 1:

**ICN – min 5 character unique identifier:**

**ICN – max 10 character unique identifier:**

ICN-S3627-S1000D0493-001-01

*Fig 1 ICN - CAGE code based*

**2.1.1 Originator code**

The originator code gives the originator of an illustration, multimedia object or other data. It consists of five alphanumeric characters. The code is the originators CAGE code.

**2.1.2 Unique identifier**

The unique identifier consists of minimum five and maximum 10 alphanumeric characters. The identifier must be unique for each originator code.

**2.1.3 Issue number**

The issue number is a three digit numerical value with leading zeros. It starts from 001 for each basic illustration, multimedia object or other data or variant thereof, and must be incremented each time the illustration, multimedia object or other data is updated.

**2.1.4 Security classification**

Security classification of the illustration or the multimedia object is identified by a two digit number. The same set of security classification values as the data modules must be used, refer to Chap 3.9.6.1. The illustration, multimedia object or other data has its individual security classification independent of where it is used.

If an illustration, multimedia object or other data is reclassified, it must be given a new issue number.

An illustration, multimedia object or other data must use the security classification values defined by the project.

## 2.2 ICN - Model identification code based

The model identification code based ICN comprises 10 parts, including the prefix "ICN-", and is built as follows. Refer to Fig 2:

**ICN – min 29 characters:**

**ICN – max 47 characters:**

ICN-S3627-S1000D0494-001-01

*Fig 2 ICN - Model identification code based*

### 2.2.1 Model identification code

Identical to the model identification code used for data module code, refer to Chap 4.3.1.

### 2.2.2 System difference code

Identical to the system difference code used for data module code, refer to Chap 4.3.2.

### 2.2.3 SNS code

Identical to the SNS code used for data module code, refer to Chap 4.3.3.

### 2.2.4 Responsible partner company code

The responsible partner company is the company or organization responsible for the illustration, multimedia object or other data independent of its use in data modules. The responsible partner company code must be defined by the project or organization.

### 2.2.5 Originator code

Refer to Para 2.1.1.

### 2.2.6 Unique identifier

The unique identifier consists of five alphanumeric characters. For each model identification code, the identifier must be unique for each originating company.

### 2.2.7 Variant code

The variant code is a single alphabetic character, which identifies the variants of a basic illustration, multimedia object or other data. The variant code "A" identifies a basic illustration, multimedia object or other data and "B" identifies the first variant. A variant is a supplemented, scaled, cropped, rotated, mirrored and/or annotated basic illustration, multimedia object or other data.

### 2.2.8 Issue number

Refer to Para 2.1.3.

**Note**

Illustrations, multimedia objects or other data using a two digit issue number in the ICN based on an S1000D Issue before 4.0 can still be used.

### 2.2.9 Security classification

Refer to Para 2.1.4.

**Note**

Illustrations, multimedia objects or other data using a one digit security classification number in the ICN based on an S1000D Issue before 4.0 can still be used. "1" is then equivalent to security classification "01", "2" to "02", etc, given in Chap 3.9.6.1.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

## 3.1 Project or organization specific decisions

**Presentation of ICN within the illustration reproduction area**. The project or organization must decide whether the ICN is to be presented within the illustration reproduction area or not. Refer to Para 1.

**Security classifications to be used**. The project or organization must decide whether to use the project security classifications or if the originator's classifications are allowed to be used. Refer to Para 2.1.4.

## 3.2 Illustration, multimedia and other data originator specific decisions

The originator specific decisions include, but are not limited to, the following:

**Structure and rules for ICN**. The originator must specify the structure and rules for the ICN, eg only numerical, fixed length, use of character set. The rules given in Chap 4.3 must be followed. Refer to Para 2.2.

**Use of CAGE code or model identification code based ICN**. The originator must decide on which method to be used for the ICN. An originator can use both methods. Refer to Para 2.2.5.

**Security classifications to be used**. If the project or the organization has decided to use the originator's classifications, the originator must decide on what security classification to be used. Refer to Para 2.2.9.

# 4 Examples

## 4.1 CAGE code based ICN

ICN - minimum 18 characters (excluding hyphens):

ICN-U8025-12345-001-01

ICN - maximum 24 characters (excluding hyphens):

ICN-S3627-S1000D0494-001-01

## 4.2 Model identification code based ICN

ICN - minimum 29 characters (excluding hyphens):

ICN-AE-A-004004-G-S3627-00355-A-002-01

ICN - maximum 43 characters (excluding hyphens):

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# Chapter 4.5

## *Information management - Data module lists*

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## 1 General

For the planning, management and control of the content of the CSDB for individual projects the use of the following data module lists are recommended:

- Data module requirement list, defined in Chap 4.5.1
- CSDB status list, defined in Chap 4.5.2

Both are implemented in one and the same Schema, given in Chap 7.5.2.

# Chapter 4.5.1

## *Data module lists - Data module requirement list*

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## 1 General

A data module requirement list is used to identify the required data modules for a project. The data module requirement list supports planning, reporting, production and configuration control, especially in a work share environment. A data module requirement list can be generated in parts (eg by partner companies for later merging) or in a complete form.

A data module requirement list contains the following elements:

- identification and status section
- data module requirement list content

## 2 Data module requirements list

The data module requirement list consists of two main sections:

- The identification and status section, using the element <identAndStatusSection>
- The main body of the data module requirement list, using the element <dmlContent>

## 2.1 Identification and status section

### 2.1.1 Data module requirements list address

**Description**: The identification consists of two blocks of information items used to uniquely address the data module requirement list object.

**Markup element:** <dmlAddress> (M)

**Attributes:**

– None

**Child elements:**

– <dmlIdent>, which uses the element <dmlCode> (refer to Para 2.1.1.1) and <issueInfo> (refer to Para 2.1.1.2) to establish the unique identity of a data module requirement list object.
– <dmlAddressItems>, which uses the element <issueDate> (refer to Para 2.1.1.3) to support identification of a data module requirement list object.

#### 2.1.1.1 Data module requirements list identification code

**Description**: Each data module requirement list is assigned a data module list code. Together with issue information it gives an identification that is unique within the S1000D domain.

The data module list code comprises up to 29 alphanumeric characters and is built up as shown in Table 2. The minimum length is 17 characters.

YY - YYYYY - A - XXXX - NNNNN (17 characters)

thru

YYYYYYYYYYYYYY - YYYYY - A - XXXX - NNNNN (29 characters)

*Table 2 Data module requirements list identification code*

| Data module list element | Rule |
|---|---|
| Model identification code | 2 thru 14 alphanumeric characters |
| Originator | 5 alphanumeric characters |
| Type of the data module requirement list | 1 alpha character |
| Issue year | 4 numeric characters |
| Sequential number per year | 5 sequential numeric characters |

**Markup element:** <dmlCode> (M)

**Attributes:**

– modelIdentCode (M). Refer to Para 2.1.1.1.1.
– senderIdent (M). Refer to Para 2.1.1.1.2.
– dmlType (M). Refer to Para 2.1.1.1.3.
– yearOfDataIssue (M). Refer to Para 2.1.1.1.4.
– seqNumber (M). Refer to Para 2.1.1.1.5.

**Child elements:**

– None

**Business rules decisions:**

– None identified

*2.1.1.1.1 Model identification code*

The model identification code is identified in the data module list code by the highlighted characters:

**YY** - YYYYY - A - XXXX - NNNNN (17 characters)

thru

YYYYY**YYYYYYYYY** - YYYYY - A - XXXX - NNNNN (29 characters)

The code is contained in attribute `modelIdentCode` (M).

Details are given in Chap 4.3.1.

*2.1.1.1.2 Sender*

The originator (sender) is identified in the data module list Code by the highlighted characters:

YY - **YYYYY** - A - XXXX - NNNNN (17 characters)

thru

YYYYYYYYYYYYYY - **YYYYY** - A - XXXX - NNNNN (29 characters)

To identify the originator, the CAGE code is used.

The code is contained in attribute `senderIdent` (M).

*2.1.1.1.3 Data module requirements list type*

The data module requirement list type is identified in the data module list code by the highlighted characters:

YY - YYYYY - **A** - XXXX - NNNNN (17 characters)

thru

YYYYYYYYYYYYYY - YYYYY - **A** - XXXX - NNNNN (29 characters)

The following types are used:

– "p" = partial data module requirement list
– "c" = complete data module requirement list

The code is contained in attribute `dmlType` (M).

**Markup example:** `<dmlIdent dmlType="c"` ...

*2.1.1.1.4 Issue year*

The year, when the data module requirement list is issued, is identified in the data module list code by the highlighted characters:

YY - YYYYY - A - **XXXX** - NNNNN (17 characters)

thru

YYYYYYYYYYYYYY - YYYYY - A - **XXXX** - NNNNN (29 characters)

The code is contained in attribute `yearOfDataIssue` (M).

*2.1.1.1.5* *Sequential number per year*
The sequential number per year is identified in the data module list code by the highlighted characters:

YY - YYYYY - A - XXXX - **NNNNN**

thru

YYYYYYYYYYYYYY - YYYYY - A - XXXX - **NNNNN**

The sequential number starts with 00001.

The code is contained in attribute `seqNumber` (M).

2.1.1.2 Issue information
Every issue of a data module requirement list receives a consecutive number. The initial issue is numbered 001.

**Markup element:** <`issueInfo`> (M)

The issue information consists of two items. In addition to the issue number, stored in the mandatory attribute `issueNumber`, there is a mandatory attribute `inwork`. They are used as described in Chap 3.9.5.1.

2.1.1.3 Issue date
Every issue of a data module requirement list receives a calendar date in the format YYYY-MM-DD.

**Markup element:** <`issueDate`> (M)

The issue date is the input date (ie the release to CSDB date), or the cut-off date for the information, as decided by the project or the organization.

Details are given in Chap 3.9.5.1.

**2.1.2 Data module requirements list status**
**Description**: The status section provides information about the status of the list.

**Markup element:** <`dmlStatus`> (M)

**Attributes:**

– `issueType` (O). This attribute gives the issue status of the data module requirement list. It must be used as it is described in Chap 3.9.5.1.

**Child elements:**

– <`security`> (M). Refer to Para 2.1.2.1.
– <`dataRestrictions`> (O) . Refer to Para 2.1.2.2.
– <`dmlRef`> (O). Refer to Para 2.1.2.3.
– <`remarks`> (O) . Refer to Para 2.1.2.4.

**Business rules decisions:**

– Use of data restrictions
– Use of reference
– Use of remarks

2.1.2.1 Security classification
The security classification of the data module requirement list must be given.

**Markup element:** <security> (M)

Details are given in Chap 3.9.5.1.

2.1.2.2 Data restrictions

The data restrictions for the data module requirement list can be given.

**Markup element:** <dataRestrictions> (O)

Details are given in Chap 3.9.5.1.

2.1.2.3 Reference

**Description**: In a data module requirement list, references can be made to other data module requirement lists (eg for partial data module requirement list). The references can be given by using the element <dmlCode> within the element <dmlRef>.

**Note**

**References in a CSDB status list (CSDB status list) must only refer to other CSDB status list.**

**Markup element:** <dmlRef> (O)

**Attributes:**

- xlink:type (O) specifies the link type, if an xlink link is established. Refer to Chap 7.4.1.1.
- xlink:href (O) specifies the link address, if an xlink link is established. Refer to Chap 7.4.1.1.
- xlink:title (O) specifies the link title, if an xlink link is established. Refer to Chap 7.4.1.1.
- xlink:show (O) specifies the link appearance, if an xlink link is established. Refer to Chap 7.4.1.1.
- xlink:actuate (O) specifies the link behavior, if an xlink link is established. Refer to Chap 7.4.1.1.

**Child elements:**

- <dmlCode> (M). Refer to Para 2.1.1.1.
- <issueInfo> (O). Refer to Chap 3.9.5.1.

2.1.2.4 Remarks

This block can be used for inserting general remarks to this data module requirement list.

**Markup element:** <remarks> (O)

Details are given in Chap 3.9.5.1.

## 2.2 Data module requirements list content

**Description**: The data module requirement list content is made up of a list of data module entries.

**Markup element:** <dmlContent> (M)

**Attributes:**

- None

**Child elements:**

- <dmEntry> (M) . Refer to Para 2.2.1.

**Business rules decisions:**

– None identified

### 2.2.1 Data module entry

**Description**: The data module entry gives the information items concerning a data module included in the data module requirement list.

**Markup element:** <dmEntry> (M)

**Attributes:**

– dmEntryType (O), specifies the type of entry using one of the attribute values:
  - "n" = new
  - "c" = changed
  - "d" = deleted

**Child elements:**

– <dmRef> (M).Reference to the data module concerned. Refer to Chap 3.9.5.2.1.2.
– <security> (O). Security classification of the data module. Refer to Chap 3.9.5.1.
– <responsiblePartnerCompany> (M). Responsible partner company for the data module. Refer to Chap 3.9.5.1.
– <answer> (O). Refer to Para 2.2.1.1.
– <remarks> (O). General remarks as required by the project or the organization. Refer to Chap 3.9.5.1.

**Business rules decisions:**

– Use of security
– Use of remarks to give narrative answers
– Use of general remarks in the data module requirement list

#### 2.2.1.1 Data module requirement answer

**Description**: This element can be used to insert comments on the data module requirement list entry.

**Markup element:** <answer> (O)

**Attributes:**

– answerToEntry (O), applied to indicate that there are comments to the entry, using one of the attribute values:
– "y" (D) = yes
– "n" = no

**Child elements:**

– <remarks> (O). When needed, used to provide a narrative answer. Refer to Chap 3.9.5.1.

**Business rules decisions:**

– Use of remarks to give narrative answers

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of data module requirement list**. The project or the organization must decide whether or not to use the data module list for specification and exchange of CSDB planning information.

**The data module requirements list issue date**. The project or the organization must decide whether the issue date of a data module requirements list must be the input date (ie the release to CSDB date), the cut-off date for the information, the planning date or some other more appropriate date.

**Use of data restriction**. The project or the organization must decide whether or not to use the element <dataRestriction> in the data module requirements list status section.

**Use of reference**. The project or the organization must decide whether or not to use the element <dmlRef> in the data module requirements list status section.

**Use of remarks**. The project or the organization must decide whether or not to use the element <remarks> in the data module requirements list status section.

**Use of security classification**. The project or the organization must decide whether or not to use the element <security> in the data module requirements list.

**Use of data module requirement answer**. The project or the organization must decide whether or not to use the element <answer> in the data module requirements list.

**Use of data module requirement remarks**. The project or the organization must decide whether or not to use the element <remarks> in the data module requirements list.

# Chapter 4.5.2

## *Data module lists - CSDB status list*

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## 1 General

The CSDB status list described herein is used to identify the status of a CSDB for a project.

## 2 CSDB status list characteristics

At all times, the CSDB at the originating agency/company is the definitive source of data modules for which that agency/company has responsibility. To ensure that all CSDB are built up without divergence, it is recommended that each agency/company will produce and exchange a periodic reference listing of all data modules that it has issued for interchange.

A CSDB status list contains the same identification code, status and data module entry elements as a data module requirements list.

The list type in the data module list identification code element is defined by setting the attribute `dmlType` (M) (of element <`dmlCode`>) to value "`s`".

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of CSDB status list**. The project or the organization must decide whether or not to use the CSDB status list for exchange of CSDB status information.

# Chapter 4.6

## *Information management - Comment*

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| Chap 4.3.1 | Data module code - Model identification code |
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## 1 General

Commenting and reporting on issues raised on data modules or publication modules during the verification process and the in-service phase of the Product can be done using the comment

form. This form is compiled by the commenting authority and sent to the issuing authority of the data modules or publication modules. The comment form is also used to provide a response to the originator of the comment. The commenting process is explained in Chap 3.7.

# 2 Comment form

**Description:** The comment data module consists of two main sections of information: the identification and status section and the content section.

**Markup element:** <comment>

**Attributes:**

– id (O), the identifier of the <comment> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <identAndStatusSection> (M). Refer to Para 2.1.
– <commentContent> (M). Refer to Para 2.2.

**Business rules decisions:**

– Use of comment forms

**Markup example:**

```
<comment>
<identAndStatusSection>
...
</identAndStatusSection>
<commentContent>
...
</commentContent>
</comment>
```

## 2.1 Identification and status section

**Description:** The element <identAndStatusSection> provides the identification elements to address and control the data module. It also provides status elements for information on the security, quality and technical status together with the applicability of the overall data module content.

**Markup element:** <identAndStatusSection> (M)

**Attributes:**

– None

**Child elements:**

– <commentAddress> (M). Refer to Para 2.1.1.
– <commentStatus> (M). Refer to Para 2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<identAndStatusSection>
<commentAddress>
...
</commentAddress>
```

```
<commentStatus>
...
</commentStatus>
</identAndStatusSection>
```

### 2.1.1 Comment address

**Description:** The comment address consists of two blocks of information items used to address the comment object, the comment identification and the supplementary comment address items.

**Markup element:** <commentAddress> (M)

**Attributes:**

– None

**Child elements:**

– <commentIdent> (M). Refer to Para 2.1.1.1.
– <commentAddressItems> (M). Refer to Para 2.1.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentAddress>
<commentIdent>
...
</commentIdent>
<commentAddressItems>
...
</commentAddressItems>
</commentAddress>
```

#### 2.1.1.1 Comment identification

**Description:** The comment identification establishes the unique identity of a comment object.

**Markup element:** <commentIdent> (M)

**Attributes:**

– None

**Child elements:**

– <commentCode> (M). Refer to Para 2.1.1.1.1.
– <language> (M). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentIdent>
<commentCode senderIdent="AAAAA" yearOfDataIssue="2008"
modelIdentCode="AA" commentType="q" seqNumber="00001"/>
<language countryIsoCode="AA" languageIsoCode="aa"/>
</commentIdent>
```

*2.1.1.1.1 Comment code*

**Description:** The comment code comprises up to 29 alphanumeric characters. It is built up as shown in Table 2. The minimum length is 17 characters.

YY - YYYYY - XXXX - NNNNN - A (17 characters)

thru

YYYYYYYYYYYYYY - YYYYY - XXXX - NNNNN - A (29 characters)

*Table 2 Comment code*

| Item | Rule |
|---|---|
| Model identification code | 2 thru 14 alphanumeric characters |
| Issuing authority (CAGE) of the comment | 5 alphanumeric characters |
| Data identification year | 4 numeric characters |
| Number of the comment (per year) | 5 numeric characters - sequential |
| Type of comment | 1 alpha character |

**Markup element:** <`commentCode`> (M)

**Attributes:**

– `modelIdentCode` (M). The model identification code is identified in the comment identification code by the highlighted characters:

**YY** - YYYYY - XXXX - NNNNN - A (17 characters)

**YYYYYYYYYYYYYY** - YYYYY - XXXX - NNNNN - A (29 characters)

Details are given in Chap 4.3.1.

– `senderIdent` (M). The issuing authority of the comment (CAGE code or equivalent) is identified in the comment identification code by the highlighted characters:

YY - **YYYYY** - XXXX - NNNNN - A (17 characters)

YYYYYYYYYYYYYY - **YYYYY** - XXXX - NNNNN - A (29 characters)

Details on CAGE are given in Chap 3.9.5.1.

– `yearOfDataIssue` (M). The year the comment is issued is identified in the comment identification code by the highlighted characters:

YY - YYYYY - **XXXX** - NNNNN - A (17 characters)

YYYYYYYYYYYYYY - YYYYY - **XXXX** - NNNNN - A (29 characters)

– `seqNumber` (M). The number of the comment per year is identified in the comment identification code by the highlighted characters:

YY - YYYYY - XXXX - **NNNNN** - A (17 characters)

YYYYYYYYYYYYYY - YYYYY - XXXX - **NNNNN** - A (29 characters)

The sequential number starts with 00001.

– commentType (M). The type of comment is identified in the comment identification code by the highlighted characters:

YY - YYYYY - XXXX - NNNNN - **A** (17 characters)

YYYYYYYYYYYYYY - YYYYY - XXXX - NNNNN - **A** (29 characters)

The following types of comment are permitted:

q = Query (raised comment)

i = Interim response

r = Final response

**Note**

There is a maximum of two responses (interim and final) allowed to a raised comment/query to avoid unlimited chaining up of comment forms. The comment code of the response is taken from the query and differs only in the attribute commentType. This links query and response together. Any reaction to a response must result in generating a new comment/query.

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

The following example shows the markup corresponding to the response, AA-AAAAA-2008-00001-R, to a previous comment.

```
<commentCode senderIdent="AAAAA" yearOfDataIssue="2008"
modelIdentCode="AA" commentType="q" seqNumber="00001"/>
```

2.1.1.2 Comment address items

**Description:** Supports the identification of a comment object.

**Markup element:** <commentAddressItems> (M)

**Attributes:**

– None

**Child elements:**

– <commentTitle> (O), contains the title of the comment, given as a simple text string.
– <issueDate> (M), contains the date when the comment or response was issued. Refer to Chap 3.9.5.1.
– <commentOriginator> (M). Refer to Para 2.1.1.2.1.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentAddressItems>
<issueDate day="01" month="08" year="2008"/>
<commentOriginator>
```

```
<dispatchAddress>
<enterprise>
<enterpriseName>...</enterpriseName>
</enterprise>
<address>
<city>...</city>
<country>...</country>
</address>
</dispatchAddress>
</commentOriginator>
</commentAddressItems>
```

*2.1.1.2.1 Originator*

**Description:** Describes the originator of the comment. Details of the originator (name, phone number, etc.) must be given.

**Markup element:** <commentOriginator> (M)

**Attributes:**

– None

**Child elements:**

– <dispatchAddress> (M). Refer to Para 2.1.1.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentOriginator>
<dispatchAddress>
<enterprise>
<enterpriseName>...</enterpriseName>
</enterprise>
<address>
<city>...</city>
<country>...</country>
</address>
</dispatchAddress>
</commentOriginator>
```

*2.1.1.2.2 Dispatch address*

**Description:** The address from where the comment/response is sent.

**Markup element:** <dispatchAddress> (M)

**Attributes:**

– None

**Child elements:**

– <enterprise> (M). The name of the sending enterprise. Refer to Para 2.1.1.2.3.
– <dispatchPerson> (O). If appointed, the name of the sending person. Refer to Para 2.1.1.2.4.
– <address> (M). The address of the sending enterprise or person, Refer to Para 2.1.1.2.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<dispatchAddress>
<enterprise>
<enterpriseName>...</enterpriseName>
</enterprise>
<address>
<city>...</city>
<country>...</country>
</address>
</dispatchAddress>
```

*2.1.1.2.3 Enterprise*

**Description:** The name of the enterprise, and when applicable body within an enterprise, from where the comment/response is sent.

**Markup element:** <enterprise> (M)

**Attributes:**

– id (O), the identifier of the <enterprise> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

– <enterpriseName> (M), the address of the sending enterprise, given as a simple text string
– <division> (O). a sending division of the enterprise, given as a simple text string
– <enterpriseUnit> (O). business unit of the division, given as a simple text string

**Business rules decisions:**

– None identified

**Markup example:**

```
<enterprise>
<enterpriseName>...</enterpriseName>
</enterprise>
```

*2.1.1.2.4 Dispatch person*

**Description:** As applicable, the element contains information about the dispatch person who is the point of contact at the sending enterprise.

**Markup element:** <dispatchPerson> (O)

**Attributes:**

– personPrefix (O). A title or prefix added to a person's name to signify veneration, an official position or a professional or academic qualification (eg, Colonel, Doctor/Materiel Data (information set) (MD), Officer, Lady).

**Child elements:**

- <lastName> (M), contains the surname of the dispatch person, given as a simple text string
- <firstName> (O), contains the first or given name of the dispatch person, given as a simple text string
- <jobTitle> (O), contains the job title or position held by the dispatch person, given as a simple text string

**Business rules decisions:**

- None identified

**Markup example:**

```
<dispatchPerson>
<lastName>...</lastName>
</dispatchPerson>
```

*2.1.1.2.5 Address*

**Description:** The postal address from where the comment/response is sent.

**Markup element:** <address> (M)

**Attributes:**

- id (O), the identifier of the <address> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- <department> (O), contains the functional or territorial department for which the comment/response is aimed, given as a simple text string
- <street> (O), contains the physical location (eg, road or street name/number, or similar), given as a simple text string
- <postOfficeBox> (O), identifies the post office box, given as a simple text string
- <postalZipCode> (O), identifies the postal zip code, given as a simple text string
- <city> (M), contains the city or town name, given as a simple text string
- <country> (M), contains the name of the country, given as a simple text string
- <state> (O), contains the name of the state, given as a simple text string
- <province> (O), contains the name of the province, given as a simple text string
- <building> (O), contains the building number or name, given as a simple text string
- <room> (O), contains the room identification, given as a simple text string
- <phoneNumber> (O), contains the phone number, given as a simple text string. Optionally this element contains the attribute contactRole giving the professional role of the point of contact.
- <faxNumber> (O), contains the fax number, given as a simple text string. Optionally this element contains the attribute contactRole giving the professional role of the point of contact.
- <email> (O) , given as a simple text string, contains the email address. Optionally this element contains the attribute contactRole giving the professional role of the point of contact.

- <internet> (O), contains the internet address (website address) of the receiving enterprise, given as a simple text string. Optionally this element contains the attribute contactRole giving the professional role of the point of contact.
- <SITA> (O), contains a SITA address of the enterprise

**Business rules decisions:**

- None identified

**Markup example:**

```
<address>
<city>...</city>
<country>...</country>
</address>
```

### 2.1.2 Comment status

**Description:** Describes the status of the comment form.

**Markup element:** <commentStatus> (M)

**Attributes:**

- issueType (O). Refer to Chap 3.9.5.1.

**Child elements:**

- <security> (M). Refer to Chap 3.9.5.1.
- <dataRestrictions> (O). Refer to Chap 3.9.5.1.
- <commentPriority> (M). Refer to Para 2.1.2.1.
- <commentResponse> (O). Refer to Para 2.1.2.2.
- <commentRefs> (M). Refer to Para 2.1.2.3.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<commentStatus>
<security securityClassification="01"/>
<commentPriority commentPriorityCode="cp01"/>
<commentRefs>
<noReferences/>
</commentRefs>
</commentStatus>
```

#### 2.1.2.1 Comment priority

**Description:** This element contains the priority of the comment.

**Markup element:** <commentPriority> (M)

**Attributes:**

- commentPriorityCode (M). This attribute can have one of the following values:
  - "cp01" - "cp99", refer to Chap 3.9.6.1.

**Child elements:**

- None

**Business rules decisions:**

– Comment priority codes must be configured

**Markup example:**

```
<commentPriority commentPriorityCode="cp01"/>
```

2.1.2.2 Comment response

**Description:** This element indicates the type of response to the comment.

**Markup element:** <commentResponse> (O)

**Attributes:**

– responseType (M). This attribute can have one of the following values:
  - "rt01" - "rt99", refer to Chap 3.9.6.1.

**Child elements:**

– None

**Business rules decisions:**

– Configuration of codes to represent various response types

**Markup example:**

```
<commentResponse responseType="rt01"/>
```

2.1.2.3 Comment references

**Description:** This element contains the reference to the information the comment is referring to. References are allowed to publication modules (including the entire publication set via list of applicable publications), data modules, data module lists or data dispatch notes. For each comment raised, there must be at least one reference. This element must not be used for responses to the comment (use subelement <noReferences>).

**Note**

For a comment related to a data module instance identified by the use of the data module code extension, the reference must include the element <identExtension> contained in element <dmRef> within this block of references.

**Markup element:** <commentRefs> (M)

**Attributes:**

– None

**Child elements:**

One of the following must be selected:

– <noReferences> (O), used to indicate that there are no references
– <dmRefGroup> (O), contains references to data modules. Refer to Para 2.1.2.3.1.
– <pmRefGroup> (O), contains references to publication modules. Refer to Para 2.1.2.3.2.
– <dmlRefGroup> (O), contains references to data module lists. Refer to Para 2.1.2.3.3.
– <ddnRefGroup> (O), contains references to data dispatch notes Refer to Para 2.1.2.3.4.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentRefs>
<noReferences/>
</commentRefs>
```

*2.1.2.3.1 Data module reference group*

**Description:** This element contains one or several references to data modules to which the comment/response relates.

**Markup element:** <dmRefGroup> (O)

**Attributes:**

– None

**Child elements:**

– <dmRef> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.2 Publication module reference group*

**Description:** This element contains one or several references to publication modules to which the comment/response relates.

**Markup element:** <pmRefGroup> (O)

**Attributes:**

– None

**Child elements:**

– <pmRef> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.3 Data module list reference group*

**Description:** This element contains one or several references to data module lists to which the comment/response relates.

**Markup element:** <dmlRefGroup> (O)

**Attributes:**

– None

**Child elements:**

– <dmlRef> (M). Refer to Chap 4.5.1.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.4 Dispatch note reference group*

**Description:** This element contains one or several references to dispatch notes to which the comment/response relates.

**Markup element:** <ddnRefGroup> (O)

**Attributes:**

– None

**Child elements:**

– <ddnRef> (M). Refer to Para 2.1.2.3.5.

**Business rules decisions:**

– None identified

**Markup example:**

```
<ddnRefGroup>
<ddnRef>
<ddnCode senderIdent="AAAAA" yearOfDataIssue="2008"
modelIdentCode="AA" receiverIdent="AAAAB" seqNumber="00001"/>
</ddnRef>
</ddnRefGroup>
```

*2.1.2.3.5 Dispatch note reference*

**Description:** This element contains a reference to a dispatch note to which the comment/response relates.

**Markup element:** <ddnRef> (M)

**Attributes:**

– xlink:type (O). Refer to Chap 7.4.1.1.
– xlink:href (O). Refer to Chap 7.4.1.1.
– xlink:title (O). Refer to Chap 7.4.1.1.
– xlink:show (O). Refer to Chap 7.4.1.1.
– xlink:actuate (O). Refer to Chap 7.4.1.1.

**Child elements:**

– <ddnRefIdent> (M). Refer to Para 2.1.2.3.6.
– <ddnRefAddressItems> (M). Refer to Para 2.1.2.3.8.
– <behavior> (O). Refer to Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.6 Dispatch note reference identity*

**Description:** This element contains the unique identity of a referred dispatch note.

**Markup element:** <`ddnRefIdent`> (M)

**Attributes:**

– None

**Child elements:**

– <`ddnCode`> (M). Refer to Para 2.1.2.3.7.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.7 Dispatch note identification code*

**Description:** This element contains a references to a dispatch note to which the comment/response relates.

**Markup element:** <`ddnCode`> (M)

**Attributes:**

– `modelIdentCode` (O). Refer to Chap 3.9.5.1.
– `senderIdent` (O), contains the CAGE code of the sender of the comment
– `receiverIdent` (O), contains the CAGE code of the receiver of the comment
– `yearOfDateIssue` (O), contains the year (YYYY) when the issue was made public
– `seqNumber` (O), contains a sequence number of the comment, related to `senderIdent` and `yearOfDateIssue`

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

*2.1.2.3.8 Supplementary addressing information pertinent to a dispatch note*

**Description:** This element contains a references to a dispatch note to which the comment/response relates.

**Markup element:** <`ddnRefAddressItems`> (M)

**Attributes:**

– None

**Child elements:**

– `issueDate` (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4.

## 2.2 Content section

**Description:** The content section contains the comment and/or the response to a comment.

**Markup element:** <`commentContent`> (M)

**Attributes:**

– None

**Child elements:**

– <`simplePara`> (M). Refer to Chap 3.9.5.2.1.10.
– <`attachmentRef`> (O). Refer to Para 2.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<commentContent>
<simplePara>...</simplePara>
</commentContent>
```

### 2.2.1 Simple paragraph

This element contains the description of the comment/response. This description must be in paragraph form. A reference to an attachment only is not sufficient. Refer to Chap 3.9.5.2.1.10.

### 2.2.2 Reference to an attachment

**Description:** The file name consists of the prefix "COM", the comment identification code, a sequential number for the attachment in this comment (MM) and the file type extension (eg .PDF, .ZIP, .XLS).

COM-YY-YYYYY-XXXX-NNNNN-A-MM.EXT

**Note**

The allowed file types must be defined by the project or the organization and must be supported by the viewing systems.

**Markup element:** <`attachmentRef`> (O)

**Attributes:**

– `attachmentNumber (M)`. This attribute contains a two digit attachment number.

**Note**

The value of this attribute is not affected by leading zeroes. For example, attachmentNumber="012" is the same as attachmentNumber="12" and both are correct specifications. Of course, changing the 0 to any number 1-9 causes a parsing error, since it makes the number three significant digits long.

- `fileExtension` (M).
- `xlink:type` (O). Refer to Chap 7.4.1.1.
- `xlink:href` (O). Refer to Chap 7.4.1.1.
- `xlink:title` (O). Refer to Chap 7.4.1.1.
- `xlink:show` (O). Refer to Chap 7.4.1.1.
- `xlink:actuate` (O). Refer to Chap 7.4.1.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- Allowable formats of attachments

**Markup example:**

```
<attachmentRef attachmentNumber="01" fileExtension="PDF"/>
```

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of comment forms**. The project or the organization must decide whether or not to use comment forms. Refer to Para 2.

**Use of comment priority codes**. The project or the organization must decide how to best configure the codes to represent at least the following (or equivalent) priorities (also refer to Chap 3.9.6.1 and Para 2.1.2.1):

- safety critical
- emergency
- routine

**Use of response type codes**. The project or organization must at least configure the codes to represent the following response types (refer to Chap 3.9.6.1 and Para 2.1.2.2):

- accepted
- pending
- partly accepted
- rejected

**Formats of attachments.** The project or the organization must decide which file types are allowed for attachments to comments. Refer to Para 2.2.2.

# 4 Examples

```
<comment>
<identAndStatusSection>
<commentAddress>
<commentIdent>
<commentCode senderIdent="AAAAA" yearOfDataIssue="2008"
modelIdentCode="AA" commentType="q" seqNumber="00001"/>
<language countryIsoCode="AA" languageIsoCode="aa"/>
</commentIdent>
<commentAddressItems>
<issueDate day="01" month="08" year="2008"/>
<commentOriginator>
<dispatchAddress>
<enterprise>
```

```
<enterpriseName>...</enterpriseName>
</enterprise>
<dispatchPerson>
<lastName>...</lastName>
</dispatchPerson>
<address>
<city>...</city>
<country>...</country>
</address>
</dispatchAddress>
</commentOriginator>
</commentAddressItems>
</commentAddress>
<commentStatus>
<security securityClassification="01"/>
<commentPriority commentPriorityCode="cp01"/>
<commentResponse responseType="rt01"/>
<commentRefs>
<ddnRefGroup>
<ddnRef>
<ddnCode senderIdent="AAAAA" yearOfDataIssue="2008"
modelIdentCode="AA" receiverIdent="AAAAB" seqNumber="00001"/>
</ddnRef>
</ddnRefGroup>
</commentRefs>
<remarks>...</remarks>
</commentStatus>
</identAndStatusSection>
<commentContent>
<simplePara>...</simplePara>
<attachmentRef attachmentNumber="01" fileExtension="PDF"/>
</commentContent>
</comment>
```

# Chapter 4.7

## *Information management - Version control of data modules*

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## 1 General

Updating of data modules is driven by changes to the Product or due to the technical publication process. This chapter gives the rules for the version control of data modules.

## 2 Version control of data modules

### 2.1 Issue and inwork number

The element <`issueInfo`> is used to record the version information of the data module. Any published update of a data module must cause the issue date to change and the issue number to increase. A consecutive three digit sequential number must indicate every issue of a data module.

### 2.2 Change of a data module

Any published update of a data module is identified with the type of update. The type of update is captured using the `issueType` attribute of the <`dmStatus`> element. There are eight values for `issueType`. For detailed descriptions for the `issueType` attribute, refer to Chap 3.9.5.1.

# 3 Examples

The following table details appropriate combinations of the `inWork`, `issueNumber`, and the `issueType` attributes. The detailed descriptions for these attribute are given in Chap 3.5 and Chap 3.9.5.1.

*Table 2 Rules for `issueNumber`, `inWork`, and `issuetype` attributes*

| Numbering | Rule | Attribute Value |
|---|---|---|
| 000.01 | new data module, first inwork version, status attribute `issuetype="new"` | `inWork="01"` `issueNumber="000"` `issueType="new"` |
| 000.02 | new data module, second inwork version, status attribute `issuetype="new"` | `inWork="02"` `issueNumber="000"` `issueType="new"` |
| 000.NN | new data module, inwork version "NN", status attribute `issuetype="new"` | `inWork="NN"` `issueNumber="000"` `issueType="new"` |
| 001.00 | first issue of data module, status attribute `issuetype="new"` | `inWork="00"` `issueNumber="001"` `issueType="new"` |
| 001.01 | first issue of data module, first inwork versionstatus attribute `issuetype="new"` | `inWork="01"` `issueNumber="001"` `issueType="new"` |
| 001.02 | first issue of data module, second inwork version, status attribute `issuetype="new"` | `inWork="02"` `issueNumber="001"` `issueType="new"` |
| 001.NN | first issue of data module, inwork version "NN", status attribute `issuetype="new"` | `inWork="NN"` `issueNumber="001"` `issueType="new"` |
| 002.00 | second issue of data module, eg status attribute `issuetype="changed"` | `inWork="00"` `issueNumber="002"` `issueType="changed"` |
| NNN.00 | issue "NNN" of data module, eg status attribute `issuetype="revised"` | `inWork="00"` `issueNumber="NNN"` `issueType="revised"` |

# Chapter 4.8

## *Information management - Interchange of data modules*

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| Chap 7.5.1 | Information interchange - File based transfer |
| www.s1000d.org | |

## 1 General

This chapter details the requirements and provides background for implementation of data interchange. The means for data interchange described herein are not limited to the interchange of data modules. They can also be used for technical information interchange in general.

To achieve an orderly and systematic digital interchange of data modules and other related CSDB information, it is necessary to work within a set of formal data interchange standards and procedures.

While certain conditions are presumed valid at the time of writing, technology is moving forward so that the interchange procedures detailed in this chapter have to be taken only as a basis. Actual implementation must be defined on the agreed optimum means available to a project during its lifecycle. The security regulations must conform to the applicable project or organization security instructions.

# 2 Data interchange

## 2.1 Interchange data format

The basic interchange unit defined in this chapter is a data module. For all types of data modules the references to illustrations, multimedia and other associated data are given within the data module text.

In order to allow cross references from data module text to documents stored in Adobe PDF, the data format PDF is used. Both multimedia and PDF files are treated like an illustration when referenced, stored and interchanged.

### 2.1.1 Data module text

The logical structure of an S1000D data module is defined in the XML Schema in accordance with the corresponding W3C recommendations. The S1000D XML Schema for data modules are described in Chap 7.3.1. The Schema defines the structure of the content of a data module, not the actual presentation or output.

### 2.1.2 Data module illustrations, multimedia and other associated data

The illustrations referenced within a data module are normally line drawings in vector and/or raster form. If agreed by the project, photographs (half tones) can also be used provided they meet all requirements to show clear details.

#### 2.1.2.1 CGM graphics

The basic data standard for 2-dimensional graphics is the CGM standard as defined in International Standards OrganizationISO/IEC 8632. A dedicated S1000D CGM profile is given in Chap 7.3.2, which defines a subset of the WebCGM profile.

WebCGM is a full CGM V4 profile based on the proforma and model profile of ISO/IEC 8632:1999-1 (second edition: 1999-12-15), "Functional specification". It has the additional value that there is an associated product certification testing service.

**Note**

CGM provides a raster graphics capability, which enables the integration of other raster encoding such as Comite Consultatif Internationale de Telegraphie et Telephonie-4 (CCITT-4), Portable Network Graphics (PNG) and Joint Photographic Experts Group (JPEG) embedded in metafiles. Therefore, the CGM standard can be used for all types of illustrations.

#### 2.1.2.2 Raster graphics

The data standard for binary (ie monochrome) raster graphics is either:

- Continuous Acquisition and Life-cycle Support (CALS) raster CCITT Gr 4 as defined in MIL-PRF-28002, but limited here to data subtype "Type 1 - untiled". The preferred resolution is 300 dpi. Other resolutions can be decided by project regulations.

– Tagged Image File Format (TIFF) based on the definition given in Chap 7.3.2 of this specification.

**Note**

Colored raster graphics in TIFF format as defined in the Adobe TIFF 6.0 specification using the loss-less Lempel-Ziv-Welch (LZW) compression method is also permitted in S1000D.

2.1.2.3 Photographs and artwork

The data standard for color and grey scale photographic images and artwork is:

– JPEG as defined in ISO/IEC 10918
– GIF as defined in CompuServe GIF 89a
– PNG as defined in REC-PNG-20031110

The preferred resolution is 300 dpi

2.1.2.4 Multimedia

The multimedia within a data module can be of any type defined in the project's business rules. Guidance on the use of multimedia is given in Chap 7.3.3, and authoring rules are given in Chap 3.9.2.

## 2.2 Interchange (transfer) package structure

An S1000D CSDB interchange (transfer) package consists of one data dispatch note as given in Chap 7.5 and at least one of the following data categories:

– one or more data modules, associated illustrations, multimedia and other data
– one or more CSDB status list
– one or more data module requirements list
– one or more comment forms and associated attachments
– one or more Publication or SCORM content package modules

There is an associated Schema for each of these data categories, except for the categories CSDB status list and data module requirements list. Both of these lists are handled with the single data module list Schema. The Schemas are described in Chap 7 together with examples.

**Note**

Electronic copies of the Schemas are available for downloading from the S1000D web site at www.s1000d.org.

## 2.3 File based transfer

The file based transfer method and the file name conventions are given in Chap 7.5.1.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Raster graphic resolution**. The project or the organization must decide the resolution to use for raster graphics. Refer to Para 2.1.2.2.

**Use of photographs**. The project or the organization must decide for what purposes photographs will be used, if at all. Refer to Para 2.1.2.3

**Use of multimedia formats**. The project or the organization must decide which multimedia formats will be used, if any at all. Refer to Para 2.1.2.4.

# Chapter 4.9

## *Information management - Publication and SCORM content package management*

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## 1 General

In order to define, prepare and manage publications and learning content generated of data modules, S1000D uses the publication module and SCORM content packages.

## 2 Content

The SCORM content data modules are built similar to other S1000D data modules with an identifier, a status section and a content section. The content section of the publication module contains the references to data modules, legacy technical publications or other publication

modules in the order and the structure the publication is delivered. The content section of the SCORM content package contains references to data modules, graphics and multimedia and other SCORM content packages in the order and structure the SCO is delivered.

Chap 4.9.1 gives the structure of the publication module. Chap 4.9.2 defines the publication module and SCORM content package codes. The building of publications and SCOs is shown in Chap 4.9.3 and the updating of publications and SCOs is described in Chap 4.9.4. Chap 4.9.5 gives the structure of the SCORM content package.

## 2.1 Key Distinctions between the Use and Intention of "SCORM Content Package" in S1000D and SCORM:

Every effort has been made to harmonize select S1000D and SCORM functions. One harmonization strategy centers on the creation of a derivative S1000D Publication Module to support the collection of learning content. That derivative is called the "SCORM Content Package Module". In advance of the following chapters, it is important to clarify and distinguish between the descriptor "SCORM Content Package" in the S1000D context, and a SCORM Content Package in the Learning Management System (LMS) context.

### 2.1.1 SCORM Content Package in the S1000D Context

The "SCORM Content Package" Module operates as a file aggregation tool in the learning content development and assembly process. It is a blend of Publication Module structures and portions of the SCORM content packaging conceptual model. Its structure is built in XML. The "SCORM Content Package" Module in S1000D does not send requests or communicate with a LMS. It is used for the express purpose of organizing references to data modules in a common source database (CSDB) developed and selected for a pre-determined learning product. It contains no attributes that would make it a runtime environment and does not interface with external applications.

### 2.1.2 SCORM Content Package in the Learning Management System Context

The "SCORM Content Package" descriptor in the LMS context is distinct from the S1000D context. The "SCORM Content Package" used in an LMS contains code that helps track a learner's progress through a course. It sends requests to a LMS through a pre-defined communication protocol. In essence, the "SCORM Content Package" in the LMS context is part of a runtime environment which serves, displays and sequences learning content to a learner during self-directed training. It is designed to interface with external applications.

### 2.1.3 Further Distinctions

The "SCORM Content Package" Module in S1000D is built and managed as an aggregation tool in a common source database. Its organization is built in XML and mirrors the relationship between files and sharable content objects (SCOs) in actual SCORM content packages compiled for use in an LMS. The SCORM Content Package Module in S1000D requires a mapping and a transformation to the native aggregation model referenced in SCORM.

### 2.1.4 Summary

The effort to harmonize S1000D and SCORM functions resulted in a new S1000D learning content aggregation model intended to mirror the conceptual content packaging model documented in the SCORM specification. The new S1000D learning aggregation model leverages SCORM terminology to accurately organize and prepare data modules managed in a CSDB and readies them for a true compile into SCORM formats and for use on a LMS.

# Chapter 4.9.1

## *Publication and SCORM content package management - Publication module*

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| Chap 7.8 | Information processing - Applicability |

# 1 General

The publication module defines the content and the structure of a publication. It is to contain one or more references to:

- data modules (including front matter data modules and access illustration data modules)
- publication modules
- legacy technical publications

The publication module Schema is defined in Chap 7.4.2.

ICN-AE-A-040901-0-C0419-00011-A-01-1

*Fig 1 Publication module concept*

# 2 Content of the publication module

**Description:** The element <pm> defines the content and structure of a publication.

**Markup element:** <pm> (M)

**Attributes:**

- id (O), the identifier of the <pm> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

- <identAndStatusSection> (M). Refer to Para 2.1
- <content> (M). Refer to Para 2.2

**Business rules decisions:**

- None identified.

**Markup example:**

```
<pm>
<identAndStatusSection>...</identAndStatusSection>
```

```
<content>...</content>
</pm>
```

## 2.1 Identification and status section

**Description:** The element <identAndStatusSection> contains the identification and status of the publication.

**Markup element:** <identAndStatusSection> (M)

**Attributes:**

– None

**Child elements:**

– <pmAddress> (M). Refer to Para 2.1.1
– <pmStatus> (M). Refer to Para 2.1.2

**Business rules decisions:**

– None identified.

**Markup example:**

```
<identAndStatusSection>
<pmAddress>...</pmAddress>
<pmStatus>...</pmStatus>
</identAndStatusSection>
```

### 2.1.1 Publication module address

**Description:** The element <pmAddress> contains the publication module address information.

**Markup element:** <pmAddress> (M)

**Attributes:**

– None

**Child elements:**

– <pmIdent> (M). Refer to Para 2.1.1.1.
– <pmAddressItems> (M). Refer to Para 2.1.1.2.

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmAddress>
<pmIdent>...</pmIdent>
<pmAddressItems>...</pmAddressItems>
</pmAddress>
```

#### 2.1.1.1 Publication module identification

**Description:** The element <pmIdent> contains the publication module identification information.

**Markup element:** <pmIdent> (M)

**Attributes:**

– None

**Child elements:**

– <identExtension> (O). Refer to Para 2.1.1.1.1.
– <pmCode> (M). Refer to Para 2.1.1.1.2.
– <language> (M). Refer to Para 2.1.1.1.3.
– <issueInfo> (M). Refer to Para 2.1.1.1.4.

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmIdent>
<pmCode modelIdentCode="S1000D" pmIssuer="I9005"
pmNumber="01000" pmVolume="00"/>
<language languageIsoCode="sx" countryIsoCode="US"/>
<issueInfo issueNumber="000" inWork="00"/>
</pmIdent>
```

2.1.1.1.1 *Identification extension*

**Description:** The element <identExtension> gives the additional parameters needed to establish a unique identification of a publication module in those cases when publication module code, issue and in-work numbers together with the language and country are insufficient to form a universally unique identity. This element establishes a producer unique subdomain for identification.

**Markup element:** <identExtension> (O)

**Attributes:**

– extensionProducer (M) the publication module producer, the value of which forms part of the universally unique identifier of a publication module instance and contains the CAGE code of the producer of the data module instance.
– exensionCode (M) the publication module extended code, the value of which is decided by the publication module producer. Typically, but not necessarily, it will contain a customer related content, e.g. customer CAGE amended with a sequence number. If it is used, it must contain uppercase alphabetic (A-Z) and numeric (0-9) characters

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<identExtension extensionCode="I9005"
extensionProducer="S1000D"/>
```

2.1.1.1.2 *Publication module code*

**Description:** The element <pmCode> contains the publication module code. Publication modules produced according to this specification must be given a Publication module code.

The details are given in Chap 4.9.2.

**Markup element:** <pmCode> (M)

**Attributes:**

- modelIdentCode (M) the model identifier or project name. Refer to Chap 4.3.1
- pmIssuer (M) the CAGE code of the publication module issuing company.
- pmNumber (M) the number of the publication module.
- pmVolume (M) the volume of the publication module. Set to "00" if only one volume exists.

**Child elements:**

- None

**Business rules decisions:**

- None identified.

**Markup example:**

```
<pmCode modelIdentCode="S1000D" pmIssuer="I9005"
pmNumber="01000" pmVolume="00"/>
```

*2.1.1.1.3 Language*

**Description:** The element <language> gives the language in which the publication module is written.

Details are given in Chap 3.9.5.1.

**Markup element:** <language> (M)

**Attributes:**

- languageIsoCode (M). Refer to Chap 3.9.5.1
- countryIsoCode (M). Refer to Chap 3.9.5.1

**Child elements:**

- None

**Business rules decisions:**

- None identified.

**Markup example:**

```
<language countryIsoCode="US" languageIsoCode="sx"/>
```

*2.1.1.1.4 Issue information*

**Description:** The element <issueInfo> gives the issue information in which the publication module is written.

**Markup element:** <issueInfo> (M)

**Attributes:**

- issueNumber (M). Refer to Chap 3.9.5.1
- inWork (M). Refer to Chap 3.9.5.1

**Child elements:**

- None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<issueInfo issueNumber="005" inWork="00"/>
```

2.1.1.2 Publication module address items

**Description:** The element <pmAddressItems> includes additional information about a publication module.

**Markup element:** <pmAddressItems> (M)

**Attributes:**

– None

**Child elements:**

– <issueDate> (M). Refer to Chap 3.9.5.1
– <pmTitle> (M). Refer to Para 2.1.1.2.2
– <shortPmTitle> (O). Refer to Para 2.1.1.2.3

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmAddressItems>
<issueDate day="01" month="08" year="2008"/>
<pmTitle>International specification for technical publications
utilizing a common source database</pmTitle>
</pmAddressItems>
```

*2.1.1.2.1 Issue date*

**Description:** The element <issueDate> contains the input date (ie the release to CSDB date), or the cut-off date for the information, as decided by the project. Every issue of a publication module whether initially written, completely revised or updated by changes, must receive a calendar date in the form YYYY-MM-DD.

Details are given in Chap 3.9.5.1.

**Markup element:** <issueDate> (M)

**Attributes:**

– year (M). Refer to Chap 3.9.5.1.
– month (M). Refer to Chap 3.9.5.1.
– day (M). Refer to Chap 3.9.5.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<issueDate year="2008" month="08" day="01"/>
```

*2.1.1.2.2 Publication module title*

**Description:** The element <pmTitle> gives the meaning of the publication and is defined by the project.

**Markup element:** <pmTitle> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmTitle>International specification for technical publications
utilizing a common source database</pmTitle>
```

*2.1.1.2.3 Short publication module title*

**Description:** The element <shortPmTitle> contains the short title of the publication and is defined by the project.

**Markup element:** <shortPmTitle> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<shortPmTitle>Spec</shortPmTitle>
```

**2.1.2 Publication module status information**

**Description:** The element <pmStatus> contains the publication module status.

**Markup element:** <pmStatus> (M)

**Attributes:**

– issueType (O)

**Child elements:**

– <sourcePmIdent> (O). Refer to Para 2.1.2.1
– <security> (M). Refer to Para 2.1.2.2
– <dataRestrictions> (O). Refer to Para 2.1.2.3
– <logo> (O). Refer to Para 2.1.2.4
– <responsiblePartnerCompany> (M). Refer to Para 2.1.2.5
– <originator> (O). Refer to Para 2.1.2.6

- <applicCrossRefTableRef> (O). Refer to Para 2.1.2.7
- <applic> (M). Refer to Para 2.1.2.8
- <pubMedia> (O). Refer to Para 2.1.2.9
- <qualityAssurance> (M). Refer to Para 2.1.2.10
- <systemBreakdownCode> (O). Refer to Para 2.1.2.11
- <functionalItemCode> (O). Refer to Para 2.1.2.11
- <reasonForUpdate> (O). Refer to Para 2.1.2.12
- <remarks> (O). Refer to Para 2.1.2.13

**Business rules decisions:**

- None identified.

**Markup example:**

```
<pmStatus>
<security securityClassification="01"/>
<responsiblePartnerCompany>
<enterpriseName>S1000D</enterpriseName>
</responsiblePartnerCompany>
<applic>
<displayText>
<simplePara>ALL</simplePara>
</displayText>
</applic>
<qualityAssurance>
<unverified/>
</qualityAssurance>
</pmStatus>
```

2.1.2.1 Source publication module identification

**Description:** The element <sourcePmIdent> contains the source publication module identification information such as publication module code, language and issue information.

**Markup element:** <sourcePmIdent> (O)

**Attributes:**

- None

**Child elements:**

- <identExtension> (O). Refer to Para 2.1.1.1.1.
- <pmCode> (M). Refer to Para 2.1.1.1.2.
- <language> (M). Refer to Para 2.1.1.1.3.
- <issueInfo> (M). Refer to Para 2.1.1.1.4.

**Business rules decisions:**

- None identified.

**Markup example:**

```
<sourcePmIdent>
<pmCode modelIdentCode="S1000D" pmIssuer="I9005"
pmNumber="01000" pmVolume="00"/>
<language countryIsoCode="US" languageIsoCode="sx"/>
```

```
<issueInfo issueNumber="005" inWork="00"/>
</sourcePmIdent>
```

2.1.2.2 Security classification

**Description:** The element <security> contains the security classification of the complete publication module and its contained or associated illustrations.

The security classification of the publication module must be given. It must correspond to the highest classified information or combination of information within the publication module.

Details are given in Chap 3.9.5.1.

**Markup element:** <security> (M)

**Attributes:**

- securityClassification (M). This attribute has possible integer values from "01" thru "99". The meaning of the value is defined by the project with the lowest classification being "01". The classification must correspond to the highest classification of the individual elements within the data module content. For the definition of the possible values, refer to Chap 3.9.6.1.
- commercialClassification (O). This attribute has possible values from "cc01" thru "cc99", which are to be applied as defined by the project. The meaning of the value is defined by the lowest classification being "cc01". The classification must correspond to the highest classification of the individual elements within the data module content. For the definition of the possible values, refer to Chap 3.9.6.1.
- caveat (O). This attribute has possible values from "cv01" thru "cv99", which are to be applied as defined by the project. The meaning of the value is defined by the lowest classification being "cv01". The classification must correspond to the highest classification of the individual elements within the data module content. For the definition of the possible values, refer to Chap 3.9.6.1.

**Child elements:**

- None

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use and definitions of the available attributes
- priorities of the attributes
- the definitions of the meanings for the ranges of classification values

**Markup example:**

The following is an example of a data module that could be classified secret, with a commercial classification of Commercial in Confidence and a caveat of UK Eyes Only.

```
<security securityClassification="01"
commercialClassification="cc51" caveat="cv51"/>
```

The following shows a data module that has the lowest possible security classification.

```
<security securityClassification="01"/>
```

2.1.2.3 Data restrictions

**Description:** The element <dataRestrictions> contains the instructions and information, applicable to the publication module, that relate to the use, storage and handling. This element can contain applicability information.

The data restrictions for the publication module are to be given, where required.

Details are given in Chap 3.9.5.1.

**Markup element:** <dataRestrictions> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
- id (O), the identifier of the data restrictions element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O) and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1
- securityClassification (O), commercialClassification (O) and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6
- authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11

**Child elements:**

- <restrictionInstructions> (C). Refer Chap 3.9.5.1.
- <restrictionInfo> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of data restrictions information
- use of applicability information

**Markup example:**

```
<dataRestrictions>
<restrictionInstructions>
<dataDistribution>To be made available to all S1000D
users.</dataDistribution>
<exportControl><exportRegistrationStmt>
<simplePara>Export of this data module to all countries that are
the residence of organizations that are users of S1000D is
permitted. Storage of this data module is to be at the
discretion of the organization.</simplePara>
</exportRegistrationStmt></exportControl>
<dataHandling>There are no specific handling instructions for
this data module.</dataHandling>
<dataDestruction>Users may destroy this data module in
accordance with their own local procedures.</dataDestruction>
<dataDisclosure>There are no dissemination limitations that
apply to this data module.</dataDisclosure>
</restrictionInstructions>
<restrictionInfo>
<copyright>
<para>TPSMG UK, 2003-2010</para>
<para>Government License - TPSMG 001</para>
</copyright>
<policyStatement>TPSMG TOR 001</policyStatement>
<dataConds>There are no known conditions that would change the
data restrictions for, or security classification of, this data
module.</dataConds>
</restrictionInfo>
</dataRestrictions>
```

2.1.2.4 Logo

**Description:** The element <logo> contains the reference to the manufacturer's, project's or sponsor's logotype. Details are given in Chap 3.9.5.1.

**Markup element:** <logo> (O)

**Attributes:**

– None

**Child elements:**

– <symbol> (M). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– Use of the logo

**Markup example:**

```
<logo>
<symbol infoEntityIdent="ICN-S3627-S1000D0494-001-01"/>
</logo>
```

2.1.2.5 Responsible partner company

**Description:** The element <responsiblePartnerCompany> contains the responsible company or authority for the publication module and must be given. Details are given in Chap 3.9.5.1.

**Markup element:** <responsiblePartnerCompany> (M)

**Attributes:**

– enterpriseCode (O). Refer to Chap 3.9.5.1.
– id (O), the identifier of the responsible partner company element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <enterpriseName> (M). Refer to Chap 3.9.5.2.11.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of the optional enterprise element and attribute
– use of the element <enterpriseName>
– use of the CAGE code
– list of permitted CAGE codes for the project

**Markup example:**

The first example is for a project which does not use the element <enterpriseName>.

```
<responsiblePartnerCompany enterpriseCode="U8025"/>
```

This example is for a project that uses the element <enterpriseName>.

```
<responsiblePartnerCompany enterpriseCode="U8025">
<enterpriseName>UK MoD</enterpriseName>
</responsiblePartnerCompany>
```

2.1.2.6 Originator

**Description:** The element <originator> contains the originator, who delivered the publication module. In most situations the originator is the same as the responsible company or authority.

Details are given in Chap 3.9.5.1.

**Markup element:** <originator> (O)

**Attributes:**

- exterpriseCode (O). Refer to Chap 3.9.5.2.11.6.
- id (O), the identifier of the originator element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

- <enterpriseName> (M). Refer to Chap 3.9.5.2.11.6.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the optional enterprise element and attribute
- use of the element <enterpriseName>
- use of the CAGE code
- list of permitted CAGE codes for the project

**Markup example:**

The first example is for a project which uses the NCAGE.

```
<originator enterpriseCode="U8025"/>
```

This example is for a project that uses the element <enterpriseName>.

```
<originator>
<enterpriseName>Bikey Bikes</enterpriseName>
</originator>
```

2.1.2.7 Applicability Cross-reference Table reference

**Description:** The element <applicCrossRefTableRef> contains a pointer to the Applicability Cross-reference Table (ACT) data module that applies to the publication module. Applicability and the ACT data module and related aspects are described in Chap 4.14 and Chap 3.9.5.3.1 and Chap 7.8.

**Markup element:** <applicCrossRefTableRef> (M)

**Attributes:**

- None

**Child elements:**

- <dmRef> (M). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified.

**Markup example:**

```
<applicCrossRefTableRef>
<dmRef>
```

```
<dmRefIdent>
<dmCode modelIdentCode="S1000DBIKE" systemDiffCode="AAA"
systemCode="D00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="AA"
infoCode="00W" infoCodeVariant="A" itemLocationCode="D" />
<issueInfo issueNumber="003" inWork="00"/>
</dmRefIdent>
</dmRef>
</applicCrossRefTableRef>
```

2.1.2.8 Applicability

For detailed information about applicability, refer to Chap 3.9.5.3.

2.1.2.9 Publication media

**Description:** The repeatable element <pubMedia> specifies the information about how the media on which the publication is delivered.

**Markup element:** <pubMedia> (O)

**Attributes:**

- pubMediaType (M), media type on which the publication module is delivered (eg paper, CD-ROM, DVD, online).
- pubMediaCode (M), media identification (label).
- volumeNumber (O), identifies the volume of the media and is defined by a two numeric character element. It is used when the information given needs to be separated into several volumes due to media restrictions. It must not correspond with the attribute pmVolume within the publication module code.
- mediaLocation (O), location of the media.

**Child elements:**

- None

**Business rules decisions:**

- None identified.

**Markup example:**

```
<pubMedia pubMediaCode="DVD01" pubMediaType="DVD"/>
```

2.1.2.10 Quality assurance status

**Description:** The element <qualityAssurance> contains details of the status of the QA process as required by the project. The publication module must be identified as either being unverified or verified. This element can contain applicability information to indicate the applicability of the QA information. This applicability information must be a subset of the mandatory applicability settings for the complete data module. This applies equally to the element <qualityAssurance> and all its subelements. Refer to Chap 3.9.5.1.

**Markup element:** <qualityAssurance> (M)

**Attributes:**

- applicRefId (O). Refer to Chap 3.9.5.3

**Child elements:**

- <unverified> (C). Refer to Chap 3.9.5.1
- <firstverification> (C). Refer to Chap 3.9.5.1

– <secondverification> (O). Refer to Chap 3.9.5.1

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

– use of applicability information

**Markup example:**

```
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
```

2.1.2.11 System breakdown code or functional item code

**Description:** The element <systemBreakdownCode> and the element <functionalItemCode> can be used to give the code for component maintenance publications. Depending on project decision, the system breakdown code, or an equivalent code, or functional item code can be indicated at this location.

These elements can be repeated. Details are given in Chap 3.9.5.1.

**Markup element:** <systemBreakdownCode> (O) or <functionalItemCode> (O)

**Attributes:**

– id (O), the identifier of the <systemBreakdownCode> element. Refer to Chap 3.9.5.2.1.2.

**Note**

The element <functionalItemCode> does not include the attribute id.

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<systemBreakdownCode>BY142</systemBreakdownCode>
<functionalItemCode>AAI2392</functionalItemCode>
```

2.1.2.12 Reason for update

**Description:** The element <reasonForUpdate> contains a short explanation of the reason for updating the publication module. Details are given in Chap 3.9.5.1.

**Markup element:** <reasonForUpdate> (C)

**Attributes:**

– applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.
– id (O), the identifier of <reasonForUpdate> element. Refer to Chap 3.9.5.2.1.2.
– updateReasonType (O). Refer to Chap 3.9.5.2.1.1.
– updateHighlight (O). Refer to Chap 3.9.5.2.1.1.

**Child elements:**

– <simplePara> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element
- use of the element in conjunction with the production process
- use of applicability information

**Markup example:**

```
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-001">
<simplePara>CPF 2006-47AA: Applicability structure change and
addition of actref element</simplePara>
</reasonForUpdate>
<reasonForUpdate updateReasonType="urt01" updateHighlight="1"
id="rfu-002">
<simplePara>CPF 2006-48AA: Export control structure change,
addition of container elements</simplePara>
</reasonForUpdate>
```

2.1.2.13 Remarks

**Description:** The element <remarks> is to be used for inserting general remarks if required by the project. Compliance category of service bulletins are to be given under this heading.

Details are given in Chap 3.9.5.1.

**Markup element:** <remarks> (O)

**Attributes:**

- applicRefId (O), the applicability information. Refer to Chap 3.9.5.3.

**Child elements:**

- <simplePara> (O). Refer to Chap 3.9.5.2.1.10.

**Business rules decisions:**

Business rules decisions include, but are not limited to, the following:

- use of the element
- use of applicability information

**Markup example:**

```
<remarks>
<simplePara>Incorporates repair instruction X15526172-
A</simplePara>
<simplePara>Incorporates repair instruction X15526172-
B</simplePara>
</remarks>
```

## 2.2 Publication module content section

**Description:** The element <content> contains the content section of the publication module. The publication module entry (one or more) is the central element for a publication module and can be defined recursively. This allows publication module structures in variable depth.

**Markup element:** <content>

**Attributes:**

– id (O), the identifier of <content> element. Refer to Chap 3.9.5.2.1.2.

**Child elements:**

– <pmEntry> (M). Refer to Para 2.2.1

**Business rules decisions:**

– None identified.

**Markup example:**

```
<content>
<pmEntry>
<dmRef>...</dmRef>
</pmEntry>
</content>
```

### 2.2.1 Publication module entry

**Description:** The element <pmEntry>

The publication module entry (one or more) is the central element for a publication module and can be defined recursively. This allows publication module structures in variable depth.

**Markup element:** <pmEntry> (O)

**Attributes:**

– pmEntryType (O). This attribute defines the publication module entry type based on the attribute definitions set forth by the project. This attribute can have the following values:
  - "pmt01" - "pmt99", refer to Chap 3.9.6.1

**Child elements:**

– <pmEntryTitle> (O). Refer to Para 2.2.2
– One or more of the following must be selected:
  - <dmRef> (C). Refer to Chap 3.9.5.2.1.2
  - <pmRef> (C). Refer to Chap 3.9.5.2.1.2
  - <externalPubRef> (C). Refer to Chap 3.9.5.2.1.2
  - <pmEntry> (C). Refer to Para 2.2.1

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmEntry>
<externalPubRef>...</externalPubRef>
</pmEntry>
```

### 2.2.2 Title of the publication module entry

**Description:** The element <pmEntryTitle> contains the title of the publication entry. The title for the following entries must be given. It can be used for the table of contents.

**Markup element:** <pmEntryTitle> (O)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

```
<pmEntryTitle>Chapter</pmEntryTitle>
```

# Chapter 4.9.2

## *Publication and SCORM content package management - Coding of publications and SCOs*

## Table of contents

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 4.3.1 | Data module code - Model identification code |

## 1 General

The Publication module code and SCORM Content package Code (SCORM module code) are the standardized and structured identifiers of a publication module and SCORM content package or a final deliverable publication and learning product. They are elements of the status section of the publication module and SCORM content packages.

The publication module code is part of the unique identifier of the publication module. The publication module code is used to manage publication modules in the CSDB, to retrieve them or to gain access to them in an IETP environment. The publication module code is used as an entry in the list of applicable publications and as a reference in data modules and publications.

The SCORM module code is part of the unique identifier of the SCORM content package. The SCORM module code is used to manage SCORM content packages in the CSDB, to retrieve them or to gain access to them in a learning environment. The SCORM module code is used as an entry in the list of applicable learning product and as a reference in data modules and other SCORM content packages.

# 2 Content

## 2.1 Publication module code and SCORM content package code

The publication module code and SCORM module code comprise up to 26 alphanumeric characters and are built up as shown in Table 2. The minimum length is 14 characters.

**Markup elements:** <`pmCode`> and <`scormContentPackageCode`>

YY - YYYYY - YYYYY - NN (14 characters)

thru

YYYYYYYYYYYYYY - YYYYY - YYYYY - NN (26 characters)

*Table 2 Publication module and SCORM content package code*

| Publication module code and SCORM module code breakdown | Length |
|---|---|
| Model identification code | 2 thru 14 alphanumeric characters |
| Issuing authority (eg CAGE) | 5 alphanumeric characters |
| Number of the publication or SCO | 5 alphanumeric characters |
| Volume number | 2 numeric characters |

### 2.1.1 Model identification code

The model identification code is applicable in the publication module code and SCORM module code to the characters identified as follows:

**YY** - YYYYY - YYYYY - NN (14 characters)

thru

**YYYYYYYYYYYYYY** - YYYYY - YYYYY - NN (26 characters)

**Markup attribute:** `modelIdentCode`

Details are given in Chap 4.3.1.

### 2.1.2 Issuing authority

The issuing authority is applicable in the publication module code and SCORM module code to the characters identified as follows:

YY - **YYYYY** - YYYYY - NN (14 characters)

thru

YYYYYYYYYYYYYY - **YYYYY** - YYYYY - NN (26 characters)

To identify the issuing authority it is recommended to use the CAGE code. The role, responsibility and identification must be defined in the project business rules.

**Markup attribute:** `pmIssuer` and `scormContentPackageIssuer`

### 2.1.3 Number of the publication module or SCORM content package

The number of the publication modules and SCORM content packages are applicable in the publication module code and SCORM module code to the characters identified as follows:

YY - YYYYY - **YYYYY** - NN (14 characters)

thru

YYYYYYYYYYYYYY - YYYYY - **YYYYY** - NN

The issuing authority assigns the number of the publication module or SCORM content package. The number is a unique alphanumeric identifier depending on the model identification code (attribute `modelIdentCode`) and the issuing authority (attributes `pmIssuer` or `scormContentPackageIssuer`).

**Markup attribute:** `pmNumber` and `scormContentPackageNumber`

### 2.1.4 Volume of the publication and SCO

The volume is applicable in the publication module code and SCORM module code to the characters identified as follows:

YY - YYYYY - YYYYY - **NN**

thru

YYYYYYYYYYYYYY - YYYYY - YYYYY - **NN**

This element is used in cases where a publication or SCO has to be separated into volumes without assigning a new number. Default value is "`00`".

**Markup attribute:** `pmVolume` and `scormContentPackageVolume`

## 2.2 Use of hyphens

The Publication module code or SCORM module code must be presented with hyphens [-] in the positions as shown above and without spaces in between. The hyphens delimit the contents of the codes, as shown, but are not included within the population of the publication module code or SCORM module code elements. This rule applies also to cases where the publication module code or SCORM module code is given as a single string.

## 2.3 Example for the publication module code and SCORM module code

On output (eg on paper, CD-ROM or for data file names), the publication module code must start with the letters "Publication Module Code (PMC)", followed by the publication module code. The SCORM module code must start with the letters “SMC”, followed by the SCORM content package code.

Example (publication module code):

- PMC-A1-C0149-00111-01
- PMC-A1-C0149-00111-02

Example (SCORM module code):

- SMC-A1-C0149-00111-01
- SMC-A1-C0149-00111-02

The output media, contained in the status section of the publication module or SCORM content package, can be added if required by the project (eg when a publication is delivered on different media). In this case the following abbreviations are recommended.

- P = paper
- CD = CD-ROM
- W = webURL

Example (publication module code):

- PMC-A1-C0149-00111-01-W
- PMC-A1-C0149-00111-01-P

Example (SCORM module code):

- SMC-A1-C0149-00111-01-W
- SMC-A1-C0149-00111-01-P

The media must not be printed on the pages in paper publications, SCO or be used as a reference.

# Chapter 4.9.3

## *Publication and SCORM content package management - Building of publications and SCOs*

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## 1 General

The publication module allows the building of the publication to be independent of the end-user presentation software. The preparation of the publication module is an authoring process.

The SCORM content package allows the building of the learning product to be independent of the end-user presentation software. The preparation of the SCORM content package is an authoring process.

# 2 Content

## 2.1 Publication construction

### 2.1.1 Status information

The status section gives the identification elements required to address and control the publication module as defined in Chap 4.9.1. The elements of the status section are similar to the elements of status section of the data module as defined in Chap 3.9.5.1.

### 2.1.2 Content information

The content of the publication module is primarily built of data modules extracted from the CSDB. This includes the required front matter as given in Chap 5.3.1.

The structure of the publication module is defined by the publication module entries. These can be recursively defined and give the table of contents of the final publication. An additional method of navigating through an IETP can be achieved by the use of access illustrations.

Each publication module entry must have a title and references to one or more elements of the following type:

- data module
- publication module
- legacy technical publication

The generation of a publication module facilitates a top down design for the publication structure of the Product. The publication structure can be defined at an early stage of a project prior to population of the content.

The publication module is also used to define and build the List of Applicable Publications (LOAP), see Chap 5.3.1.1.

### 2.1.3 Example

The following markup example represents a valid publication module fragment in XML format:

```
<pm xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_4-
0/xml_schema_master/pm/pmSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
<identAndStatusSection>
<pmAddress>
<pmIdent>
<pmCode pmVolume="00" modelIdentCode="DEE1B" pmNumber="01132"
pmIssuer="C0419"/>
<language countryIsoCode="US" languageIsoCode="sx"/>
<issueInfo inWork="01" issueNumber="002"/>
</pmIdent>
<pmAddressItems>
<issueDate day="01" month="01" year="2010"/>
<pmTitle>Air vehicle maintenance - Landing gear system</pmTitle>
</pmAddressItems>
</pmAddress>
<pmStatus>
<security securityClassification="02"/>
<responsiblePartnerCompany enterpriseCode="C0419"/>
<applicCrossRefTableRef>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="A" infoCode="001" subSystemCode="A"
modelIdentCode="S1000D" infoCodeVariant="A"
```

```
disassyCodeVariant="A" subSubSystemCode="1" itemLocationCode="A"
assyCode="11" systemCode="33" disassyCode="01"></dmCode>
</dmRefIdent>
</dmRef>
</applicCrossRefTableRef><applic>
<displayText></displayText>
</applic>
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
</pmStatus>
</identAndStatusSection>
<content>
<pmEntry>
<pmEntryTitle>Front matter</pmEntryTitle>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="A" infoCode="001" subSystemCode="A"
modelIdentCode="S1000D" infoCodeVariant="A"
disassyCodeVariant="A" subSubSystemCode="1" itemLocationCode="A"
assyCode="11" systemCode="33" disassyCode="01"></dmCode>
</dmRefIdent>
</dmRef>
</pmEntry>
<pmEntry>
<pmEntryTitle>Extension and retraction</pmEntryTitle>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="B" infoCode="040" subSystemCode="3"
modelIdentCode="DEE1B" infoCodeVariant="A"
disassyCodeVariant="A" subSubSystemCode="0" itemLocationCode="A"
assyCode="00" systemCode="32" disassyCode="00"></dmCode>
</dmRefIdent>
</dmRef>
</pmEntry>
</content>
</pm>
```

## 2.2 SCO construction

### 2.2.1 Status information

The status section gives the identification elements required to address and control the SCORM content package as defined in Chap 4.9.1. The elements of the status section are similar to the elements of status section of the data module as defined in Chap 3.9.5.1.

### 2.2.2 Content information

The content of the SCORM content package is primarily built of data modules extracted from the CSDB.

The structure of the SCORM content package is defined by the SCORM content package entries. These can be recursively defined and give the navigation requirements for the LMS.

Each SCORM content package entry can have a description of the content and references to one or more elements of the following type:

- data module
- other SCORM content packages

The generation of a SCORM content package facilitates a top down design for the structure of the learning product. The structure can be defined at an early stage of a project prior to population of the content.

# 3 Markup examples

There are two examples for the SCORM content package construction. These examples are provided to show the two ways a SCORM content package can be employed: as a description of a full learning event (eg lesson) or as a description of a single or collection of learning products that is not describing a full learning event.

## 3.1 SCORM content package as a full learning event

The following XML markup example represents a valid SCORM content package fragment where the SCORM content package contains a collection of learning products that, together, make up a complete learning event such as a lesson:

```
<!DOCTYPE scormContentPackage [
<!ENTITY v1 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000027-
A-01-1.avi" NDATA avi>
<!NOTATION avi PUBLIC "avi">
<!ENTITY g2 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000013-
A-01-1.jpg" NDATA JPEG>
<!ENTITY g1 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000007-
A-01-1.jpg" NDATA JPEG>
<!NOTATION JPEG PUBLIC "jpg">
]>
<scormContentPackage xmlns:lom="http://ltsc.ieee.org/xsd/LOM"
xmlns:ns3="http://ltsc.ieee.org/xsd/LOM/extend"
xmlns:ns1="http://ltsc.ieee.org/xsd/LOM/unique"
xmlns:ns2="http://ltsc.ieee.org/xsd/LOM/vocab"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="scormcontentpackageSchema.xsd">
<!--This example illustrates how a single SCORM content package
can describe a full learning event (one or more learning
products that make up a course or lesson).
The IDSTATUS section gives all the identification elements
required to address and control the SCORM content package. -->
<identAndStatusSection>
<scormContentPackageAddress>
<scormContentPackageIdent>
<scormContentPackageCode modelIdentCode="DEE1B"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<language countryIsoCode="US" languageIsoCode="en"/>
<issueInfo inWork="00" issueNumber="003"/>
</scormContentPackageIdent>
<scormContentPackageAddressItems>
<issueDate day="01" month="08" year="2008"/>
<scormContentPackageTitle>Air vehicle maintenance training -
Landing gear system</scormContentPackageTitle>
</scormContentPackageAddressItems>
</scormContentPackageAddress>
<scormContentPackageStatus>
<security securityClassification="01"/>
<responsiblePartnerCompany
enterpriseCode="C0419"></responsiblePartnerCompany>
<scormContentPackageMedia scormContentPackageMediaCode="DKS:1"
scormContentPackageMediaType="CD-ROM"/>
<qualityAssurance>
```

```
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
<personSkill skillLevelCode="sk01"/>
</scormContentPackageStatus>
<!--The LOM at this level is used to insert metadata about the
SCORM content package. If the SCORM content package describes a
single learning product, then this is the only place where the
LOM might be referenced. If the SCORM content package is a
collection of learning products used to describe a full learning
event then there may be a LOM reference here for the learning
event and then additional LOM references at the individual
learning product level to describe those products.-->
<lom:lom>
<lom:general>
<lom:identifier>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:title>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:title>
<lom:description>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:description>
<lom:keyword>
<lom:string>Air vehicle maintenance training, Landing gear
system</lom:string>
</lom:keyword>
</lom:general>
<lom:lifeCycle>
<lom:version>
<lom:string language="en">2007.06.17.12.12.15.737</lom:string>
</lom:version>
<lom:status>
<lom:source>LOMv1.0</lom:source>
<lom:value>final</lom:value>
</lom:status>
</lom:lifeCycle>
<lom:metaMetadata>
<lom:identifier>
<lom:catalog>GUID</lom:catalog>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:metadataSchema>LOMv1.0</lom:metadataSchema>
<lom:metadataSchema>SCORM_CAM_v1.3</lom:metadataSchema>
</lom:metaMetadata>
</lom:lom>
</identAndStatusSection>
<content>
<!--This is a reference to one learning product used to make up
the courseware.-->
<scoEntry>
<scoEntryAddress>
<scoEntryCode modelIdentCode="DEE1B1"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<scoEntryTitle>Parts of the Landing Gear</scoEntryTitle>
</scoEntryAddress>
```

```
<scoEntryStatus>
<qualityAssurance>
<unverified/>
</qualityAssurance>
</scoEntryStatus>
<!--Since this SCORM content package is a collection of learning
products used to make up a full learning event, then there might
be another LOM reference here for this individual product.-->
<lom:lom>
<lom:general>
<lom:identifier>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:title>
<lom:string>Landing gear system - Parts of the Landing
Gear</lom:string>
</lom:title>
<lom:description>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:description>
<lom:keyword>
<lom:string>Air vehicle maintenance training, Landing gear
system, components</lom:string>
</lom:keyword>
</lom:general>
<lom:lifeCycle>
<lom:version>
<lom:string language="en">2007.06.17.12.12.15.792</lom:string>
</lom:version>
<lom:status>
<lom:source>LOMv1.0</lom:source>
<lom:value>final</lom:value>
</lom:status>

</lom:lifeCycle>
<lom:metaMetadata>
<lom:identifier>
<lom:catalog>GUID</lom:catalog>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:metadataSchema>LOMv1.0</lom:metadataSchema>
<lom:metadataSchema>SCORM_CAM_v1.3</lom:metadataSchema>
</lom:metaMetadata>
</lom:lom>
<scoEntryContent>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="AAAA" infoCode="921" subSystemCode="5"
modelIdentCode="MODELIC" infoCodeVariant="A"
disassyCodeVariant="AAA" subSubSystemCode="0"
itemLocationCode="A" assyCode="0000" systemCode="A53"
disassyCode="00"/>
</dmRefIdent>
</dmRef>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="AAAA" infoCode="921" subSystemCode="5"
modelIdentCode="MODELIC" infoCodeVariant="A"
disassyCodeVariant="AAA" subSubSystemCode="0"
```

```
itemLocationCode="A" assyCode="0001" systemCode="A53"
disassyCode="00"></dmCode>
</dmRefIdent>
</dmRef>
<extraResources>
<!-- <figure>
<title>Landing Gear</title>
<graphic infoEntityIdent="g1"></graphic>
</figure>-->
<!-- Only one (figure or mulitimedia) is allowed.-->
<multimedia>
<title>Landing Gear Up</title>
<multimediaObject multimediaType="video" infoEntityIdent="v1"
showPluginControls="show"></multimediaObject>
</multimedia>
</extraResources>
<xPaths>
<xPath xPath="DMC-ALMDSANAES1-A-00-P1-00-000-0100-D_001-
00.xml/para1[1]"></xPath>
</xPaths>
</scoEntryContent>
<!--This is a reference to another SCO used to make up the
courseware.-->
<scoEntry>
<scoEntryAddress>
<scoEntryCode modelIdentCode="DEE1B2"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<scoEntryTitle>Landing Gear Hydraulics</scoEntryTitle>
</scoEntryAddress>
<scoEntryStatus>
<qualityAssurance>
<unverified/>
</qualityAssurance>
</scoEntryStatus>
<scoEntryContent>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="AAAA" infoCode="921" subSystemCode="5"
modelIdentCode="MODELIC" infoCodeVariant="A"
disassyCodeVariant="AAA" subSubSystemCode="0"
itemLocationCode="A" assyCode="00" systemCode="A53"
disassyCode="00"/><!-- assyCode=0000 -->
</dmRefIdent>
</dmRef>
<extraResources>
<!-- <figure>
<title>Landing Gear Hydraulics</title>
<graphic infoEntityIdent="g2"></graphic>
</figure> -->
<!-- Only one (figure or mulitimedia) is allowed.-->
<multimedia>
<title>Landing Gear Up</title>
<multimediaObject multimediaType="video" infoEntityIdent="v1"
showPluginControls="show"></multimediaObject>
</multimedia>
</extraResources>
<xPaths>
```

```
<xPath xPath="DMC-ALMDSANAES1-A-00-P1-00-000-0100-D_001-
00.xml/para1[3]"></xPath>
</xPaths>
</scoEntryContent>
</scoEntry>
</scoEntry>
</content>
</scormContentPackage>
```

## 3.2 SCORM content package describing one or more SCOs

The following XML markup example represents a valid SCORM content package fragment where the SCORM content package contains one or mores learning products. The learning products can be referenced by other SCOs:

```
<!DOCTYPE scormContentPackage [
<!ENTITY v1 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000027-
A-01-1.avi" NDATA avi>
<!NOTATION avi PUBLIC "avi">
<!ENTITY g2 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000013-
A-01-1.jpg" NDATA JPEG>
<!ENTITY g1 SYSTEM "ICN-ALMDSANAES1-A-00P100-NSWC-70974-000007-
A-01-1.jpg" NDATA JPEG>
<!NOTATION JPEG PUBLIC "jpg">
]>
<scormContentPackage xmlns:lom="http://ltsc.ieee.org/xsd/LOM"
xmlns:ns3="http://ltsc.ieee.org/xsd/LOM/extend"
xmlns:ns1="http://ltsc.ieee.org/xsd/LOM/unique"
xmlns:ns2="http://ltsc.ieee.org/xsd/LOM/vocab"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="scormcontentpackageSchema.xsd">
<!--This example illustrates how SCORM content package can be
used to describe a single learning product or several products
in learning event (lesson).The IDSTATUS section gives all the
identification elements required to address and control the
SCORM content package.-->
<identAndStatusSection>
<scormContentPackageAddress>
<scormContentPackageIdent>
<scormContentPackageCode modelIdentCode="DEE1B"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<language countryIsoCode="US" languageIsoCode="sx"/>
<issueInfo inWork="00" issueNumber="003"/>
</scormContentPackageIdent>
<scormContentPackageAddressItems>
<issueDate day="01" month="08" year="2008"/>
<scormContentPackageTitle>Air vehicle maintenance training -
Landing gear system</scormContentPackageTitle>
</scormContentPackageAddressItems>
</scormContentPackageAddress>
<scormContentPackageStatus>
<security securityClassification="01"/>
<responsiblePartnerCompany
enterpriseCode="C0419"></responsiblePartnerCompany>
<scormContentPackageMedia scormContentPackageMediaCode="DKS:1"
```

```
scormContentPackageMediaType="CD-ROM"/>
<qualityAssurance>
<unverified/>
</qualityAssurance>
<personSkill skillLevelCode="sk01"/>
</scormContentPackageStatus>
<!--The LOM at this level is used to insert metadata about the
SCORM content package. Since the SCORM content package is not
describing a full learning event, then this is the only place
where the LOM might be referenced.-->
<lom:lom>
<lom:general>
<lom:identifier>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:title>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:title>
<lom:description>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:description>
<lom:keyword>
<lom:string>Air vehicle maintenance training, Landing gear
system</lom:string>
</lom:keyword>
</lom:general>
<lom:lifeCycle>
<lom:version>
<lom:string language="en">2007.06.17.12.12.15.737</lom:string>
</lom:version>
<lom:status>
<lom:source>LOMv1.0</lom:source>
<lom:value>final</lom:value>
</lom:status>
</lom:lifeCycle>
<lom:metaMetadata>
<lom:identifier>
<lom:catalog>GUID</lom:catalog>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:metadataSchema>LOMv1.0</lom:metadataSchema>
<lom:metadataSchema>SCORM_CAM_v1.3</lom:metadataSchema>
</lom:metaMetadata>
</lom:lom>
</identAndStatusSection>
<content>
<!--This is a reference to one learning product used to make up
the courseware.-->
<scoEntry>
<scoEntryAddress>
<scoEntryCode modelIdentCode="DEE1B1"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<scoEntryTitle>Parts of the Landing Gear</scoEntryTitle>
</scoEntryAddress>
<scoEntryStatus>
<qualityAssurance>
```

```
<unverified/>
</qualityAssurance>
</scoEntryStatus>
<scoEntryContent>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="AAAA" infoCode="921" subSystemCode="5"
modelIdentCode="MODELIC" infoCodeVariant="A"
disassyCodeVariant="AAA" subSubSystemCode="0"
itemLocationCode="A" assyCode="0000" systemCode="A53"
disassyCode="00"/>
</dmRefIdent>
</dmRef>
</scoEntryContent>
<scoEntry>
<!--This is an example of how a reference is made to another
SCORM content package. This would be done in cases where the
SCORM content package is being used to reference one or a
collection of learning products, but the SCORM content package
does not make up a full learning event.-->
<scoEntryAddress>
<scoEntryCode modelIdentCode="DEE1B2"
scormContentPackageNumber="01132"
scormContentPackageIssuer="C0419"
scormContentPackageVolume="00"/>
<scoEntryTitle>Landing Gear Hydraulics</scoEntryTitle>
</scoEntryAddress>
<scoEntryStatus>
<qualityAssurance>
<unverified/>
</qualityAssurance>
</scoEntryStatus>
<scoEntryContent>
<dmRef>
<dmRefIdent>
<dmCode systemDiffCode="AAAA" infoCode="921" subSystemCode="5"
modelIdentCode="MODELIC" infoCodeVariant="A"
disassyCodeVariant="AAA" subSubSystemCode="0"
itemLocationCode="A" assyCode="0000" systemCode="A53"
disassyCode="00"/>
</dmRefIdent>
</dmRef>
<extraResources>
<!-- <figure>
<title>Landing Gear Hydraulics</title>
<graphic infoEntityIdent="g2"></graphic>
</figure> -->
<!-- Only one (figure or mulitimedia) is allowed.-->
<multimedia>
<title>Landing Gear Up</title>
<multimediaObject multimediaType="video" infoEntityIdent="v1"
showPluginControls="show"></multimediaObject>
</multimedia>
</extraResources>
<xPaths>
<xPath xPath="DMC-ALMDSANAES1-A-00-P1-00-000-0100-D_001-
00.xml/para1[3]"></xPath>
</xPaths>
</scoEntryContent>
</scoEntry>
```

```
</scoEntry>
</content>
</scormContentPackage>
```

# Chapter 4.9.4

## *Publication and SCORM content package management - Updating of publications*

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| Chap 5.3.1.2 | Common requirements - Technical content |

## 1 General

Updates of publications and learning products are caused by updates to the publication modules and SCORM content packages instance (eg new entry in the content) or are driven by changes to the referenced elements of the publication modules or SCORM content packages (eg the data modules of the Product). Updates of publications or learning products can be prepared as complete publication modules or SCORM content packages, including all referenced elements or partly by updating the constituent publication modules or SCORM content packages and the referenced changed elements. The update of a publication or learning product must be reflected in the front matter data modules (eg change record, highlights) as defined in Chap 5.3.1.2.

This chapter gives the rules for the version control of publication module and SCORM content packages.

## 2 Content

### 2.1 Issue and revision number

Any update of a referenced element or an update of the publication module or SCORM content package requires the re-issue of the publication module or SCORM content package. A consecutive three digit sequential number is used to indicate every issue of a publication module or SCORM content package. The first edition of a publication is called the initial issue.

Updating can be prepared either in the form of a change or a new issue. The initial issue of a publication module or SCORM content package must be numbered "001".

Markup attribute: `issueNumber`

The attribute `inWork` is used to number drafts/revisions or changes of a publication module or SCORM content package issue in the same way as for data modules. The attribute is a two digit sequential number.

As the issue numbers and inwork numbers are changed throughout the life of a data module, the value of the attribute `issueType`, of the elements <`pmStatus`> and <`scormContentPackageStatus`> is populated as follows:

Numbering rule:

- 000-01 - new publication module or SCORM content package, first change, `issueType`= "`new`"
- 000-02 - new publication module or SCORM content package, second change, `issueType`= "`new`"
- 000-NN - new publication module or SCORM content package, change "NN", `issueType`= "`new`"
- 001-00 - first issue of publication module or SCORM content package, `issueType`= "`new`"
- 001-01 - first issue of publication module or SCORM content package, first change, `issueType`= "`new`"
- 001-02 - first issue of publication module or SCORM content package, second change, `issueType`= "`new`"
- 001-NN - first issue of publication module or SCORM content package, change "NN", `type` = "`new`"
- 002-00 - second issue of publication module or SCORM content package, eg `issueType`= "`changed`"
- NNN-00 - issue "NNN" of publication module or SCORM content package, eg `issueType`= "`revised`"

## 2.2 Change of a publication module or SCORM content package

A value of the attribute `issueType` of the element <`pmStatus`> and element <`scormContentPackageStatus`> gives the type of the update for the new issue of the publication module or SCORM content package. It is related only to the issue number. The attribute values must be selected from:

- "`new`" = new publication module or SCORM content package
- "`changed`" = publication module or SCORM content package content changed
- "`deleted`" = publication module or SCORM content package deleted
- "`revised`" = publication module or SCORM content package completely revised
- "`status`" = publication module or SCORM content package status only change
- "`rinstate-changed`" = publication module or SCORM content package reinstated with content changed
- "`rinstate-revised`" = publication module or SCORM content package reinstated with content completely revised
- "`rinstate-status`" = publication module or SCORM content package reinstated with status only change

**Note**

A reinstated publication module or SCORM content package without any content changes receives a new issue number and the `issueType` attribute value "`rinstate-status`".

The detailed descriptions for the `issueType` attribute value are the same as for data modules, which are given in Chap 3.5 and Chap 3.9.5.1.

# Chapter 4.9.5

## *Publication and SCORM content package management - SCORM content package module*

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# 1 General

S1000D supports the aggregation of training information into deliverables through the use of the SCO Reference Model (SCORM) content package schema. The SCORM content package schema allows courseware developers to collect training and maintenance modules into a learning product output. The schema is derived from the S1000D publication module, which is used to aggregate data modules into technical publications.

## 1.1 Scope

The structure of the new SCORM content package module mirrors the structure of publication module. To be more representative of how training is packaged for use in a LMS, certain element names in the SCORM content package module have been modified, and new elements have been added. Below is a summary of those changes.

- Modified publication module element names in the S1000D SCORM content package:
  - The root element <pm> is changed to <scormContentPackage>
  - Name changes in the identification section (element <identAndStatusSection>):
    - <pmAddress> is now <scormContentPackageAddress>
    - <pmStatus> is now <scormContentPackageStatus>
  - Name changes in the <content> section:
  - All element names beginning with "pm" now begin with "sco". For example:
    - <pmEntry> is now <scoEntry>
  - Name changes to the publication module code (<pmCode>) makes a parallel relationship to SCORM content packages and a sharable content objects used in a LMS. In S1000D, the element <pmCode> is used to name the complete aggregation of data modules for a technical manual, and also used to name any nested aggregations. In the SCORM specification, the name of the complete aggregation of content is distinct from the names of aggregations inside the content package. The S1000D SCORM content package aggregation model contains the following changes to the <pmCode> to reflect how learning content is packaged for use in a LMS:
  - <pmCode> is now <scormContentPackageCode> when used in the element <scormContentPackageIdent>
  - <pmCode> in now <scoEntryCode> when used in the element <content>
- New Structures in S1000D SCORM Content Package:
  - Added the Learning Object Metadata (LOM) schema in the element <identAndStatusSection> and in the element <scoEntry>. The LOM insertion represents one means of harmonizing S1000D and SCORM.
  - Added the element <xPaths> to the element <scoEntryContent> to support the identification and use of selected objects inside a data module.

- Added the element <extraResources> to the element <scoEntryContent> to support the identification and use of graphics and multimedia in a learning product.
- Added the element <contentDescription> to the element <scoEntryContent> to describe the learning content and multimedia objects
- Added the element <personSkill> to the element <scormContentPackageStatus> to describe the required skills and competencies to take the course.

The SCORM Content Package Schema is defined in Chap 7.4.2.

## 1.2 Purpose

The SCORM Content Package can aggregate a complete learning event (eg a course) or it can aggregate a learning event subset (eg a lesson) that can then be referenced by other SCORM Content Packages that are aggregated together to form a complete learning event. The structure of a SCORM Content Package is project design decision.

The SCORM Content Package has two purposes:

– Aggregation and structure of training and maintenance modules
– Reusability of technical information

Like the publication module, the SCORM Content Package is used to aggregate training modules and maintenance modules to describe a complete learning event or single learning product. Resource aggregation is accomplished in the element <scoEntryContent>.

# 2 Content of the SCORM content package

## 2.1 scormContentPackage

**Description:** The element <scormContentPackage> is the root of the schema. It contains two major element wrappers: the element <identAndStatusSection> describes training life cycle and configuration information; the element <content> contains pointers to training and maintenance information to support the aggregation of a learning product deliverable.

**Markup element:** <scormContentPackage>

**Attributes:**

– id (O), the identifier of the <scormContentPackage> element. Refer to Chap 3.9.5.2.1.2

**Child elements:**

– <identAndStatusSection> (M). Refer to Para 2.2
– <content> (M). Refer to Para 2.3

**Business rules decisions:**

– None identified

**Markup example:**

```
<scormContentPackage>
<identAndStatusSection>…</identAndStatusSection>
<content>...</content>
</scormContentPackage>
```

## 2.2 Identification and status section

**Description:** The element <identAndStatusSection> is the first part of the SCORM content package. The identification and status section gives all the identification elements required to name and control the SCORM content package. It also provides the status elements for information on the security and quality of the overall SCORM content package.

**Markup element:** <identAndStatusSection>

**Attributes:**

– None

**Child elements:**

– <scormContentPackageAddress> (M). Refer to Para 2.2.1.
– <scormContentPackageStatus> (M). Refer to Para 2.2.2.

**Business rules decisions:**

– None identified

**Markup example:**

```
<identAndStatusSection>
<scormContentPackageAddress>…</scormContentPackageAddress>
<scormContentPackageStatus>…</scormContentPackageStatus>
</identAndStatusSection>
```

### 2.2.1 SCORM content package address

**Description:** The SCORM content package address is used to apply a code and a title to a SCORM content package.

**Markup element:** <scormContentPackageAddress>

**Attributes:**

– None

**Child elements:**

– <scormContentPackageIdent> (M). Refer to Para 2.2
– <scormContentPackageAddressItems> (M). Refer to Para 2.2.1.3

**Business rules decisions:**

– None identified

**Markup example:**

```
<scormContentPackageAddress>
<scormContentPackageIdent>...</scormContentPackageIdent>
<scormContentPackageAddressItems>...</scormContentPackageAddress
Items>
</scormContentPackageAddress>
```

#### 2.2.1.1 SCORM content package identification

**Description:** The SCORM content package identification contains the code that makes up the address for either a full learning event or a single or collection of learning products. The SCORM content package identification is contained within the markup element <scormContentPackageIdent>.identifies the complete aggregation.

**Markup element:** <scormContentPackageIdent>

**Attributes:**

– None

**Child elements:**

– <identExtension> (O). Refer to Chap 3.9.5.1.
– <scormContentPackageCode> (M). Refer to Para 2.2.1.2.
– <language> (M). Refer to Chap 3.9.5.1.
– <issueInfo> (M). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

2.2.1.2 SCORM content package code

**Description:** The SCORM content package code contains code that identifies the content packages produced according to this specification must be given a SCORM content package Code (SCORM module code).

**Markup element:** <scormContentPackageCode> (M)

**Attributes:**

– modelIdentCode (M). Refer to Chap 4.3.1.
– scormContentPackageIssuer (M). Refer to Chap 4.9.2.
– scormContentPackageNumber (M). Refer to Chap 4.9.2.
– scormContentPackageVolume (M). Refer to Chap 4.9.2.

**Child elements:**

– None identified

**Business rules decisions:**

– None identified

2.2.1.3 SCORM content package address items

**Description:** The SCORM content address items provide a title to the learning product deliverable.

**Markup element:** <scormContentPackageAddressItems> (M)

**Attributes:**

– None

**Child elements:**

– <issueDate> (M). Refer to Chap 3.9.5.1.
– <scormContentPackageTitle> (M). Refer to Para 2.2.1.4.

**Business rules decisions:**

– None identified

2.2.1.4 SCORM content package title

**Description:** The SCORM content package address title contains the name of the learning product deliverable.

**Markup element:** <scormContentPackageTitle> (M)

**Attributes:**

– None

**Child elements:**

– None

**Business rules decisions:**

– None identified

### 2.2.2 SCORM content package status

**Description:** The SCORM Content Package Status is used to identify the configuration and life cycle status of the learning content product. Information includes applicability, QA checks, and system breakdown numbers.

**Markup element:** <scormContentPackageStatus>

**Child elements:**

– <sourceScormContentPackageIdent> (O). Refer to Para 2.2.2.1
– <security> (M). Refer to Chap 3.9.5.1.
– <dataRestrictions> (O). Refer to Chap 3.9.5.1.
– <responsiblePartnerCompany> (M). Refer to Chap 3.9.5.1.
– <originator> (O). Refer to Chap 3.9.5.1.
– <applicCrossRefTableRef> (O). Refer to Chap 3.9.5.3.
– <applic> (O). Refer to Chap 3.9.5.3.
– <scormContentPackageMedia> (O). Refer to Para 2.2.2.2
– <qualityAssurance> (M). Refer to Chap 3.9.5.1.
– <systemBreakdownCode> (O). Refer to Chap 3.9.5.1.
– <functionItemCode> (O). Refer to Chap 3.9.5.1.
– <personSkill> (M). Refer to Para 2.2.2.3
– <reasonForUpdate> (O). Refer to Chap 3.9.5.1.
– <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

#### 2.2.2.1 Source SCORM content package identification

**Description:** The element <sourceScormContentPackageIdent>

**Markup element:** <sourceScormContentPackageIdent> (O)

**Attributes:**

– None

**Child elements:**

– <identExtension> (O). Refer to Chap 3.9.5.1.
– <scormContentPackageCode> (M). Refer to Para 2.2.1.2
– <language> (M). Refer to Chap 3.9.5.1.
– <issueInfo> (M). Refer to Chap 3.9.5.1.

**Business rules decisions:**

– None identified

2.2.2.2 SCORM content package media

**Description:** This element has mandatory **attributes:** type and code (label) of the media on which the SCORM content package is delivered. Additional optional attributes are volume and location of the media. This element can be repeated.

**Markup element:** <`scormContentPackageMedia`> (O)

**Attributes:**

- `scormContentPackageMediaType` (M). Media type (eg paper, CD-ROM, DVD, online)
- `scormContentPackageMediaCode` (M). Media identification (label)
- `volumeNumber` (O). Volume of the media is defined by a two numeric character element. It is used when the information given needs to be separated into several volumes due to media restrictions. It must not correspond with the element <`scormContentPackageVolume`> within the publication module code.
- `mediaLocation` (O). Location of the media.

**Child elements:**

- None

**Business rules decisions:**

- None identified

2.2.2.3 Person Skill

**Description:** This block lists the learner's required skill level. The skill level is assigned through the attribute `skillLevelCode`. This attribute goes from sk01 to sk99. The definitions of the attribute values are defined by the project and should be explained in the business rules.

**Markup element:** <`personSkill`> (M)

**Attributes:**

- `skillLevelCode` (M), the actual code. Refer to Chap 3.9.6.1.
- `id` (O), the identifier of the <`personSkill`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

**2.2.3 Learning Object Model**

**Description:** The IEEE LOM is a part of the SCO reference model (SCORM) specification. It defines a set of metadata elements for describing learning content, including element names, definitions, data types, and field lengths. The inclusion of the LOM in the SCORM content package allows learning content developers to add metadata about the learning content references within the SCORM content package.

The LOM, at this level, is used to insert metadata about the SCORM content package. If the SCORM content package describes a single or collection of learning products, then this is the only place where the LOM might be referenced. If the SCORM content package is a collection of learning products used to describe a full learning event then the LOM here would describe the full learning event and then there might be additional LOM references at the individual SCO entry level to include metadata for those learning products.

The LOM is a SCORM requirement, therefore a full description of the LOM can be found at the ADL downloads page at http://www.adlnet.gov/downloads/DownloadsSearchResults.aspx?Category=Products. The LOM is described in detail in the Content Aggregation Model (CAM).

ICN-83007-0000000047-001-01

*Fig 1 Element <lom>*

**Markup element:** <lom> (O)

**Attributes:**

– None

**Child elements:**

– Refer to the SCORM CAM documentation for this information at http://www.adlnet.gov/downloads/DownloadsSearchResults.aspx?Category=Products.

**Business rules decisions:**

– None identified

## 2.3 Content section

**Description:** The content section contains all the references to technical information required to build a learning deliverable.

Throughout this section, the acronym SCO is used in various elements. There is a difference between the term SCO in SCORM and how it is used in S1000D. A SCO in SCORM is a single, reusable learning object that is able to launch a request to a LMS during a learning event. In S1000D, a SCO is the collection of aggregated technical information assembled during content product prior to being compiled SCORM into a SCORM package. The S1000D SCORM Content Package does not communicate with a LMS. The naming similarities are intentional so to align the process of aggregating content and the structure of the content used during a learning event.

**Markup element:** <`content`>

**Attributes:**

– None

**Child elements:**

– <`scoEntry`> (M). Refer to Para 2.3.1

**Business rules decisions:**

– None identified

### 2.3.1 SCO Entry

**Description:** The SCO entry (one or more) is the central element for a SCORM content package and can be defined recursively. This allows SCORM content package structures in variable depth.

**Markup element:** <`scoEntry`> (M)

ICN-83007-0000000048-001-01

*Fig 2 Element <`scoEntry`>*

**Attributes:**

– `scoEntryType` (O), the type of SCO entry

**Child elements:**

- <scoEntryAddress> (M). Refer to Para 2.2.1.1.
- <scoEntryStatus> (M). Refer to Para 2.2.1.3.
- <lom> (O). Refer to Para 2.2.3
- <scoEntryContent> (M). Refer to Para 2.3.1.8
- <scoEntry> (O).

**Business rules decisions:**

- None identified

**Markup example:**

```
<scoEntry>
<scoEntryAddress>
...
</scoEntryAddress>
<scoEntryStatus>
...
</scoEntryStatus>
<lom>
...
</lom>
<scoEntryContent>
...
</scoEntryContent>
<scoEntry>
...
</scoEntry>
</scoEntry>
```

2.3.1.1 SCO entry address

**Description:** The element <scoEntryAddress> is used to provide an address for each SCO entry within the SCORM content package. The SCO entry address information is given.

**Markup element:** <scoEntryAddress> (M)

ICN-83007-0000000049-001-01

*Fig 3 Element <scoEntryAddress>*

**Attributes:**

- None

**Child elements:**

- <scoEntryCode> (M). Refer to Para 2.2.1.1.
- <scoEntryTitle> (M). Refer to Para 2.3.1.3.
- <issueDate> (O). Refer to Chap 3.9.5.1.
- <language> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<scoEntryAddress>
<scoEntryCode modelIdnetCode="FCSARV" scoIssuer="L3DPA"
scoNumber="99987" scoVolume="01" />
<issueDate year="2008" month="08" day="01" />
<language languageIsoCode="sx" countryIsoCode="US" />
</scoEntryAddress>
```

2.3.1.2 SCO entry code

**Description:** Learning products produced according to this specification must be given a SCO entry code.

**Markup element:** <scoEntryCode>

**Attributes:**

- modelIdentCode (M). Refer to Chap 4.3.1.
- scormContentPackageIssuer (M). Refer to Chap 4.9.2.
- scormContentPackageNumber (M). Refer to Chap 4.9.2.
- scormContentPackageVolume (M). Refer to Chap 4.9.2.

**Child elements:**

- None

**Business rules decisions:**

- None identified

2.3.1.3 SCO entry title

**Description:** The title must give the meaning of the learning product and are defined by the project.

**Markup element:** <scoEntryTitle>

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

- None identified

2.3.1.4 SCO entry status information

The element <scoEntryStatus> contains the status of the SCO entry.

**Markup element:** <scoEntryStatus>

ICN-83007-0000000050-001-01

*Fig 4 Element <scoEntryStatus>*

**Attributes:**

- issueType (O). Refer to Chap 3.9.5.1.

**Child elements:**

- <sourceScoIdent> (O).Refer to Chap 3.9.5.1.
- <security> (O). Refer to Chap 3.9.5.1.
- <dataRestrictions> (O). Refer to Chap 3.9.5.1.
- <responsiblePartnerCompany> (O). Refer to Chap 3.9.5.1.
- <originator> (O). Refer to Chap 3.9.5.1.
- <applicCrossRefTableRef> (O). Refer to Chap 3.9.5.3.
- <applic> (O). Refer to Chap 3.9.5.3.
- <scoMedia> (O). Refer to Para 2.3.1.6

- <qualityAssurance> (M). Refer to Chap 3.9.5.1.
- <systemBreakdownCode> (O). Refer to Chap 3.9.5.1.
- <functionalItemCode> (O). Refer to Chap 3.9.5.1.
- <personSkill> (O). Refer to Para 2.3.1.7
- <reasonForUpdate> (O). Refer to Chap 3.9.5.1.
- <remarks> (O). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

**Markup example:**

```
<scoEntryStatus>
<security securityClassification="01"/>
<responsiblePartnerCompany enterpriseCode="AH019">
<enterpriseName>Isselnord</enterpriseName>
</responsiblePartnerCompany>
<qualityAssurance>
<unverified/>
</qualityAssurance>
<systemBreakdownCode>H1234</systemBreakdownCode>
<personSkill skillLevelCode="sk01"/>
<reasonForUpdate>
<simplePara>Release</simplePara>
</reasonForUpdate>
</scoEntryStatus>
```

2.3.1.5 Source SCO identification

**Description:** The element <sourceScoIdent> contains the identification of the source SCO.

**Markup element:** <sourceScoIdent> (O)

**Attributes:**

- None

**Child elements:**

- <identExtension> (O). Refer to Chap 3.9.5.1.
- <scormContentPackageCode> (M). Refer to Para 2.2.1.2.
- <language> (M). Refer to Chap 3.9.5.1.
- <issueInfo> (M). Refer to Chap 3.9.5.1.

**Business rules decisions:**

- None identified

2.3.1.6 SCO media

**Description:** The element <scoMedia> has mandatory **attributes:** type and code (label) of the media on which the SCO entry is delivered. Additional optional attributes are volume and location of the media. This element can be repeated.

**Markup element:** <scoMedia> (O)

**Attributes:**

- scoMediaType (M). Media type (eg paper, CD-ROM, DVD, online).

- scoMediaCode (M). Media identification (label).
- volumeNumber (O). Volume of the media is defined by a two numeric character element. It is used when the information given needs to be separated into several volumes due to media restrictions. It must not correspond with the element <scormContentPackageVolume> within the publication module code.
- mediaLocation (O). Location of the media.

**Child elements:**

- None

**Business rules decisions:**

- None identified

2.3.1.7 Skill

**Description:** This block lists the learner's required skill level. The skill level is assigned through the attribute skillLevelCode. This attribute goes from sk01 to sk99. The definitions of the attribute values are defined by the project and explained in the business rules.

**Markup element:** <personSkill> (O)

**Attributes:**

- id (O), the identifier of the <personSkill> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- skillLevelCode (C), the actual code. Refer to Chap 3.9.6.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.6.

**Child elements:**

- None

**Business rules decisions:**

- None identified

2.3.1.8 SCO entry content

**Description:** The SCO entry content section is contained within the element <scoEntryContent>.

The SCO entry content is where all learning data modules and required resources are referenced and is a required entry.

**Markup element:** <scoEntryContent>

ICN-83007-0000000051-001-01

*Fig 5 Element <scoEntryContent>*

**Attributes:**

- id (O), the identifier of the <scoEntryContent> element. Refer to Chap 3.9.5.2.1.2.
- scoEntryType (O), the type of SCO entry

**Child elements:**

- <contentDescription> (O). Refer to Para 2.3.1.9.
- <dmRef> (M). Refer to Para 2.3.1.10.
- <extraResources> (O). Refer to Para 2.3.1.12.
- <xPaths> (O). Refer to Para 2.3.1.11.
- <externalSco> (O). Refer to Para 2.3.1.13.
- <scoEntryContent> (O).

**Business rules decisions:**

- None identified

Markup example 1:

```
<scoEntryContent>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="MD" systemDiffCode="A" systemCode="34"
subSystemCode="2" subSubSystemCode="3" assyCode="10"
disassyCode="00" disassyCodeVariant="A" infoCode="921"
infoCodeVariant="A" itemLocationCode="A"/>
<xPaths>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[1]"/>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[2]">
<extraResources>
<multimedia>
<multimediaObject multimediaType="video" infoEntityIdent="ICN-
MD-A-342310-I-AH019-09564-A"/>
```

```
</multimedia>
</extraResources>
</xPath>
</xPaths>
</dmRefIdent>
</dmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="MD" systemDiffCode="A" systemCode="34"
subSystemCode="2" subSubSystemCode="3" assyCode="10"
disassyCode="00" disassyCodeVariant="A" infoCode="520"
infoCodeVariant="A" itemLocationCode="A"/>
<xPaths>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[1]"/>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[2]"/>
</xPaths>
</dmRefIdent>
</dmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="MD" systemDiffCode="A" systemCode="34"
subSystemCode="2" subSubSystemCode="3" assyCode="10"
disassyCode="00" disassyCodeVariant="A" infoCode="720"
infoCodeVariant="A" itemLocationCode="A"/>
<xPaths>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[1]"/>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[2]"/>
</xPaths>
</dmRefIdent>
</dmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="MD" systemDiffCode="A" systemCode="34"
subSystemCode="2" subSubSystemCode="3" assyCode="10"
disassyCode="00" disassyCodeVariant="A" infoCode="921"
infoCodeVariant="A" itemLocationCode="A"/>
<xPaths>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[3]"/>
<xPath xPath="/dmodule/content/proced/mainfunc/step1[4]"/>
</xPaths>
</dmRefIdent>
</dmRef>
</scoEntryContent>
```

Markup example 2:

```
<scoEntryContent>
<contentDescription>
<simplePara>This SCO is used to the skill of the student after
the lesson. The referred DM contain instruction on how to do the
test, the esternal reference is the reference on SCO containing
the test activities</simplePara>
</contentDescription>
```

```
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="MD" systemDiffCode="A" systemCode="00"
subSystemCode="4" subSubSystemCode="0" assyCode="00"
disassyCode="00" disassyCodeVariant="A" infoCode="000"
infoCodeVariant="A" itemLocationCode="T"/>
</dmRefIdent>
</dmRef>
<externalSco>
<title>Test your skill</title>
<fileName>externalSCO.swf</fileName>
</externalSco>
</scoEntryContent>
```

2.3.1.9 Content description

The element <contentDescription> can be used for describing the scope of the learning content, using the element <simplePara>. Refer to Chap 3.9.5.2.1.10.

2.3.1.10 Data module reference

The references to data modules to be part of this SCO entry are to be given, where required. It includes references to data modules for learning content, access illustrations and a description of the scope of the data module.

The element <dmRef> is used to reference a file to be used in the SCO. Refer to Chap 3.9.5.2.1.2.

2.3.1.11 xPaths

**Description:** To facilitate reusability of technical data, the element <xPaths> links to pieces of technical data in other modules that make up a leaning object. Specifically, the <xPaths>is a wrapper element is used to reference the content within different data modules. This allows that contains pointers to data module parts for inclusion of parts of in a data module (eg paragraphs or figures) rather than the entire data module.SCO. The path to the data module content is entered in the XPATH attribute of the <xPaths> element and should be the location for the data module. The rules for how to use <xPaths> should be explained in the business rules.

**Markup element:** <xPaths> (O)

This element contains:

ICN-83007-0000000052-001-01

*Fig 6 Element <xPaths>*

**Attributes:**

– None

**Child elements:**

– <xPath> (M).

**Business rules decisions:**

– None identified

**Markup example:**

```
<dmRef>
<dmRefIdent>
<xPaths>
<xPath xPath="//figure[@id='f1']"/>
<xPath xPath="//para[@id='p1']"/>
</xPaths>
</dmRefIdent>
</dmRef>
```

2.3.1.12 Extra SCO resources

**Description:** The element <extraResources> is used to references all figures and multimedia required to appear in the SCO. The elements <figure> and <multimedia> can be used, as required.

**Markup element:** <extraResources> (O)

**Attributes:**

– None

**Child elements:**

– <figure>(O). Refer to Chap 3.9.5.2.1.7.
– <multiMedia>(O). Refer to Chap 3.9.2.
– <foldout>(O). Refer to Chap 3.9.5.2.1.7.
– <table> O). Refer to Chap 3.9.5.2.1.6.

**Business rules decisions:**

– None identified

2.3.1.13 External SCO references

**Description:** The element <externalSco> is used to identify any external SCOs, which are required within the current SCO. The elements <title> and <filename>, which identifies the file for the external SCO, are required. The use of <externalSco > should be explained in the business rules.

ICN-83007-0000000053-001-01

*Fig 7 Element <externalSco>*

**Markup element:** <externalSco> (O)

**Attributes:**

– None

**Child elements:**

– <title> (M). Refer to Chap 3.9.5.2.1.5.
– <fileName> (M), contains the filename of the external SCO

**Business rules decisions:**

– None identified

**Markup example:**

```
<externalSco>
<title>Unmanned Aerial Vehicle Operator Training</title>
<fileName>SMC-FCSARV-L3DPA-99987-00.xml</fileName>
</externalSco>
```

# Chapter 4.10

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# 1 General

This chapter describes the BREX mechanism provided by the specification.

The mechanism is a means to communicate business rules that have been developed and agreed within a project or organization.

# 2 The BREX concept

## 2.1 Introduction

To facilitate unambiguous description of the business rules agreed within a project or organization, a BREX data module can be used. BREX data modules are stored in the CSDB.

Examples of use of the BREX data module include:

- To record and exchange rules while they are being developed in a project or organization. The possibility to make a formal description of the business rules decreases the risk of misinterpretations and misunderstandings.
- To support a correct interpretation of the CSDB objects. This is of particular significance for security and safety related information (for example classification and units of measure for threshold intervals).

– To enable validation of the CSDB objects against agreed rules, for example applying automated methods.

Every data module must refer to a BREX data module containing the business rules that apply to the content of that data module. Each data module has one and only one BREX data module. The BREX data module provides the rules that govern the production of the data module. If a data module must be changed, changes must be in accordance with its associated BREX data module.

**Note**

Only in extraordinary circumstances would a data module be changed to reference a new BREX data module. A data module is considered re-authored if it is altered to reflect a new BREX data module. If a data module is changed to be associated with a new BREX data module, the data module is likely to require changes in content to conform to the requirements of the associated BREX data module.

If a project or organization chooses to encompass all the constructs laid out by S1000D, and not to diverge from any of the applicable rules, the data modules can refer to a default BREX data module. If a project or organization decides to apply its own set of business rules it must also develop its own BREX data module.

The coding of BREX data modules is explained in Chap 4.10.1.

The structure of the BREX data module is described in Chap 4.10.2.

The characteristics of the default BREX data module are described in Chap 4.10.3.

## 2.2 Layered BREX data modules

A layered business rules structure can be reflected in a corresponding layered BREX data module hierarchy. Refer to Chap 2.5.1.

For example, a data module in a project can refer to a project BREX data module defining the rules for the project. This project BREX data module can be based on and refer to an organization BREX data module. The organization BREX data module can itself be based on and refer to a set of even more general rules defined for a higher level organization (eg a BREX data module for the civil aviation industry). At the top level are the S1000D default BREX data module and the XML schemas, which reflect the rules that are imposed by the specification itself.

Any layered BREX data module must only contain restrictions to the rules defined by the BREX data module on which it is based. For example, if an organization BREX restricts a certain value to fall within the interval A thru M, a project BREX based on that company BREX must not allow values out of the range A thru M. However, it can restrict the interval further (eg A thru H).

The project or the organization must ensure that there are no conflicts between various business rules within a hierarchical BREX data module structure. However, since the rules given in a certain BREX data module must be based on the rules given in the BREX data module to which it refers (ie rules of the layer above) and there are conflicts between the rules in the two modules then the referred upper-layer BREX data module takes precedence. For rules and guidance regarding conflicting business rules, refer to Chap 2.5.1.

It must be noted that a BREX data module in a layered hierarchy does not have to repeat the rules given in the BREX data module on which it is based. It is sufficient that it contains only the additional specific restrictions that apply in its own layer. Therefore, to ensure that a full set of BREX encoded rules is provided for a data module of interest, it is necessary to provide the whole hierarchy of BREX data modules, throughout the layers to the S1000D default BREX.

Any layered BREX hierarchy ends in the S1000D default BREX data module. Refer to Chap 4.10.3. This hierarchy reflects a corresponding layering in the business rules, where the basis for any defined complex of business rules (layered or not) is S1000D itself.

**Note**

A BREX data module for any specific environment does normally define the rules that apply to it, regardless of whether these rules are generic within the environment, or if they apply specifically to the BREX data module. The procedure of verifying a BREX data module can therefore deviate slightly from verification of data modules in general, since it can be verified against the rules it contains in addition to the rules contained in the BREX data module it refers to.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of a project specific BREX data module**. The project or organization must decide whether to develop and use a specific BREX data module or not. Refer to Para 2.

**Use of layered BREX data modules**. The project or organization must decide whether to apply a layered BREX data module structure. This decision is related to, but not entirely dependent on, whether a layered business rules structure applies or not (Refer to Para 2.2 and Chap 2.5.1).

# Chapter 4.10.1

## *Business rules exchange - Coding of BREX data modules*

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## 1 General

The BREX data module is stored in the CSDB. This chapter explains the data module code for a BREX data module. The general principles for the data module code are given in Chap 4.3.

## 2 The BREX data module code

A BREX data module contains information about a whole Product or some part of a Product and must apply the data module code accordingly.

The Model Identification (MI) for a BREX data module will in most production situations be the MI of the project concerned. However, BREX data modules can be developed on (eg national or company level), in order to constitute a platform for developing modules for specific projects. In this situation, the organization has to allocate/apply for an MI code that will serve the organization purposes.

SNS must not be applied below sub-subsystem level. The unit/assembly code of the BREX data module code must always be "00" or "0000", respectively. The disassembly code is applied as described below. As far as employment of material item category code is appropriate, depending on the scope of a BREX data module, it can be used in the BREX data module code.

The information code for a BREX data module is 022, and the item location code is D.

It is recommended that a project applies the same set of business rules to all data modules, and therefore has one BREX data module for the project. If this is not possible, it is recommended that the project or the organization keeps the number of BREX data modules to a minimum.

**Note**

There can be only one BREX that applies to a data module, reflecting the Business rules that apply to that particular data module.

In the simplest case, which is also the normal case, there will be only one BREX data module for an entire project. Then the module will be coded on the product top level.

Example:

An example of a BREX data module code for the complete Product is:

XX - A - 00 - 00 - 00 - 00A - 022A - D (17 characters)

Sometimes it is relevant to assign a set of business rules to a system of the product. In this case the module must be coded to that specific system.

Example:

A data module code for a BREX applying to system NN of Product XX (variant B) would be coded:

XX - B - NN - 00 - 00 - 00A - 022A - D (17 characters)

When a project needs more than one BREX data module for the same SNS, the disassembly code must to uniquely identify each BREX data module. The first BREX data module must have a disassembly code 00, and the disassembly code must be incremented for the subsequent BREX data modules.

Example:

Two different BREX variants are needed within a project. They both apply to the product top level. They are coded:
XX - A - 00 - 00 - 00 - 00A - 022A - D (17 characters)

XX - A - 00 - 00 - 00 - 01A - 022A - D (17 characters)

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Applicable sets of business rules.** The Project or the organization must decide which set or sets of business rules are allowed within the given project or the organization. Accordingly, it must decide which BREX data module or modules will be used to reflect those business rules.

# Chapter 4.10.2

## *Business rules exchange - The BREX data module*

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| Chap 3.9.5.3 | Data modules - Applicability |
| Chap 7.3 | Information processing - CSDB objects |
| REC-xmlschema-2-20041-28 | W3C Recommendation: XML Schema Part 2: Datatypes Second Edition (2004 Second Edition) |

# 1 General

The BREX data module contains the business rules applicable to a project. It can contain:

- specifications of SNSs that apply to the context concerned
- specifications of elements and attributes that must or must not be applied to CSDB objects generated for the project
- definitions of which values are allowed/used for specified elements and/or attributes and how these values are interpreted
- descriptions of the purpose of markup elements and attributes

Like other data modules the BREX data module has an identification and status section contained within the markup element <`identAndStatusSection`> as described in Chap 3.9.5.1.

For technical information about the BREX Schema, refer to Chap 7.3.

The default BREX data module provided with the specification shows how the data module is to be marked up.

# 2 Content section

The content section is contained within the markup element <`content`>.

## 2.1 References

A BREX data module can refer to other supporting data modules or publications (Refer to Chap 3.9.5.2.1.2).

**Markup element:** <`refs`> (O)

## 2.2 Exchange business rules

**Description:** The element <`brex`> contains all business rules specified by a BREX data module.

**Markup element:** <`brex`> (M)

ICN-83007-0000000013-001-01

*Fig 1 Element <brex>*

**Attributes:**

- id (O), the identifier of the <brex> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <snsRules> (O). Refer to Para 2.3.
- <contextRules> (M). Refer to Para 2.4.

**Business rules decisions:**

- None identified.

## 2.3 SNS rules

**Description:** The element <snsRules> can provide descriptions of one or several SNS systems that apply to the project concerned.

**Markup element:** <snsRules> (O)

ICN-83007-0000000014-001-01

*Fig 2 Element <snsRules>*

**Attributes:**

- id (O), the identifier of the <snsRules> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <snsDescr> (C). Refer to Para 2.3.1.

**Business rules decisions:**

– None identified.

### 2.3.1 SNS description

**Description:** The element <snsDescr> provides a description of each specific SNS system.

**Markup element:** <snsDescr> (C)

ICN-83007-0000000015-001-01

*Fig 3 Element <snsDescr>*

This element can be repeated.

**Attributes:**

– id (O), the identifier of the <snsDescr> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– <snsSystem> (M). Refer to Para 2.3.2.

**Business rules decisions:**

– None identified.

### 2.3.2 SNS system code

**Description:** The element <snsSystem>contains the specification of each system defined for the SNS.

**Markup element:** <snsSystem> (M)

ICN-83007-0000000016-001-01

*Fig 4 Element <snsSystem>*

This element can be repeated.

**Attributes:**

- id (O), the identifier of the <snsSystem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <snsCode> (M). Refer to Para 2.3.6.
- <snsTitle> (M). Refer to Para 2.3.7.
- <snsSubSystem> (O). Refer to Para 2.3.3.

**Business rules decisions:**

- None identified.

### 2.3.3 SNS subsystem code

**Description:** The element <snsSubSystem> contains the specification of each subsystem defined for the SNS system.

**Markup element:** <snsSubSystem> (O)

ICN-83007-0000000017-001-01

*Fig 5 Element <snsSubSystem>*

This element can be repeated.

**Attributes:**

- id (O), the identifier of the <snsSubSystem> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <snsCode> (M). Refer to Para 2.3.6.
- <snsTitle> (M). Refer to Para 2.3.7.
- <snsSubSubsystem> (O). Refer to Para 2.3.4.

**Business rules decisions:**

- None identified.

### 2.3.4 SNS sub-subsystem code

**Description:** The element <snsSubSubsystem> contains the specification of each sub-subsystem defined for the SNS subsystem concerned.

**Markup element:** <snsSubSubsystem> (O)

ICN-83007-0000000018-001-01

*Fig 6 Element <snsSubSubsystem>*

This element can be repeated.

**Attributes:**

- `id` (O), the identifier of the <`snsSubSubsystem`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`snsCode`> (M). Refer to Para 2.3.6.
- <`snsTitle`> (M). Refer to Para 2.3.7.
- <`snsAssy`> (O). Refer to Para 2.3.5.

**Business rules decisions:**

- None identified.

### 2.3.5 SNS assembly code

**Description:** The element <`snsAssy`> contains the specification of each assembly defined for the SNS sub-subsystem concerned.

**Markup element:** <`snsAssy`> (O)

ICN-83007-0000000019-001-01

*Fig 7 Element <snsAssy>*

This element can be repeated.

**Attributes:**

- id (O), the identifier of the <snsAssy> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <snsCode> (M). Refer to Para 2.3.6.
- <snsTitle> (M). Refer to Para 2.3.7.

**Business rules decisions:**

- None identified.

### 2.3.6 SNS code

**Description:** The element <snsCode> contains a code used to define a component in an SNS structure. The code concerned is represented as text content. Depending on the context it can be either the code of a system, a subsystem, a sub-subsystem or an assembly.

**Markup element:** <snsCode> (M)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

- None identified.

### 2.3.7 SNS title

**Description:** The element <snsTitle> contains a title corresponding to a code used to define a component in an SNS structure. The title is represented as text content. Depending on the context it can be either the title of a system, a subsystem, a sub-subsystem or an assembly.

**Markup element:** <snsTitle> (M)

**Attributes:**

- None

**Child elements:**

- None

**Business rules decisions:**

- None identified.

## 2.4 Context related rules

**Description:** The element <contextRules> can be repeated to give the rules for different contexts within a project. Business rules specified by a BREX data module, and concerned with how the information structures (ie schemas) can be used, must define the context to which they are related. The context can be the entire project or it can be information in accordance with one

of the Schemas that are applied within the project. Rules given for a specific context override rules specified for all contexts. If rules are defined for an object more than once, the first occurrence of rules for that object takes precedence.

**Markup element:** <`contextRules`> (M)

ICN-83007-0000000020-001-01

*Fig 8 Element <`contextRules`>*

**Attributes:**

- `rulesContext` (O), specifies the context to which the contained rules apply. Context must be specified by the applicable URL of the Schema for XML encoded CSDB objects, eg http://www.s1000d.org/S1000D_4-0/xml_schema_master/dm/descriptSchema.xsd.
- `id` (O), the identifier of the <`contextRules`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`structureObjectRuleGroup`> (O). Refer to Para 2.5.
- <`notationRuleList`> (O). Refer to Para 2.6.

**Business rules decisions:**

- None identified.

## 2.5 Structure rules

**Description:** The element <`structureObjectRuleGroup`> specifies all rules about the project-specific use of elements and attributes for all the various document types (Schema) used within the project.

**Markup element:** <`structureObjectRuleGroup`> (O)

ICN-83007-0000000021-001-01

*Fig 9 Element <`structureObjectRuleGroup`>*

**Attributes:**

- id (O), the identifier of the <structureObjectRuleGroup> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <structureObjectRule> (C), each occurrence representing a rule regarding one object. Refer to Para 2.5.1.

**Business rules decisions:**

- None identified.

### 2.5.1 Structure object rule

**Description:** The element <structureObjectRule> contains rules that apply to an element or an attribute, which must be given when the intended use of that object does not fully coincide with the specification, for instance by being more restrictive.

**Markup element:** <structureObjectRule> (C)

This element can be repeated.

ICN-83007-0000000022-001-01

*Fig 10 Element <structureObjectRule>*

**Attributes:**

- id (O), the identifier of the <structureObjectRule> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <objectPath> (M). Refer to Para 2.5.2.
- <objectUse> (O). Refer to Para 2.7.

– <objectValue> (O). Refer to Para 2.5.3.

**Business rules decisions:**

– None identified.

### 2.5.2 Object path

**Description:** The element <objectPath> contains an XPath address defining where the element or attribute occurs in the Schema structure. This must be identified for an element or attribute for which rules are given.

**Markup element:** <objectPath> (M)

If a project or an organization decides that the use of the object concerned is optional, then attribute allowedObjectFlag must not be specified.

**Attributes:**

– allowedObjectFlag defines if and how the object is applied within the project. Allowable values are:
  - "0": no, meaning that the object must not be used within the project in the context concerned.
  - "1": yes, meaning that the object must be included in the context concerned.
– id (O), the identifier of the <objectPath> element. Refer to Chap 3.9.5.2.1.2.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

– None

**Business rules decisions:**

– None identified.

**Markup example:**

The following example shows a rule expressing a narrative statement concerning the use of an element - neither is the use of the element mandated, nor is the use prohibited.

```
<structureObjectRule>
<objectPath>//graphic/@boardno</objectPath>
<objectUse>Responsible partner company code in ICN must be an
uppercase A</objectUse>
</structureObjectRule>
```

The following example shows how the use of either the element <systemBreakdownCode> or the element <functionalItemCode> (in the status section) is mandated (or rather, their absence is prohibited).

```
<structureObjectRule>
<objectPath
allowedObjectFlag="0">not(//dmStatus/systemBreakdownCode or
//dmStatus/systemBreakdownCode)</objectPath>
<objectUse>Responsible partner company code in ICN must be an
uppercase A</objectUse>
</structureObjectRule>
```

The following example shows how the attribute `learnCode` is mandated in the identification of a data module.

```
<structureObjectRule>
<objectPath
allowedObjectFlag="1">//dmIdent/dmCode/@learnCode</objectPath>
<objectUse>Learn code must always be included in the data module
identifications</objectUse>
</structureObjectRule>
```

### 2.5.3 Object value

**Description:** The element <`objectValue`> contains the description of the intended meaning.

When relevant, each specific single value, range of values, or pattern value that is applicable to an element or attribute within a project or organization must be given. In addition, there should be a short description of each single value, value range, or pattern value to explain the intended meaning of the value.

Since this element is repeatable, it is possible to specify multiple and/or single values, ranges of values, or pattern values for a specific element or attribute.

**Markup element:** <`objectValue`> (O)

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*Fig 11 Element <`objectValue`>*

**Attributes:**

- `valueForm`, specifies the type of content contained in the attribute `valueAllowed` and can have the following values:
  - "`single`", which specifies that a single value applies to the object.
  - "`range`", which specifies that a range of values applies to the object.
  - "`pattern`", which specifies that a pattern value applies to the object.
- `valueAllowed` contains the specification for the single value, range of values or pattern value applicable to the object. A range should be specified in the format defined in Chap 3.9.5.3. A pattern should be provided as a regular expression in accordance with "(REC)-xmlschema-2-20041-28 W3C Recommendation: XML Schema Part 2: Datatypes Second Edition (2004 Second Edition)"
- `id` (O), the identifier of the <`objectValue`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <subScript> (O). Refer to Chap 3.9.5.2.1.1.
- <superScript> (O). Refer to Chap 3.9.5.2.1.1.

**Business rules decisions:**

- None identified.

## 2.6 Notation rules

**Description:** The element <notationRuleList> contains excluded notations. A project or an organization can decide to exclude one or several of the notations allowable by S1000D. These restrictions are to be included in the BREX data module.

**Markup element:** <notationRuleList> (O)

**Attributes:**

- id (O), the identifier of the <notationRuleList> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <notationRule> (C). Refer to Para 2.6.1.

**Business rules decisions:**

- None identified.

### 2.6.1 Notation specific rule

**Description:** The element <notationRule> contains a notation more specific than defined by S1000D. The rule that applies must be specified. An example would be when a project or an organization decides to exclude use of a particular notation.

**Markup element:** <notationRule> (C)

This element can be repeated. Each occurrence then represents its own notation.

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*Fig 12 Element <notationRule>*

**Attributes:**

- id (O), the identifier of the <notationRule> element. Refer to Chap 3.9.5.2.1.2.

- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <notationName> (M). Refer to Para 2.6.2.
- <objectUse> (O). Refer to Para 2.7.

**Business rules decisions:**

- None identified.

### 2.6.2 Notation name

**Description:** The element <notationName> contains a specific notation name. Each notation, for which special project rules are given, must be specified and its intended use explained.

**Markup element:** <notationName> (M)

**Attributes:**

- allowedNotationFlag (O), declares whether the notation is applied within the project:
  - value "0": no, means that the notation must not be used within the project in the context concerned
  - value "1": yes, means that the notation must be used in the context concerned.
- id (O), the identifier of the <notationName> element. Refer to Chap 3.9.5.2.1.2.
- changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- None

**Business rules decisions:**

- None identified.

## 2.7 Object use

**Description:** The element <objectUse> contains a specific description and intended use for each element, attribute, or notation that is recorded in the BREX data module.

The description should be a short narrative explanation of the use to the extent that interpretation of the object is perfectly clear. This description can contain references to supporting data modules and/or other technical publications, by use of the optional subelement <refs> as described in Chap 3.9.5.2.1.

**Markup element:** <objectUse> (O)

**Attributes:**

- id (O), the identifier of the <objectUse> element. Refer to Chap 3.9.5.2.1.2.

- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`subScript`> (O). Refer to Chap 3.9.5.2.1.1.
- <`superScript`> (O). Refer to Chap 3.9.5.2.1.1.
- <`refs`> (O). Refer to Chap 3.9.5.2.1.2.

**Business rules decisions:**

- None identified.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Exchange of SNS using the BREX data module**. The project or the organization must decide if it is suitable to use the BREX data module for exchange of information on the applied SNS. Refer to Para 2.2.

**Exchange of restrictions in using notations**. The project or the organization must decide if it will impose any restrictions in the use of various formats for illustrations and multimedia. It must also decide if the BREX data module will be used to exchange information about which information formats are acceptable. Refer to Para 2.6

# 4 Examples

The following example shows a BREX data module for a project “PRODUCT”. This module constitutes a number of restrictions compared to a parent layer applying a BREX data module identified by Model Identification (MI) code "PRODUCTGROUP".

The example below gives a brief view of how to represent an SNS definition in a BREX data module. Further, it defines one structural rule applicable to one specific schema, the Comment schema, and a set of rules applicable to all schemas. Among these common rules there is a restriction to the set of applicable information codes.

**Note**

The example given below does not intend to provide a complete realistic BREX data module. Normally, the rules contained a BREX data module will be far more extensive than is reflected in the example.

```
<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_4-
0/xml_schema/dm/brexSchema.xsd"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/">
<identAndStatusSection>
<dmAddress>
<dmIdent>
<dmCode modelIdentCode="PRODUCT" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="00" disassyCode="00" disassyCodeVariant="A"
infoCode="022" infoCodeVariant="A" itemLocationCode="D"/>
<language languageIsoCode="sx" countryIsoCode="US"/>
<issueInfo issueNumber="001" inWork="00"/>
```

```
</dmIdent>
<dmAddressItems>
<issueDate day="01" month="08" year="2008"/>
<dmTitle>
<techName>This project</techName>
<infoName>Business rules</infoName>
</dmTitle>
</dmAddressItems>
</dmAddress>
<dmStatus>
<security securityClassification="01"/>
<responsiblePartnerCompany enterpriseCode="SI">
<enterpriseName>SF518</enterpriseName>
</responsiblePartnerCompany>
<originator enterpriseCode="SI">
<enterpriseName>SF518</enterpriseName>
</originator>
<applic><displayText>Product type A</displayText></applic>
<brexDmRef>
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="PRODUCTGROUP" systemDiffCode="A"
systemCode="00" subSystemCode="0" subSubSystemCode="0"
assyCode="0000" disassyCode="00" disassyCodeVariant="A"
infoCode="022" infoCodeVariant="A" itemLocationCode="D"/>
<issueInfo issueNumber="003" inWork="00"/>
</dmRefIdent>
</dmRef>
</brexDmRef>
<qualityAssurance>
<firstVerification verificationType="tabtop"/>
</qualityAssurance>
</dmStatus>
</identAndStatusSection>
<content>
<brex>
<snsRules>
<snsDescr>
<snsSystem>
<snsCode>30</snsCode>
<snsTitle>Ice and rain protection</snsTitle>
<snsSubSystem>
<snsCode>0</snsCode>
<snsTitle>General</snsTitle>
<snsSubSubSystem>
<snsCode>0</snsCode>
<snsTitle>General</snsTitle>
</snsSubSubSystem>
</snsSubSystem>
<snsSubSystem>
<snsCode>1</snsCode>
<snsTitle>Air foil</snsTitle>
<snsSubSubSystem>
<snsCode>0</snsCode>
<snsTitle>Air foil general</snsTitle>
</snsSubSubSystem>
</snsSubSystem>
<snsSubSystem>
<snsCode>2</snsCode>
<snsTitle>Air intakes</snsTitle>
```

```
</snsSubSystem>
<snsSubSystem>
<snsCode>3</snsCode>
<snsTitle>Pitot and static</snsTitle>
</snsSubSystem>
<snsSubSystem>
<snsCode>4</snsCode>
<snsTitle>Windows, windshields, canopies and doors</snsTitle>
</snsSubSystem>
<snsSubSystem>
<snsCode>5</snsCode>
<snsTitle>Antennas and radomes</snsTitle>
</snsSubSystem>
<snsSubSystem>
<snsCode>6</snsCode>
<snsTitle>Propellers/rotors</snsTitle>
</snsSubSystem>
</snsSystem>
</snsDescr>
</snsRules>
<!-- A structure rule specific to the comment schema -->
<contextRules rulesContext="http://www.s1000d.org/S1000D_4-
0/xml_schema/comment/commentSchema.xsd">
<structureObjectRuleGroup>
<structureObjectRule>
<objectPath>//comment</objectPath>
<objectUse>The comment object is not applied to these
projects</objectUse>
</structureObjectRule>
</structureObjectRuleGroup>
</contextRules>
<!-- Rules applicable to all schemas -->
<contextRules>
<structureObjectRuleGroup>
<structureObjectRule>
<objectPath
allowedObjectFlag="0">//dmAddress/dmIdent/dmCode/@infoCode</obje
ctPath>
<objectUse>This BREX applies a small subset of information codes
(actually, too small for practical purposes)</objectUse>
<objectValue valueForm="range" valueAllowed="000~022">Use iaw
S1000D Iss 4.0</objectValue>
<objectValue valueForm="single"
valueAllowed="920">Change</objectValue>
<objectValue valueForm="single"
valueAllowed="993">Neutralization of a bacterial
substance</objectValue>
</structureObjectRule>
<structureObjectRule>
<objectPath allowedObjectFlag="0">//changeInline</objectPath>
<objectUse>Element change must not be used</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath
allowedObjectFlag="0">//@changeType="delete"</objectPath>
<objectUse>Change annotation value -delete- is not allowed.
Deleted text must always be removed from the context, ie not
just marked deleted using the attribute change set to -delete-.
Change history must not be preserved in data modules (and other
CSDB objects). This means that marked up changes in a data
```

```
module issue must always only concern changes since last issue.
For all non-editorial changes, reason for change must be given
using the attribute rfc on the element concerned</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath>//refs</objectPath>
<objectUse>Titles must be included in the presented list of
references in a data module BUT must not be applied in dmRefs
outside the refs element</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath
allowedObjectFlag="0">//title/internalRef</objectPath>
<objectUse>References in titles are not allowed</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath allowedObjectFlag="0">//title/dmRef</objectPath>
<objectUse>References in titles are not allowed</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath allowedObjectFlag="0">//title/pmRef</objectPath>
<objectUse>References in titles are not allowed</objectUse>
</structureObjectRule>
<structureObjectRule>
<objectPath
allowedObjectFlag="0">//title/externalPubRef</objectPath>
<objectUse>References in titles are not allowed</objectUse>
</structureObjectRule>
</structureObjectRuleGroup>
</contextRules>
</brex>
</content>
</dmodule>
```

# Chapter 4.10.3

## *Business rules exchange - The BREX default data module*

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## 1 General

This chapter describes the default BREX data module provided by the specification.

## 2 The BREX default data module

Since business rules carry information essential for the correct interpretation of the content of the CSDB, the rules must be carefully recorded in a BREX data module. The project or the organization should examine the default data module to conclude if it meets the project or the organization requirements.

This default BREX data module specifies a number of rules generally applicable to the current issue of the specification:

- the predefined value sets of the configurable attributes as these are specified in Chap 3.9.6.
- a collection of rules not possible to reflect directly in the schemas

The default BREX data module specifies itself as the applicable BREX data module.

The data module code of the default BREX is S1000D-A-04-10-0301-00A-022A-D.

**Note**

Normally, the data module code of a BREX data module will be at the top level of the product structure (ie system code, subsystem code, etc will all be zeros). The BREX default data module, since also serving as an example of how a BREX module can be marked up, is assigned a data module code distinguishing it as a part of Chap 4.10.

# Chapter 4.11

## *Information management - Process data module*

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# 1 General

This chapter gives an overview of the process data module.

# 2 Process data module

## 2.1 Principle

The S1000D process data module represents a procedural flow consisting of several data modules and/or steps that are sequenced. Decision points (branching), looping, and selective filtering are supported. An interface to external applications which can return results to direct procedural flow is supported. The process data module can be considered a procedural flow script.

The process data module can be used to represent any level of granularity of information except for an entire publication. Typically a process data module represents a small discrete task and is simply an alternate method to mark up procedural data, descriptive data, fault data, etc. A process data module can also be used to sequence several "smaller" data modules and therefore represent larger overall processes.

The process data module can be used to represent most types of information. It is especially well suited to represent procedural data, fault data and descriptive data. It is not well suited to represent wiring data, parts data and schedule data.

The conceptual logic engine component of S1000D reads a process data module as an input and executes instructions contained within. In computing terms it acts as an interpreter on the process data module. In an IETP implementation, the logic engine can be a separate software component or can be directly contained within the viewer.

The process data module declares variables that are used to control branching, looping, and context filtering. The logic engine is necessary to maintain the values assigned to the declared variables and to evaluate expressions containing them in support of decision points and filtering mentioned above. The variables and associated values are referred to as state information. There are several ways for variables to obtain values. Values can be directly assigned to variables within the process data module content using presets and postsets, dialogs can be used to ask questions of the user and assign values depending upon the user's answer, and external applications can return values which get assigned to variables.

The user is presented with data modules, steps and dialogs as they are sequenced within the process data module. The logic engine and the process data module work together, in the background, to guide the procedural flow. In order to allow the user to navigate through the process data module, two functions are available:

- The "Next" function, which instructs the logic engine to continue executing the process data module until a new data module, step or dialog is to be presented.
- The "Previous" function, which instructs the logic engine to return to the previous data module, step or dialog.

Fig 1 provides a conceptual overview of the process data module, its interaction with other data modules, the logic engine and the user.

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*Fig 1 Process data module conceptual diagram*

In Fig 1, a process data module sequences (one or) several occurrences of element <dmNode> which include an element <dialog>, two occurrences of element <dmRef>, and two occurrences of element <proceduralStep>. The user interacts with the logic engine through navigation functions ("Next" and "Previous") which instruct the logic engine to proceed or return, and through dialog functions which collect state information values. More detailed information is given in Chap 3.9.5.2.10.

The architecture in Fig 1 implies that the logic engine and the IETP are separate components. This architecture is used only for illustration purposes and is not mandated by S1000D. Any number of architectures could provide the same functionality.

A typical sequence of operation includes:

1 The logic engine starts executing the process data module.
The element <dmNode> (dialog) is executed.
The logic engine sends the dialog fragment to the IETP for display to the user.

2 The user answers the dialog in the IETP.
The IETP sends the user response to the logic engine.
The logic engine updates the appropriate variable in the state information table.

3 The element <dmIf> is executed.
The logic engine evaluates the (IF) expression against variables in the state table.
The logic engine determines which path to take.

4 Assuming element <dmThenSeq> branch:

4.1 The element <dmNodeAlt> is executed.
The applicability expression of each element <dmNode> within element <dmNodeAlt> is evaluated against variables in the state table.
The first element <dmNode> with its applicability expression evaluated to TRUE is executed.

4.2 The element <dmNode> (containing an element <dmRef>) is executed.
The logic engine notifies the IETP to display the referenced data module.
The IETP locates the data module and displays it to the user.

5 Assuming the element <dmElseSeq> branch:

5.1 The element <dmNode> (proceduralStep) is executed.
The logic engine sends the element <proceduralStep> fragment to the IETP for display to the user.

5.2 The user activates the "Next" function within the IETP.
The IETP notifies the logic engine to move NEXT.

5.3 The second element <dmNode> (proceduralStep) is executed.
The logic engine sends the element <proceduralStep> fragment to the IETP for display to the user.

## 2.2 Benefits

The process data module adds some advanced capability not available from other data module types. The cost of these advanced capabilities is complexity, both in the applications to create and display the data, and in the data itself. A project or an organization must carefully consider requirements for these advanced capabilities and use them where the benefits will outweigh the additional effort.

### 2.2.1 Applicability processing model

The process data module provides a defined processing model for the expression within applicability. This allows for a standard method to determine whether an applicability statement pertains to the current maintenance activity. As a result, the IETP can customize the display to the user based on known product configuration, operating conditions, or any previously collected information. It also means that one process data module can be used for different configurations of the Product. The defined processing model ensures that applicability expressions will be evaluated the same between different viewers, thus supporting interchangeability.

### 2.2.2 Interaction with the user

The process data module can be much more interactive than other data modules. Dialogs can ask the user questions and store the answer for further use. These answers can be used to direct the maintenance flow and the customized display.

### 2.2.3 External application interface

An external application interface is provided that allows for initiating a software program external to the IETP, sending information to that process and retrieving results. One of the more powerful uses of this is to interface with automated test equipment or even the Product itself to retrieve information that will further direct the maintenance flow. This works much the same as the interaction with the user, but it is a machine interface.

### 2.2.4 Branching and looping

If-then-else branching is supported in the process data module along with conditional looping. The point of branching is to simplify the maintainer's navigation through a procedure by ensuring everything he sees is applicable to him in his current circumstance. Looping can ensure that a user performs a complicated series of actions repeatedly until some goal is achieved. Conditional constructs such as these make navigation through the same data potentially different every time it is used dependant upon equipment configuration, equipment failure conditions, operating conditions or any number of variables created within the data module.

## 2.3 Identification of process data module

A process data module must always be written with a maintenance or operational goal in mind. As such, the standard method of assigning data module codes must be applied. In the case where an information code cannot be found to express the maintenance or operational goal, a generic process information code of 950 is available. Refer to Chap 8.4. The implication of using this method is that the maintenance or operational goal represented by the process data module is not available.

## 2.4 S1000D business rules

Although allowed by the Schema, S1000D enforces the following business rules:

– **Global variables**. All variables are considered global within an IETP session. Therefore a consistent variable naming scheme must apply across a project.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the process data module**. The project or the organization must decide whether to use the process data module or not. Refer to Para 2.

**Identification of the process data module**. The project or the organization must decide the identification method for the process data module. Refer to Para 2.3.

**Variable naming conventions**. The project or the organization must decide on a variable naming convention which will eliminate or lessen confusion surrounding process data module

variables as different authors at possibly different sites create process data modules which will work together. Refer to Para 2.4.



**End of data module**

# Chapter 4.12

## *Information management - Multiple instances of data modules*

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## 1 General

This chapter describes the management of multiple instances of the "same" data module. There are several similar situations where multiple instances might be required. The potential existence of these instances adds another level of complexity to the identification of data modules.

The most prominent need for multiple data module instances is in the relation between a manufacturer and his customers. Normally manufacturers have to maintain information, ie data modules, for all configurations of a product whereas a specific customer, who owns and operates a limited number of product configurations, is only concerned with the information that is effective to his specific configurations.

For example, there can be a need to create one data module instance per customer. Instances will be derived from the master data module by filtering mechanisms based on applicability, where filtering includes removal of information applicable to product configurations (which do not belong to the considered customer). This strategy is often referred to as the master-customized concept.

For a more thorough definition of the terms applicability and effectivity, refer to Chap 9.2.

# 2 The conceptual model

## 2.1 The data module

The data module is a central concept in S1000D. It is the smallest independent chunk of data that is administered by S1000D.

## 2.2 Data module instances

A data module can be instantiated in several instances (customer variants etc). For example, this could be due to needs for:

- an updated and new issue of the data module
- ongoing updating that generate a new in-work version
- a data module variant in a second, third, etc language
- a data module variant in a particular (country related) dialect of a language
- a variant marked up using a different S1000D version
- instances that for other reasons than above are generated to the specific needs of a particular user community, eg a tailored for certain customer's product versions

The first two examples represent the normal situation, ie information about a Product needs updating of various reasons during the product lifecycle. The other examples represent a feature in S1000D that is frequently used when there are multiple customers for a single data module.

Different customers of a Product often have different configurations of that Product and so, the supporting information must reflect those configurations. S1000D provides the means to filter a master data module to generate several customer specific instances - applicable to the various configurations and effective to the various customers' needs. Such filtering is based on the metadata provided with the data module and, in particular, based on the applicability given for the master data module as a whole and optionally for fragments of those data modules that use inline applicability (Refer to Chap 3.9.5.3).

It is important to realize that even though an instance of a data module can be derived from another data module, a source/master, it is managed as an independent data module like its source. As an example, even though it is not normally the case, a source data module might be deleted while the instances derived from it still exist.

Even though a data module instance can be derived as the result of a filtering process where data is extracted based on inline applicability markings, there are cases when this is not possible, and each instance has to be created separately and managed separately.

## 2.3 Applicability, effectivity and sensitivity

### 2.3.1 Applicability

Applicability is used to indicate which configuration of a Product that data module supports. The range and scope of a data module's applicability is declared in the identification and status

section (See Chap 3.9.5.1) and the specific applicability for various configurations is declared in the content section, using inline applicability (See Chap 3.9.5.3).

### 2.3.2 Effectivity

These different configurations of the Product can be delivered to a single customer or to multiple customers. For those situations where there is only one single customer, the complete master data module is delivered and the presentation of the different configurations is dealt with at presentation time.

### 2.3.3 Sensitivity

When there are multiple customers, any one (or more) of those customers may not wish to take delivery of information that supports a configuration of the Product that they have not received. Further, there can be cases where a particular customer does not wish other customers to know that he has taken delivery of a particular configuration of the Product and nor, therefore, the supporting data modules for that configuration.

It is for these cases that S1000D provides the mechanism for filtering the information, by "matching up" the applicability of data modules to the effectivity, derived from customer needs.

## 2.4 Data module identification

A data module is identified by the parameters specified in its identification and status section. In several cases it is sufficient to use only a subset of these parameters to uniquely identify a data module globally. The most applied subset consists of the data module code but it is quite common that issue and inwork numbers and language/country codes are added to provide the unique identification.

Chap 7.5.1 describes how data module files are named based on the following parameters (with subparameters) in order to achieve globally unique identities in a web environment:

- data module code, element <`dmCode`> with attributes
- language, element <`language`> with attributes
- issue number, element <`issueInfo`> with attributes

## 2.5 Data module instance identification

### 2.5.1 Data module code extension

When there are several instances of a data module, the instances must be properly and uniquely identified.

To ensure that uniqueness of the identity is always be achieved, there is an extended identification scheme available for instances of a data module. This scheme ensures that unique identities are provided, regardless of the reasons or situation that requires the extended identification.

The identification scheme adds two attributes to contain extra parameters in addition to the regular ones mentioned at Para 2.4. The following two attributes are contained in the element <`identExtension`>:

**Attributes:**

- `extensionProducer`, data module instance producer.
- `extensionCode`, instance code.

The attribute `extensionProducer`, must be populated with the CAGE code of the data module instance producer.

The attribute `extensionCode`, is used by the data module instance producer to control and guarantee uniqueness within his own "CAGE domain".

### 2.5.2 Basic identification items

The basic identification parameters, contained in element <dmCode>, element <language> and element <issueInfo> apply the same to all instances. An implication is that issue numbering is specific to each instance, and the increase in issue numbers does not have to be synchronized between various instances and their sources.

### 2.5.3 Data module code extension interchange

Chap 7.5.1 explains how this extended identification scheme is applied to interchange file names.

## 2.6 Instance traceability

To ensure the traceability of the master data module, related to its instances, it is possible to record the identification of the source data module from which an instance has been derived. When an instance is created from a master data module, the content of the element <dmAddress> of the source is copied into the corresponding element <sourceDmIdent> within the status section of the new instance. The element <dmAddress>, of the new instance is updated to reflect its particular properties, if these differ from the source. Typically, element <identExtension> (containing attribute extensionProducer and attribute extensionCode) as well as element <issueInfo> must be updated.

## 2.7 Instance referencing

Usually, it is not of interest to address a particular instance of a data module in a data module reference, since the use case will keep track of which instance that is the relevant one.

However, there can be cases when a direct reference to a particular instance, out of several possible, needs to be addressed. In order to enable such referencing, the element <dmRef> is supplied with sufficient parameters to point at any instance using the regular or the extended identification scheme. Chap 3.9.5.2.1.2 describes how <dmRef> can be populated.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of several instances per data module**. The project or the organization must decide if there is a need to generate several customized instances of any one data module issue. Refer to Para 2.

# Chapter 4.13

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## 1 General

This chapter presents various mechanisms to optimize the content management of data modules including:

- Paragraph significant data and quantity data. Refer to Chap 4.13.1.
- Technical information repository data module. Refer to Chap 4.13.2.
- Container data module. Refer to Chap 4.13.3.

# Chapter 4.13.1

## *Optimizing and reuse - Paragraph significant data and quantity data*

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## 1 General

This chapter describes the concept of managing significant data inside data modules.

Data modules can contain two types of meaningful information:

- Paragraph significant data refers to technical information objects such as circuit breakers, access points, consumables, etc.
- Quantity data refers to numerical data such as torque value or weight.
- The basic principle is to use content specific markup in order to identify the technical information or numerical data, ie "to make explicit what is implicit". This allows for the possibility for the information to be processed (eg for the extraction of data based on queries). This means that the data can be used for more than display to the end user.

For example, explicit tagging of access points allows potential functionalities such as:

- querying the data for all access points identified in the paragraphs of a data module (or of a set of data modules)
- querying the data for all data modules where a given access point is identified
- getting further information on a given access point, such as equipment that can be accessed, enclosing zone, fastener used for a panel, man hours needed for opening the panel, etc. Refer to Para 2.1.2.

In the following sentence:

“The access door 311AB allows setting the switch to …”

The string "311AB" is clearly an identifier of the access point. The following markup example shows explicit tagging which expresses this information and therefore allows the functionalities described above:

```
<para>The access door <accessPointRef
accessPointNumber="311AB"/> allows setting the switch to
...</para>
```

For example, explicit tagging can facilitate the implementation of a circuit breaker consistency check, ie check that circuit breakers open at the beginning of a maintenance task are closed at the end of the task. In the following sentence:

"Close the following circuit breakers: 68WV, 12WV."

The string "68WV" is clearly an identifier of the circuit breaker and the action to perform is to close this circuit breaker. The following tagging explicitly expresses this information:

```
<para>Close the following circuit breakers: <circuitBreakerRef
circuitBreakerNumber="68WV" circuitBreakerAction="close"/>,
<circuitBreakerRef circuitBreakerNumber="12WV"
circuitBreakerAction="close"/>
</para>
```

# 2 Paragraph significant data and quantity data

## 2.1 Paragraph significant data

### 2.1.1 Groups of paragraph significant data

Paragraph significant data which have a corresponding technical repository data module correspond to the following objects (refer to Chap 4.13.2):

- functional items, used to uniquely identify an item performing a function in a given system at a given position
- circuit breakers, used to uniquely identify a device used to properly break an electrical circuit or to inactivate an electrical function
- parts, used to uniquely identify an item of the Product, forming part of an assembly or subassembly, which is not normally broken down further
- zones, used to uniquely identify a structural area of the Product
- access, used to uniquely identify an access point to be opened to gain access to the equipment
- supplies, used to uniquely identify both the consumable products and their use conditions (consumable requirement and use conditions). It covers any consumables (such as oils, greases, paints), materials (gasket sheet, sheet metal) and expendables (such as O-rings, gaskets, tab washers) required to correctly accomplish a given action, task or procedure.
- support equipment, used to uniquely identify any support equipment, including standard and special tools required to correctly accomplish a given action, task or procedure.
- controls and indicators, used to uniquely identify any control or indicator required to correctly accomplish a given action, task or procedure

Other paragraph significant data consists of many meaningful pieces of information (objects listed below can be extended according to the project or the organization needs):

- ammunition
- instruction disposition
- level (training level or maintenance level)
- lubricant
- maintenance level
- manufacturer code
- manufacturers recommendation
- modification code
- qualification code
- training level

A complete definition of paragraph significant data elements is given in Chap 3.9.5.2.1.10.

### 2.1.2 The relation between paragraph significant data and technical information repository data modules

2.1.2.1 Principle

As described in Chap 4.13.2, a project or an organization can decide to manage the detailed information associated with significant paragraph data in dedicated technical information repository data modules. The types of information that can be managed in this way are defined in the first group of the data listed in Para 2.1.1.

The main advantage of this architecture (significant data tagged inside data modules and technical information repository data modules) is that detailed technical information is stored in a controlled manner and easily shared across the whole project. This allows an optimized method of organizing technical information.

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*Fig 1 Data redundancy*

In the example given in Fig 1, paragraph significant data elements reference detailed information in the technical information repository data module. During the publication process, the information stored in the technical information repository data module is resolved for display in the original data modules.

2.1.2.2 Reference methods

To allow referencing between paragraph significant information and technical information repository data modules, two reference methods can be used as described in Chap 4.13.2:

- **Implicit references**. The reference is resolved by using only the identifier or value of the considered information type element, eg the zone number. In this way, the technical information repository data module is addressed in a non-ambiguous way.
- **Explicit references**. The corresponding technical information repository data module is explicitly referenced using the element <dmRef>. Thus, the reference is resolved by using first the element <dmRef> and then the target of the considered information element.

In order to cover the two reference methods, paragraph significant information elements (circuit breaker, panels, zone etc.) share a similar definition, comprising:

- an object identifier (a "logical key"), uniquely identifying the object (the same identifier is used in the technical information repository data module)
- an optional possibility to "repeat" (inside the procedural, fault, or descriptive data module) the detailed designation, which is a part of the detailed information stored in the repository data module (thus allowing to keep data modules as a "self unit" object)
- an optional reference to a particular target in the corresponding technical information repository data module (standard reference to data module). This standard reference using

the attribute `referredFragment`, can be computed from the logical key, as introduced above, and is intended to allow a standard data module to data module navigation.

## 2.2 Quantity data

The quantity data element provides the capability to identify a portion of a paragraph as being a quantity (numerical value and unit of measurement). The exact meaning of the quantity data element can be specified using a set of pre-defined S1000D values, or extended to support specific program needs.

The quantity data element also provides the ability to define numerical values to a very precise level, and includes capabilities such as:

- specifying a unit of measure chosen from a finite list.
- grouping values and tolerances together, and managing unit of measure accordingly.

The quantity data element is described in Chap 3.9.5.2.1.10.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**General use of paragraph significant data elements**. The paragraph significant data elements are optional, and the project or the organization must decide to use all or part of them, or not to use them. If used, the project or the organization must decide whether to use the associated technical information repository data modules. (Refer to Para 2 and Chap 4.13.2).

**Use of name in conjunction with the technical information repository**. The project or the organization must decide whether to repeat the name of objects referenced to the technical information repository. There are two options:

- Data modules contain a repetition of the name (no need to extract information from technical information repository data module).
- Data modules do not contain name and the reference to the corresponding entry within the technical information repository data module allowing resolution of the name information later in the process, for example during publication generation. Refer to Para 2.1.2.2.

**Reference mechanisms**. The project or the organization must decide whether to use implicit or explicit references between paragraph significant information and technical information repository data modules. Refer to Para 2.1.2.2.

# Chapter 4.13.2

## *Optimizing and reuse - Technical information repository data module*

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# 1 General

This chapter describes the technical information repository data module concept, a mechanism to group properties related to different technical information types with the aim to reduce redundant information and to increase support consistency. Refer to Chap 3.9.5.2.11 for detailed information about each technical information type and technical information repository data module.

# 2 Technical information repository

## 2.1 Principle

Some technical information is used in many places in many data modules. For example, circuit breakers, panels, zones and access doors appear several times within data modules and across data modules. In addition, properties associated to such information types (like description and zone) are duplicated in various data modules, as illustrated in Fig 1.

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*Fig 1 Data redundancy*

The duplication of information can lead to data inconsistency and adds complexity to content management of the technical information. The grouping of all the properties related to technical information in the same place, called a technical information repository, ensures data consistency and simplifies the management of technical information.

This minimization can be done in two ways:

- internally in the production environment by using "libraries" for repeated information. This is commonly used for tools or consumables, among others.
- by the use of technical information repository data modules. These data modules can be used within the production environment only or be delivered to the customer as part of the publications or publication package.

Using the previous example it is possible to minimize data redundancy and simplify data management by using a technical information repository. In Fig 2, the properties (eg description) associated to eg a functional item are maintained in a technical information repository data module. In this example, two procedural data modules use the functional item to identify the common content stored in the technical information repository data module.

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*Fig 2 Technical information repository data module concept*

## 2.2 Technical information repository types concerned

A dedicated technical information repository data module covers one of the following technical information repository types:

- functional items, used to uniquely identify an item performing a function in a given system at a given position
- circuit breakers, used to uniquely identify a device used to break properly an electrical circuit or to inactivate an electrical function
- parts, used to uniquely identify an item of the Product, forming part of an assembly or subassembly, which is not normally broken down further
- zones, used to uniquely identify a structural area of the Product
- access, used to uniquely identify an access point to be opened to gain access to the equipment
- organizations, used to uniquely identify an organization involved in the manufacturing or in the supply of the Product or part of it
- supplies, used to uniquely identify both the consumable products and their use conditions (consumable requirement and use conditions). It covers any consumables (such as oils, greases, paints), materials (gasket sheet, sheet metal) and expendables (such as O-rings, gaskets, tab washers) required to correctly accomplish a given action, task or procedure.
- support equipment, used to uniquely identify any support equipment, including standard and special tools required to correctly accomplish a given action, task or procedure
- functional and/or physical areas, used to uniquely identify the functional and/or physical area of the Product (eg a system, subsystem etc)

– controls and indicators, used to uniquely identify any control or indicator required to correctly accomplish a given action, task or procedure

A complete definition of those technical information repository types is given in Chap 3.9.5.2.11.

## 2.3 Technical information repository data module identification

A specific information code is allocated for each technical information repository data module type. Refer to Chap 8.4.1 for the short information code definition.

For each of technical information repository types, the project or the organization must decide to have one or several technical information repository data modules. In the case of several data modules for a dedicated type, the granularity of these data modules is determined by the application of the SNS.

## 2.4 References to a technical information repository

For technical information within a technical information repository data module, retrieval of common information is performed by two alternate methods.

In order to associate technical information to a technical information repository data module, the technical information must first be identified in the referencing data module. After that, there are two reference methods:

– **implicit references**. The reference is resolved by using only the identifier or value of the considered information type element, eg the zone number. Refer to Chap 4.13.1. In this way, the technical information repository data module is addressed in a non-ambiguous way. Refer to Fig 3.

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*Fig 3 Implicit reference to the technical information repository data module*

– **explicit references**. The corresponding technical information repository data module is explicitly referenced using the element <dmRef>, as described in Chap 4.13.1. Thus, the reference is resolved by using first the element <dmRef> and then the target of the considered information element. See Fig 4.

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*Fig 4 Explicit reference to technical information repository data module*

## 2.5 Publication process and technical information repository data modules

### 2.5.1 Resolving the references for display or printed output

Since the technical information repository data modules are intended to avoid redundancy and inconsistency during the production of the technical documentation, it is not recommended to display or print these data modules for the end user. The publication process (IETP or page-oriented output) is responsible for extracting and generating the presented information, retrieved from the technical information repository data modules.

In the previous example with functional item technical information repository data module, the description given by the functional item is not provided in the procedural data module itself. During the publication process, the description (or other relevant property) is retrieved from the functional item repository data module and will be presented in the procedure to the end user, as shown in Fig 5.

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*Fig 5 Data enrichment and publication process*

### 2.5.2 Change marking

With respect to updating, the data modules are marked as changed as a result of revised information in the technical information repository data modules. Refer to Chap 3.9.5.2.1.2. The publication process (IETP or page-oriented output) is responsible for tracking the change marking within the data modules when changed technical information is incorporated, as shown in Fig 6.

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*Fig 6 Updating process*

By applying the "Master - Customer" concept described in Chap 4.12, the variant data module produced by the publication process will be uniquely identified.

# 3 Business rules decisions

Business rules decisions include but are not limited to the following:

**Use of technical information repository**. Use of the technical information repository data module is optional. As its use changes the concept of self-contained of data modules, the project or the organization must first decide to use it or not. Refer to Para 2

**Use of technical information repository internally or as a customer delivery**. The project or the organization must decide if technical information repository data modules are only used internally to the manufacturer or integrator, as part of the production / integration environment. The project or the organization must decide if technical information repository data modules are delivered to customer or not. Refer to Para 2

**Technical information repository data module types to be used**. The project or the organization must decide which technical information repository data module types must be used or not. In order to avoid any redundancy and inconsistency, care must be paid on some types, depending on other project specific decisions, eg tailoring of the S2000M. Refer to Para 2.2

**Use of one or several data modules for a technical information repository type**. The project or the organization must decide whether there is one single or several data modules for a dedicated type of technical information or not. Refer to Para 2.2

**Reference mechanisms**. The project or the organization must decide whether to use implicit or explicit references or not. Refer to Para 2.4

# Chapter 4.13.3

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## 1 General

This chapter describes the container data module concept. The container data module is a production management mechanism to associate several data modules representing the same data. Refer to Chap 3.9.5.2.14.

# 2 Container data module

## 2.1 Principle

The grouping of data modules can be used when several data modules achieve the same maintenance goal, but the detailed procedures differ due to product configuration, maintenance environment or other conditions.

For example (refer to Fig 1), a maintenance action to remove a pump can be performed differently depending on the type of pump, such as “Remove pump ABC-100” (Data module alternate 1) and "Remove pump ABC-200" (Data module alternate 2). A container data module "Remove pump ABC" can be used to associate the two alternate data modules. References to the "Remove pump ABC" container data module will target the group of two alternate data modules.

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*Fig 1 Container data module remove pump ABC*

As the container data module is a data management tool, there is no specific need to display it to the end user. The IETP process can suppress the container data module and display the accurate alternate data module 1 or data module 2 depending of configuration context.

## 2.2 Benefits

As the container is configuration independent, referencing a container data module has several benefits for data management and referencing purposes:

- reduction of configuration dependencies between data modules
- consistency of links
- configuration consistency checks
- content management
- reuse of classical configuration management processes and tools

### 2.2.1 Reduction of configuration dependencies between data modules

A container data module limits the impact of evolutions linked to configuration. For example, consider an Original Equipment Manufacturer (OEM) data module referring to supplier data module, refer to Fig 2:

- left part describes the way of working without container.
- right part describes the container data module approach, where the reference does not target the supplier's procedural data module directly, but targets the supplier's container data module.

With configuration evolution, a second variant of the supplier procedural data module is created (description of a new configuration). The following figure illustrates the new situation.

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*Fig 2 OEM and Supplier relationship with configuration evolution*

Without the container data module, the OEM will have to create a new issue of the referencing data module in order to reference both the initial supplier procedural data module and the new "variant" of the supplier procedural data module. In other words, the OEM has to follow and react to each configuration evolution of the supplier procedural data modules.

With the container approach, a new issue of the OEM data module is not necessary since the reference to the container data module remains valid. The workload of the OEM will be strongly reduced, and the opposite is also true in case of a supplier data module referencing an OEM container data module.

The example illustrates how configuration dependency can be avoided and how workload can be reduced by use of container data module.

### 2.2.2 Consistency of links

The container data module helps to maintain the consistency of links by centralizing the link management and providing the capability to define the linking at the source instead of at the point of usage. Taking the previous example using the container data module and assuming a publication contains 10 separate links to the supplier data module, when the supplier adds the variant data module, the links only have to be changed one time in the container as opposed to 10 times at each usage. The container also provides the capability to have the supplier define and deliver the alternate data module relationships in container data modules as opposed to requiring the OEM to define them.

### 2.2.3 Configuration consistency checks

The configuration consistency between the various alternate data modules can be ensured. At a given moment in time (ie for a given product configuration and under a given operational condition), only one alternate data module is applicable for a container data module. The applicability of one referenced data module within a container must not overlap the applicability of any other referenced data module within the same container. Refer to Chap 3.9.5.3.

The sum of all applicability of referenced data modules within a container does not have to cover every possible product configuration or technical condition. It is allowed to have a case where none of the referenced data modules within a container is applicable to a certain product configuration or technical condition.

The configuration check between alternate data modules is simplified by grouping the references to various alternates within an explicit structure of the container data module.

## 2.3 Identification of container data module

### 2.3.1 General

A container data module is used to associate a number of data modules with the same maintenance goal. Although it does not contain the procedure to perform the maintenance action, the target of the container data module has the same maintenance goal as the alternates it references. Therefore, the container can be considered a variant of the referenced data modules and could be identified as a variant. This method works well if the data modules referenced by the container have similar data module codes. It becomes more difficult when the data module codes differ (such as different SNS numbers or different information code numbers).

Container data modules are identified by one of the following methods:

- use of the disassembly code variant of the data module code. The disassembly code variant distinguishes the container data module from the referencing alternate data modules. The characters used for the container disassembly code variant and the number of characters for the container disassembly code variant is a project decision.
- use of the generic container information code. Refer to Chap 8.4.1. The implication of using this method is that the maintenance goal represented by the container is not available.

The choice of the container identification method is a business rule decision.

### 2.3.2 Container identification example

For example, the business rule decisions are:

- the disassembly code variant is used to identify the container
- the disassembly code variant character "A" is always used for container
- the disassembly code variant has one character of length

The following example illustrates the data module code for one container referencing two alternate data modules:

- the data module code for the container is AJ-A-35-13-51-00A-720A-A
- the data module code for the first alternate is AJ-A-35-13-51-00B-720A-A
- the data module code for the second alternate is AJ-A-35-13-51-00C-720A-A

## 2.4 Printing and displaying of container data modules

The main purpose of the container data module is for data management, therefore the display or printing of a container data module provides no benefit to the end user. In fact, displaying or printing the container data module will force the user to select an additional link or look up an additional data module which is detrimental to the end user in both cases.

Although not prohibited, it is recommended that an IETP viewer process both the link to a container data module and the subsequent link to the target alternate data modules in a single

operation. The container data module is hidden from the end user and it must appear that the target alternate data modules are linked at the source data module. Likewise, it is recommended that the same principle of hiding the container data module is used when composing a printed publication.

### 2.5 Business rules

Although allowed by the Schema, the following business rules must apply:

- A container data module cannot refer to another container data module. A container data module can only refer to data modules with content (eg procedural, descriptive).
- The configuration consistency between the various alternate data modules must be ensured. Refer to Para 2.2.3.
- Applicability annotations from the referenced data modules do not have to be duplicated in the container data module. If necessary, the IETP could retrieve the applicability of referenced data modules.

## 3 Business rules decisions

Business rule decisions include but are not limited to the following:

**Use of container data module**. The project or the organization must decide if container data modules are used. Refer to Para 2.

**Identification of container data module**. The project or the organization must choose the container identification method. The chosen method must be used systematically. Refer to Para 2.3.

**Use of applicability within container data module content**. The project or the organization must decide if applicability annotations are duplicated from the referenced data modules to the container data module or not. Refer to Para 2.5.

# Chapter 4.14

## *Information management - Applicability*

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# 1 General

Applicability provides the mechanism to identify the context for which a data module or parts of a data module is valid. This context is usually associated with the physical configuration of the Product but can include other aspects such as tool availability and environmental conditions. Applicability capabilities can vary greatly, from a simple annotation placed in the content of a data module to managing the life cycle of applicability which includes product definition, applicability authoring and product instance configuration tracking. This chapter provides an overview of applicability capabilities and the mechanisms for managing applicability.

The applicability mechanism is supported by the applicability annotation within data modules and by three specific data module types:

- the Applicability Cross-reference Table (ACT) data module
- the Conditions Cross-reference Table (CCT) data module
- the Products Cross-reference Table (PCT) data module

Chap 4.14.1 provides a detailed overview of the capabilities and mechanisms available in the ACT data module.

Chap 4.14.2 provides a detailed overview of the capabilities and mechanisms available in the CCT data module.

Chap 4.14.3 provides a detailed overview of the capabilities and mechanisms available in the PCT data module.

Detailed authoring information for applicability can be found in Chap 3.9.5.3.

# 2 Applicability

## 2.1 Applicability concepts

### 2.1.1 Static versus filtered view

2.1.1.1 Filtered view

With the advent of cheap portable computing devices and viewers, it is possible to generate a tailored view of the data which is filtered for the product instance. It is the applicability model along with a defined set of rules for processing of applicability annotations that makes this filtered view possible.

For example, in the sample bicycle data set, the data module S1000DBIKE-AAA-D00-00-00-00AA-258A-A contains a procedural step with an applicability annotation specifying that the step information is appropriate for the “Model: Mountain storm Version: MK1” bicycle. The next procedural step has an applicability annotation specifying that the step information is appropriate for the "Model: Brook trekker Version: Mk9" bicycle. The viewer could use the applicability annotations and the known model of the bicycle being serviced to filter the data module content and only show the information that is appropriate.

Filtering on applicability can also be used to perform customization during publication. In this scenario a master data module contains the information for all deliveries (customers) and during publishing for a specific delivery (customer) the data module is customized (filtered) to contain only data that is appropriate for that delivery (customer). Taking the above example, customer A only resells "Model: Mountain storm Version: Mk1" bicycles and does not want information about "Model: Brook trekker Version: Mk9" bicycles included in their manuals. During publication, all data modules are customized to remove any "Model: Brook trekker Version: Mk9" specific information. The applicability model with its filtering capability facilitates this. Refer to Chap 4.12 for more information about customization.

2.1.1.2 Static view

With page-oriented publications or conditions where a viewer is not available, a static view of the applicability and associated data must be supported. In a static view, all information must be

presented and the maintainer must determine which data is appropriate for the product instance.

**Note**

The data may have been filtered before publishing.

Taking the example from Para 2.1.1.1, both steps would have to be presented along with the applicability pertaining to each. The maintainer must decide which of the two steps are appropriate for the bicycle he/she is working on.

2.1.1.3 Functionality comes at a cost

The applicability model can support schemes from the very simple to the complex, supporting the full range from page-oriented to automated filtering in a viewer.

If only static applicability is required and computation of applicability is not needed, then only a part of the applicability annotation is used within data modules. The ACT, CCT and PCT data modules are not needed.

If applicability filtering is required, then the full applicability annotation, including the ACT, CCT and PCT data modules, are required. The project or the organization must decide to which level applicability is to be implemented.

Refer to Chap 3.9.5.3 and subchapters for implementation details.

### 2.1.2 Life cycle of applicability data

The applicability model provides the mechanism to manage applicability throughout the life cycle as it relates to technical data. A project or an organization can elect to adopt only portions of the process depending upon business requirements. Refer to Fig 1 for a diagram of the life cycle.

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*Fig 1 Applicability life cycle*

2.1.2.1 Planning

During planning, information coming from engineering, logistics support analysis, manufacturing, and other sources is used to identify attributes about the Product and an initial set of conditions which has an effect on determining the applicability of technical data. These product attributes and conditions will become the basis for creating applicability annotations in data modules. Product attributes are declared and configuration managed in the ACT data module. Conditions are declared and configuration managed in the CCT data module.

2.1.2.2 Authoring

During authoring, product attributes from the ACT data module and conditions from the CCT data module as well as some free text conditions are used to build applicability annotations. Applicability annotations can apply to an entire data module or to only a portion of the content.

2.1.2.3 Product evolution

As the Product evolves, new product attributes and conditions will be identified. The ACT and CCT data modules, respectively, are modified and up-issued to reflect the new product attributes and conditions. New applicability annotations are created and existing applicability annotations are updated as needed within the data modules.

2.1.2.4 In service life of a product instance

As product instances are maintained throughout their life, the actual configuration of the product instance will change and is maintained in the PCT data module. The PCT data module can be published in cases where the product instance configuration is fairly static. The PCT data module can also be a transient file used only to convey the product instance configuration at a

particular time between an authoritative source, such as a maintenance management system, and a viewer.

2.1.2.5 Filtering of the end view

At the final point of usage, a viewer uses the product instance configuration information, from the PCT data module, as actual values to "plug in" to an applicability annotation in order to evaluate the outcome. A positive outcome indicates that the associated data is appropriate to display, a negative outcome indicates that the associated data is not appropriate to display. Thus the display can be tailored for the specific product instance.

### 2.1.3 Applicability annotation components

The applicability annotation is conceptually divided into two parts:

- one part designed for human readability
- one part designed for computer processing

The project or the organization must determine which parts of applicability to implement depending upon the project or the organization requirements.

A project or an organization that is required to support a printed or static electronic display and does not need to support customized deliveries will only need to use the human readable part of the applicability annotation. The computer processing part of the applicability annotation as well as the ACT, CCT and PCT data modules are not required. Refer to Chap 3.9.5.3 for implementation details.

A project or an organization that is required to support filtering of the end view or customized deliveries will need to use the computer processing part of applicability. Applicability annotations will still need to be presented to the user in a human readable form. This can be achieved either by providing the human readable part of applicability or by relying on the viewer to generate the human readable part from the computer processing part at the time of display. The project or the organization must decide whether to provide both parts of the applicability annotation or rely on the viewer to generate the human readable part.

Refer to Chap 7.8 for details on generating the human readable part from the computer processing part of applicability.

## 2.2 Structure of applicability

### 2.2.1 General

To facilitate the lifecycle view of applicability, three specific data module types contain applicability information in addition to the applicability annotations contained in data modules and publication modules. Although not prohibited, the ACT, CCT and PCT data modules are not intended to be displayed to the end user.

### 2.2.2 ACT data module

The ACT data module is used to declare product attributes that can affect applicability of data. Product attributes are properties of the Product that will typically not change throughout the service life of a product instance, such as model or serial number. A project or an organization can have one ACT data module instance.

The ACT data module serves as the central point of reference for applicability definitions. It provides references to one CCT and one PCT data modules. All data modules, publication modules and SCORM content package modules requiring applicability filtering must reference one ACT data module from the IDSTATUS section (refer to Fig 2). A project or an organization can have multiple ACT data module instances, however, each data module, publication module or SCORM content package module can reference only one ACT data module.

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*Fig 2 Referencing scheme*

Refer to Chap 4.14.1 for details on the ACT data module.

### 2.2.3 CCT data module

The CCT data module is used to declare any type of condition that can affect applicability of data. Conditions can be technical, operational, environmental or any other type of condition that can affect technical data. Technical conditions are typically tied to the configuration of the Product, such as service bulletins or modifications. The state of technical conditions can change throughout the service life of a product instance. Examples of operational and environmental conditions are location of maintenance, availability of tools, regulatory rules, temperature, wind speed and sandy conditions.

Similar to the ACT data module, a project or an organization can have multiple CCT data module instances. A project or an organization can decide to use more than one CCT data module instance to segregate conditions between major subsystems or to segregate between project partners.

The CCT data module is divided into three major elements:

- an element to define common types of conditions
- an element to define specific conditions
- an optional incorporation status list for technical conditions

Refer to Chap 4.14.2 for details on the CCT data module.

### 2.2.4 PCT data module

The PCT data module is a repository for defining product instances and the specific values for product attributes and conditions for each product instance. It is a formal method of defining product instances and the configuration of each product instance.

Similar to the ACT data module, a project or an organization can have multiple PCT data module instances. A project or an organization can decide to use more than one PCT data module instance to segregate conditions between major subsystems or to segregate between project partners.

Refer to Chap 4.14.3 for more details on the PCT data module.

### 2.2.5 Referencing scheme

The ACT data module serves as the central point of reference for applicability definitions. All data modules, publication modules and the SCORM content package module reference an ACT data module from the data module or publication module status section, respectively. The ACT data module references the CCT and PCT data modules. Thus all data modules and publication modules can gain access to all three applicability data modules with a single reference (refer to Fig 2).

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Level of applicability lifecycle**. The project or the organization must decide to what level to implement the life cycle of applicability. The level can range from providing only the human readable part of the applicability annotation to support print and static display to implementing the entire process to support customization and filtered display. Refer to Para 2.1.2.

**Method of displaying invalid content**. The project or the organization must specify the method that content is presented which is not valid for the current maintenance context. The content can be removed, hidden or de-emphasized in some manner. Refer to Para 2.1.2.

**Number of ACT, CCT and PCT data module instances**. A project or an organization which provides ACT, CCT and PCT data modules must decide whether to provide one instance of each data module type or to segregate the project into multiple instances of each data module type, and the method for segregation. Refer to Para 2.1.2.

**Product attribute and conditions naming and identification scheme**. It is highly recommended that a project or an organization using the ACT and CCT data modules define a consistent naming and identification scheme for product attributes and conditions. Refer to Para 2.1.3.

**Providing the human readable part of applicability**. A project or an organization which provides the computer processing part of applicability must decide whether to also provide the human readable part of applicability or rely on the viewer to build the human readable part. Refer to Para 2.1.3.

# Chapter 4.14.1

## *Applicability - Applicability cross-reference table*

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# 1 General

The Applicability Cross-reference Table (ACT) data module is the central point of reference for applicability definitions when applicability filtering is required for either customized deliveries or filtering by a viewer. Refer to Chap 4.14 for an overview of these processes.

The ACT data module contains the following elements:

- mandatory definition of product attributes
- optional reference to the Conditions Cross-reference Table (CCT) data module
- optional reference to the Products Cross-reference Table (PCT) data module

This combination provides access to all applicability definitions and product instance values from a single data module.

# 2 ACT data module

## 2.1 Product attribute definition

### 2.1.1 Product attributes

A product attribute is a property of the Product that can affect the applicability of technical data. Product attributes are properties of the Product that are typically set at the time of manufacture

of a product instance and will usually not change throughout the service life of a product instance. Examples of product attributes are model, series and serial number.

### 2.1.2 Definition of the product attributes

The definition of a product attribute in the ACT data module includes a mandatory unique identifier, name and description as well as optional display name, enumeration and pattern. The unique identifier is used to reference this product attribute from other data modules. The name and description provide help in identifying the product attribute. The display name can be used when generating a human readable applicability annotation (refer to Chap 7.8). The enumeration and pattern together define the allowable values for a product attribute.

The values that are allowed for a product attribute can be specified with either the enumeration or pattern or with both. The pattern specifies a format that values must adhere to. For example, a serial number must be three digits or the version of bicycle must be "Mk" followed by either 1 or 9. The enumeration specifies a number of discrete values or ranges allowable. For example, the model of bicycle must be "Brook trekker" or "Mountain storm", the serial number must be "001" thru "999", or the version of bicycle must be "Mk1" or "Mk9". There is some overlap in the capabilities of these two methods but there are also unique capabilities with each. The examples in this paragraph can be found in the bicycle sample data module DMC-S1000DBIKE-AAA-D00-00-00-00AA-00WA-D.

A product attribute can be populated with free text if no pattern or enumeration is specified. The only restriction is that a product attribute value cannot contain the reserved tilde (~) or vertical bar (|) characters.

## 2.2 Reference to the CCT data module

If one or more CCT data module instances are used on a project a reference must be given to one CCT data module instance.

## 2.3 Reference to the PCT data module

If one or more PCT data module instances are used on a project a reference must be given to one PCT data module instance.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of product attributes versus conditions**. The project or the organization must decide what types of properties about the Product become product attributes (in the ACT data module) versus conditions (in the CCT data module). One method of classification is to divide product attributes into properties that are set during manufacturing and conditions into properties that are set after market. Another method is to divide product attributes into properties which the value will not change throughout the service life of the product instance and conditions into properties which the value can change. Any number of other methods can be applied.

**Configuration management of product attributes**. The project or the organization must decide to what extent they configuration manage and limit editing access to the product attributes. The modification of an existing product attribute can have a significant affect to existing data.

# Chapter 4.14.2

## *Applicability - Conditions cross-reference table*

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## 1 General

The Conditions Cross-reference Table (CCT) data module is used to declare conditions that have an affect on the applicability of data and is used to define the incorporation status for technical conditions. Refer to Chap 4.14 for an overview.

The CCT data module is divided into three sections:

- a definition of common types of conditions
- a definition of specific conditions
- an optional incorporation status list for technical conditions

# 2 Conditions cross-reference table

## 2.1 Conditions

A condition is any property other than a product attribute that has an affect on the applicability of data. Conditions differ from product attributes in that values of a condition are more likely to change throughout service life of a product instance or are often not tracked against a product instance. Conditions can be associated with the physical configuration of the Product, with maintenance conditions, with weather conditions or any other condition that has an affect on the applicability of data.

It is important to note that conditions are extensible and are not limited to the following examples.

### 2.1.1 Technical conditions

Conditions can be associated with the physical configuration of the Product. These technical conditions can be tracked against a product instance. Examples of technical conditions are service bulletins, engineering orders, and modifications.

### 2.1.2 Operational conditions

Conditions can be associated with the operation of the Product or conditions at the time of maintenance. These operational conditions are usually not considered as part of the configuration of the Product and are not tracked as such. An example of an operation condition is regulatory rules that are in effect, such as Extended-range Twin-engine Operational Performance Standards (ETOPS). Examples of maintenance conditions include availability of tools, internal or external power and location of maintenance (such as indoor or outdoor).

### 2.1.3 Environmental conditions

Conditions can be associated with environmental conditions at the time of maintenance or during operation prior to maintenance. Examples of environmental conditions include temperature, wind speed, rain, sandy conditions and volcanic ash.

### 2.1.4 Other conditions

Conditions are not limited. As systems become more integrated, conditions can be associated with information not typically available to technical documentation. For instance, as training and technical data become more integrated, conditions could be created to represent the qualifications and training records of the person performing maintenance and the technical data could be tailored for that person’s qualifications. The extensible nature of the CCT data module will allow any condition to be created.

## 2.2 Definition of the conditions

The definition of a condition in the CCT data module is a two step process. First, a general condition type must be defined, and then a specific condition must be defined of that type. For example, a generic service bulletin type can be defined with allowable values of "pre" and "post", then a specific service bulletin condition can be defined for whether a chain guard service bulletin has been installed ("post") or not ("pre"). Many specific conditions can be defined which are the same general condition type. For example, all specific service bulletin conditions will be of the general service bulletin type.

### 2.2.1 Condition types list definition

The definition of a condition type in the CCT data module includes a mandatory unique identifier, name, description and enumeration as well as an optional pattern. The unique identifier is used to reference this condition type when defining a specific condition. The name and description provide help in identifying the condition type. The enumeration and pattern together define the allowable values for a product attribute.

The condition type definition is similar to the product attribute definition and follows the same rules (refer to Chap 4.14.1) with the exceptions that a display name does not exist in the condition type and the enumeration is mandatory in the condition type.

### 2.2.2 Condition list definition

The definition of a condition in the CCT data module includes a mandatory unique identifier, condition type reference, name and description as well as an optional display name and references. The unique identifier is used to reference this condition from other data modules and from the incorporation list of this data module. The name and description provide help in identifying the condition. The display name can be used when generating a human readable applicability annotation (refer to Chap 7.8). The references are used if there is additional information associated with this condition. A common use of this is to refer to service bulletin documentation for a service bulletin condition.

## 2.3 Incorporation status list

The optional incorporation status list of the CCT data module is used to document which technical conditions have been incorporated into the associated publications or data modules for the relevant product instances. It has the capability to reference a condition defined earlier in the data module and provide a list of documents the condition affects. The list can include a reference to the data module or publication affected, the status of the incorporation including optional date and applicability information which can identify which product instances are affected.

This information can be used to create incorporation status front matter. The project or the organization must determine whether incorporation status front matter is required or whether incorporation status information would be helpful in managing the project.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of product attributes versus conditions**. The project or the organization must decide what types of properties about the Product become product attributes (in the Applicability Cross-reference Table (ACT) data module) versus conditions (in the CCT data module). One method of classification is to divide product attributes into properties that are set during manufacturing and conditions into properties that are set after market. Another method is to divide product attributes into properties which the value will not change throughout the service life of the product instance and conditions into properties which the value can change. Any number of other methods can be applied. Refer to Para 2.

**Configuration management of the conditions**. The project or the organization must decide to what extent they configuration manage and limit editing access to the conditions. The modification of an existing condition can have a very extensive affect to existing data. Refer to Para 2.

**Use of the pattern**. The project or the organization defining conditions must decide if enumeration provides enough information specifying the allowable values for a condition or whether the pattern is also needed. Refer to Para 2.2.1.

**Use of the incorporation list**. The project or the organization must decide whether to use the incorporation status list. Refer to Para 2.3.

# Chapter 4.14.3

## *Applicability - Products cross-reference table*

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## 1 General

The Products Cross-reference Table (PCT) data module is a repository of product instances and the values for product attributes and conditions for each product instance.

## 2 Product

### 2.1 Definition

A product instance is a single physical occurrence of the Product.

### 2.2 Definition of products and actual values

The definition of a product instance in the PCT data module includes a list of assignments of actual values to product attributes and conditions for the product instance. Each assignment must include three pieces of information:

- a reference to the product attribute or condition
- an indicator whether this is a product attribute or condition
- the actual value

### 2.3 Scope of products

The PCT data module can contain any number of product instances that are appropriate for the operating environment as defined by the project or the organization. In many cases only the product instances of a certain organization are listed. As examples, a commercial airline will list only the Airbus A330 aircraft that it owns, a battalion will list only the Abrams M1 battle tanks

within the battalion, or the United States (US) Naval Air squadron will only list the F/A-18 aircraft in the squadron. In other cases all product instances can be listed. As an example, Airbus may want an internal list of all A330 aircraft in service regardless of owner, or the US Navy may want a list of all F/A-18 aircraft it owns.

### 2.4 Operational use of a temporary file

Many organizations already own and maintain systems to track the configuration of their product instances. These systems are often considered the authoritative source for configuration information and these organizations will not want to also maintain a PCT data module. In cases such as this, the PCT data module can be generated from the configuration management authoritative source and used as a transient transfer mechanism to a viewer. The PCT data module provides a standard interface independent of which viewer is being used.

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of a published or a transient data module**. The project or the organization using the PCT data module must decide whether to publish a static issue of the data module or use the data module as a transient transfer mechanism between an external system and a viewer.

**Scope of the product instances**. The project or the organization using the PCT data module must decide how many product instances are contained in a data module. Options include listing all product instances in service or listing only the product instances within an organization.

**Configuration management of the product instances**. The project or the organization must decide how to configuration manage the list of product instances and associated values for product attributes and conditions.

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# Chapter 5.1

## *Information sets and publications - General*

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## 1 General

This chapter contains common and specific rules for information sets and publications for the Product.

It is based on the following definitions:

- An information set is the required information in a defined scope and depth (author view) in form of data modules managed in the CSDB. A project data module requirements list lists all required data modules for that project.
- A publication is the compilation and publishing of information for a customer. This can be an IETP, a paper publication compiled from data modules or a publication containing legacy data. The List of Applicable Publications (LOAP) lists the required publications for a customer project.

A publication can be a subset of or equal to an information set, but it can also be a superset of several Information sets or parts of them.

Requirements for Information sets are given in Chap 5.2 and for publications in Chap 5.3.

Throughout these chapters, examples of maintenance data module coding are given. For the sake of brevity, these examples are limited to 17 and 37 character coding. The project or the organization must adapt their data module coding strategies to suit their needs and not necessarily restrict themselves to either 17 or 37 character coding.

Data module coding examples are also given for training data modules. With the addition of the learn code and the learn event code, these examples are limited to 21 and 41 character coding. The project or the organization must adapt their data module coding strategies to suit their needs and not necessarily restrict themselves to either 21 or 41 character coding.

# Chapter 5.2

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| Chap 5.2.2 | Information sets - Air specific information sets |
| Chap 5.2.3 | Information sets - Land/Sea specific information sets |

## 1 General

This chapter references chapters that provide general and specific guidance for the preparation and coding of the following:

- Common information sets, refer to Chap 5.2.1
- Air specific information sets, refer to Chap 5.2.2
- Land/Sea specific information, refer to Chap 5.2.3

# Chapter 5.2.1

## *Information sets - Common information sets*

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| Chap 5.2.1.12 | Common information sets - Stores loading information |
| Chap 5.2.1.13 | Common information sets - Role change information |
| Chap 5.2.1.14 | Common information sets - Battle damage assessment and repair information |
| Chap 5.2.1.15 | Common information sets - Illustrated tool and support equipment information |
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| Chap 5.2.1.18 | Common information sets - Common information and data |
| Chap 5.2.1.19 | Common information sets - Training |
| Chap 5.2.1.20 | Common information sets - List of applicable publications |
| Chap 5.2.1.21 | Common information sets - Maintenance checklists and inspections |

# 1 General

The complete production process involves agreeing the purpose, scope and depth of the technical information, establishing the business rules for data module coding, generating a data module requirements list, producing and publishing the data modules. Information sets are provided to assist the generation part of the process.

# 2 Common information sets

The following chapters provide the rules for the preparation and coding of common information sets.

General and specific guidance are given in the following chapters:

- Crew/Operator information, refer to Chap 5.2.1.1
- Description and operation, refer to Chap 5.2.1.2
- Maintenance information, refer to Chap 5.2.1.3
- Wiring data, refer to Chap 5.2.1.4
- IPD, refer to Chap 5.2.1.5
- Maintenance planning information, refer to Chap 5.2.1.6
- Mass and balance information, refer to Chap 5.2.1.7
- Recovery information, refer to Chap 5.2.1.8
- Equipment information, refer to Chap 5.2.1.9
- Weapon loading information, refer to Chap 5.2.1.10
- Cargo loading information, refer to Chap 5.2.1.11
- Stores loading information, refer to Chap 5.2.1.12
- Role change information, refer to Chap 5.2.1.13
- Battle damage assessment and repair information, refer to Chap 5.2.1.14
- Illustrated tool and support equipment information, refer to Chap 5.2.1.15
- Service bulletins, refer to Chap 5.2.1.16
- Material data, refer to Chap 5.2.1.17
- Common information and data, refer to Chap 5.2.1.18
- Training, refer to Chap 5.2.1.19
- Common information sets - List of applicable publications, refer to Chap 5.2.1.20
- Common information sets - Maintenance checklists and inspections, refer to Chap 5.2.1.21

# 3 Business rules decisions

For all the chapters above, business rules decisions include, but are not limited to, the following:

**Data module coding strategy**. The project or the organization must decide the definition of the data module coding strategy to be applied.

**Project specific information sets**. The project or the organization must decide on the project specific information sets.

# Chapter 5.2.1.1

## *Common information sets - Crew/Operator information*

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| Chap 5.2.2.7 | Air specific information sets - Aircrew information |
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## 1 General

This chapter contains references to the chapters for preparation and coding of data modules for crew/operator information.

## 2 Crew/Operator information

It covers the rules for the preparation of information needed to provide crew/operators with the necessary degree of understanding of the Product and its systems and the procedures to operate the Product, its system and equipment to their full potential under normal and failure modes. Unnecessary theory and superfluous engineering detail which is not of direct concern to the crew/operators must be excluded. Duplicated information concerning procedures, techniques or any other material contained in other documents (air vehicle, land or sea system equipment publications, regulations or official publications) should be avoided. Performance information can be included.

The requirements for the preparation of this information are given in the following chapters:

- Air vehicles, refer to Chap 5.2.2.7
- Land/Sea Systems, refer to Chap 5.2.3

# Chapter 5.2.1.2

## *Common information sets - Description and operation*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product Description and Operation (D&O) information and related schematic diagrams.

## 1.2 Scope

It covers the rules for the preparation of information which will enable skilled maintenance personnel to understand the construction, function, operation and control of a system, subsystem, sub-subsystem, and unit of the Product. The information must include the identification and location of related systems and maintenance overviews of training significant items.

The requirements for the preparation of schematic diagrams which are provided to illustrate the entire Product and some component circuits are also covered. The schematic diagrams must portray a system in sufficient detail to supplement fault isolation and understanding of the system operation by maintenance personnel.

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Description and operation

## 2.1 Introduction

### 2.1.1 Function, data and description

The purpose of these data modules (IC 0XX) must explain the location, build-up and function of a complete system and its subsystems. Description of components must be included to understand their construction and functioning to the extent necessary for the adequate performance of maintenance functions. For simple systems, IC 040 (Description of how it is made and its function) must not be subdivided. The information must be presented so that it is understandable to the mechanic trainee and must be in a form suitable for training. It must be written in clear, logical, easy-to-read style and be well illustrated.

Systems must be described to reflect the levels of breakdown, indicated by the SNS. The levels are indicated by:

- System YY-00-00 (6 characters)
- System YYY-00-0000 (9 characters)

  This level includes the purpose of the system and subsystems and its functional scope and interrelation to sub-subsystems as well as to other systems.

- Subsystem YY-**Y**0-00 (6 characters)
- Subsystem YYY-**Y**0-0000 (9 characters)

  This level includes a description of the function, operation and control of the subsystem and the general purpose and scope of function of the major components within the subsystem. Information about the components location must also be given. Interrelations to other sub-subsystems or systems must be included. In simple systems, where no breakdown in subsystems is required, the above mentioned can be covered under "System".

- Sub-subsystem YY-YY-00 (6 characters)
- Sub-subsystem YYY-YY-0000 (9 characters)

  This level includes a description of the function, operation and control of the sub-subsystem and the general purpose and scope of the function of the major components within the sub-subsystem. Information about the components location must also be given. Interrelations to

other sub-subsystems or systems must be included. If no breakdown in sub-subsystems is required, the above mentioned can be covered under "Subsystems".

- Assembly YY-YY-YY (6 characters)
- Assembly YYY-YY-YYYY (9 characters)

This level includes a detailed description of the function, operation and control of the individual major components or assemblies including tests. It also includes adjustments which affect the performance of the unit and special maintenance practices or handling procedures when applicable. Interrelations to other units must be included. The scope of coverage must be in accordance with the requirements of the maintenance concept of the Product.

Peculiarities of individual systems, subsystems, or sub-subsystems, can dictate minor changes in this style of presentation, but it must be followed as closely as possible.

Location information for all components must be prepared at the appropriate system, subsystem or sub-subsystem level in a standardized presentation preferably including the following:

- Component index. A listing of the related components cross references to the subsystem or sub-subsystem as appropriate.
- Access/Area identification. An illustrated listing of the access openings/locations indicating the means and location for gaining access to the indexed components. The component index and access/area identification illustration can be combined or presented separately.
- Component location/identification. Illustrations of the indexed components showing their physical location relative to known structural or system features. Components such as circuit breakers or fuses need not be illustrated provided that the panel location is illustrated and component references are listed. Component location/identification and access/area identification illustrations can be combined.

For details on the information codes, refer to Chap 8.4.

## 2.2 Operation

These data modules (IC 1XX) provide all the necessary procedures to operate the Product. The procedures include data on the necessary controls and indicators, pre- and post-operation procedures, operation and emergency procedures.

For details on the information codes, refer to Chap 8.4.

## 2.3 Illustrations

### 2.3.1 Presentation

Illustrations must be used as the primary source of information transfer. They must be developed uncluttered with limited information/learning points and presented in a self-explanatory style. The information breakdown must follow the whole-part-whole concept.

For further details, see Chap 3.9.2.

### 2.3.2 Illustration types

Acceptable types of illustrations are shown in the examples Fig 1 thru Fig 7.

ICN-AE-A-050201-A-D0216-00003-A-01-1

*Fig 1 System level illustration - Example*

ICN-AE-A-050201-A-D0216-00004-A-01-1

*Fig 2 System level illustration - Example*

ICN-AE-A-050201-A-D0216-00005-A-01-1

*Fig 3 Subsystem level illustration - Example*

ICN-AE-A-050201-A-D0216-00006-A-01-1

*Fig 4 Sub-subsystem level illustration - Example*

ICN-AE-A-050201-A-D0216-00007-A-01-1

*Fig 5 Sub-subsystem level illustration - Example*

ICN-AE-A-050201-A-D0216-00008-A-01-1

*Fig 6 Unit level illustration - Example*

ICN-AE-A-050201-A-D0216-00009-A-01-1

*Fig 7 Unit level illustration - Example*

### 2.3.3 Schematic diagrams

Schematic diagrams data modules must be provided for all circuits of the Product.

The schematic diagrams must show the direction of flow through a system and the relationship of the components comprising the system. Every effort must be made to obtain the most logical presentation of information by showing signal or supply flow from left to right and/or top to bottom. Schematic diagrams of electro-mechanical systems, such as hydraulic, pneumatic, fuel, etc, must be drawn showing the mechanical and electrical relationships in an integrated presentation.

If necessary, the flow through pipelines must be identified by different patterns. Units and components of the system being presented must be outlined and identified by name and/or equipment identification and location. Splitting of black boxes on schematics must be held to a minimum.

Complex subsystems, sub-subsystems and/or functions and their interconnections will require more than one level of schematic as noted below:

| | |
|---|---|
| First level | **Block schematic diagrams** (have broad scope but little depth) |
| Second level | **Simplified schematic diagrams** (have schematic symbols but do not show individual wires) |
| Third level | **Detail schematic diagrams** (show all components, applicable wiring, functional interfaces and give sufficient detail for maintenance) |

Data modules must be coded:

YY-A-SS-YY-YY-NNY-054A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-YYYY-NNYYY-054A-A (37 characters)

Where:

- "SS-YY-YY"/"YSS-YY-YYYY" is the SNS the schematic diagram is related to.
- "NN" is a sequential number starting from "00", if more than one data module is needed.

#### 2.3.3.1 Block schematic diagrams

The block schematic must be used in the descriptive portion to simplify complex circuits. Non-specialist personnel should be able to obtain an understanding of the function and operation of the system, subsystem, or sub-subsystem. The block schematic is useful to show the arrangement of system components and current/signal flow through the system. It should be considered a training aid, supplementing the circuit description, without requiring extensive electrical background on the part of the reader or trainee. In general, the function of a particular system component is indicated without stating how this is accomplished.

The primary purpose of the block schematic diagram must provide a rapid understanding of the major replacement items and their interrelationship. Signal flow information is limited to primary functions and does not include control, inhibiting, interlocking, etc.

The block schematic diagrams must only consist of one figure for the depicted system, subsystem or sub-subsystem.

Unit or component representation will generally be limited to rectangular shapes with restricted use of symbols and pictorial drawings.

Block schematic diagrams data modules must be prepared for each system except those instances where one or two subsystems comprise the entire function.

For an example of a block schematic diagram, refer to Fig 8.

ICN-AE-A-050201-A-D0216-00010-A-01-1

*Fig 8 Block schematic diagram - Example*

2.3.3.2 Simplified schematic diagrams

The simplified schematic is in the same category as Para 2.3.3.1 but must be broader in scope. A simplified circuit must be presented without regard to unit location in the air vehicle, land or sea system, but electrically accurate, to allow a clear presentation of the overall circuit. This type of schematic is valuable in showing the simplified electrical operation of the system, subsystem, or sub-subsystem components and their interconnections. It can be used for training to allow a more detailed understanding of the operation of the system. The primary purpose of simplified schematic diagrams must supplement the block of detail schematic diagrams to provide a better understanding of the performed function, or functions.

Simplified schematic diagrams data modules are normally prepared for systems, subsystems or sub-subsystems where the complexity is such that detail schematic diagrams do not enable easy understanding of the system.

Simplified schematic diagram data modules can consist of more than one figure.

For an example of a simplified schematic diagram, refer to Fig 9.

ICN-AE-A-050201-A-D0216-00011-A-01-1

*Fig 9 Simplified schematic diagram - Example*

2.3.3.3 Detail schematic diagrams

The detail schematic diagrams must be used to depict electronic systems and components which use logic or two-state devices in their construction. It must be designed to aid the understanding of the function and operation of a circuit without showing the physical construction.

The primary purpose of the detail schematic diagrams must provide sufficient information for subsystem maintenance.

Detail schematic diagram data modules must be prepared for systems, subsystems, sub-subsystems and/or functions if required by its complexity.

Detail schematic diagram data modules can consist of more than one figure.

For an example of a detail schematic diagram, refer to Fig 10.

ICN-AE-A-050201-A-D0216-00012-A-01-1

*Fig 10 Detailed schematic diagram - Example*

# Chapter 5.2.1.3

## *Common information sets - Maintenance information*

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| Chap 5.2.1.3.4 | Maintenance information - Corrosion control |
| Chap 5.2.1.3.5 | Maintenance information - Storage |

## 1 General

This chapter contains the references to the chapters for preparation and coding of data modules of information required for the on-equipment maintenance on the Product.

## 2 Maintenance information

They cover the rules for the information which enable skilled personnel to perform maintenance tasks on systems and its installed components of the Product. The detailed specifications are referenced in the chapters below:

- Maintenance procedures, refer to Chap 5.2.1.3.1
- Fault isolation, refer to Chap 5.2.1.3.2
- Non-destructive testing, refer to Chap 5.2.1.3.3
- Corrosion control, refer to Chap 5.2.1.3.4
- Storage, refer to Chap 5.2.1.3.5

# Chapter 5.2.1.3.1

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| Chap 8.2 | SNS information and learn codes - Maintained SNS - General |
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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding of data modules for the Product maintenance procedures.

## 1.2 Scope

It covers the requirements for the preparation of information which will enable skilled maintenance personnel to maintenance tasks on the Product and its installed components. The information must be given to enable personnel to:

- connect and disconnect test equipment and power supplies
- use any requirement special tools and support equipment
- maintain and service the Product and its systems/components
- do tests which will show whether systems and components meet their minimum acceptable performance standards
- rectify failures
- remove and install all systems/components in the minimum time

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Content

## 2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-000-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.2 General maintenance procedures

### 2.2.1 Air vehicles, systems 00 thru 20 and 51, 60 and 70

For air vehicles normally the following systems are applicable in maintenance procedure data modules:

- 00 - Air vehicles general
- 06 - Dimensions and areas
- 07 - Lifting, shoring, recovering and transporting
- 09 - Handling and taxiing
- 10 - Parking and mooring
- 11 - Placards and markings
- 12 - Servicing
- 18 - Vibration and noise analysis and attenuation
- 20 - Standard practices - Systems

System 51, Standard practices - Structures, System 60, Standard practices – Propeller/rotor and System 70, Standard practices - Engine, can also be included, although the main part of this information is covered in other information sets, eg the Structure Repair (SR) information set, Chap 5.2.2.2, and the Engine Standard Practices (ESP) information set, Chap 5.2.2.6.

### 2.2.2 Land and sea Products, systems 00 thru 19

For land and sea Products, systems 00-19 must be used where appropriate.

Land and sea applications will utilize the SNS as defined within their specific program but will follow the information code examples within this chapter.

### 2.2.3 Breakdown of information

Applicable systems must normally be broken down into the subsystems/sub-subsystems outlined in the SNS. Example: Chapter 09 "Handling and taxiing" contains subsystem "General", "Handling" and "Taxiing". Subdivision of the information into data modules must follow applicable information code headings.

### 2.2.4 Data module coding

Guidelines for the information content of these systems are given in the detailed definitions of the SNS subsystems/sub-subsystems listed in Chap 8.2 and Chap 8.3.

Data module codes must be structured:

YY-Y-YY-YY-YY-00Y-XXXA-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-00YYY-XXXA-A (37 characters)

## 2.3 Systems

### 2.3.1 Applicable systems

2.3.1.1 Air vehicles

Information on the air vehicles must be covered, as applicable, in the following systems:

– System 21 - Environmental control

thru

– System 99 - Electronic warfare

except systems 51, 60 and 70

2.3.1.2 Land and sea Products

For land and sea Products, applicable systems can be determined by the project or the organization.

### 2.3.2 Data module coding

Basically, the information breakdown must be structured in accordance with the data module code Chap 4.3.

Data module codes must be structured:

YY-Y-YY-YY-YY-YYY-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-XXXA-A (37 characters)

The following paragraphs give details on the information to be covered, as applicable, for each system.

### 2.3.3 Servicing

For details on servicing information (IC 2xx), refer to the information code definitions in Chap 8.4.

Servicing procedures data modules must include those procedures that are normally required as a result of other maintenance actions. These servicing procedures must be self-contained when possible and can be either routine or restorative in nature.

### 2.3.4 Examinations, tests and checks

For details on examinations, tests and checks information (IC 3xx), refer to the information code definitions in Chap 8.4.

Tests will vary in complexity and stringency according to the conditions under which a unit functions or was replaced. It is not intended that a complex functional test of a complete system and its attendant closer tolerances be performed if the unit replaced reactivates the system and operates within the confines of a go-no-go specification. To avoid duplication of test procedures, maintenance procedures must reference a test only if the major test procedure is so unitized that the individual assembly/unit test can be called out without overlap and accomplishment must not require completion of the overall test. In this case, specific start and stop instructions must be given.

### 2.3.5 Disconnect, remove and disassemble procedures

For details on disconnect, remove and disassemble procedures information (IC 5xx), refer to the information code definitions in Chap 8.4.

These data modules procedures describing the removal of a component, assembly, subassembly, unit, combination of parts, etc from the Product must clearly describe the step-by-step operation in a logical work flow sequence as necessary to gain access to and subsequently remove the desired hardware. Where necessary, attention should be drawn to variations of removal procedures due to the future installation of the same or a replacement item. A list of required materials, tools, fixtures, or support equipment must be listed in tabular format at the beginning of the procedure. Any prerequisite procedures (required conditions), such as access panel opening, that must be performed prior to a particular removal or deactivation task, must be given or appropriately referenced. Panel opening instructions must reference the panel number. All measurements or values to be documented prior to an individual task must be listed at the beginning of the applicable step.

### 2.3.6 Repairs and locally make procedures and data

For details on locally make procedures information (IC 6xx) refer to the definitions in Chap 8.4.

These data modules procedures must consist of detailed step-by-step repair processes and specifications in a logical work flow sequence, as required, to restore a worn or damaged part to serviceable condition. The repair procedure must show the level of restoration required for the specified level of maintenance. Excluded are repairs contained in the SR information set. Each repair data modules must be self-contained and include basic information such as, but not limited to:

- views of the basic condition/location for all areas of restoration
- data such as pertinent finish, reference dimensions, flow rate, etc
- special dimensional instructions
- inspection requirements necessary to determine the integrity of the repair. If a test is required following the repair, the specific test required must be referenced.

### 2.3.7 Assemble, install and connect procedures

For details on assemble, install and connect procedures information (IC 7xx) refer to the information code definitions in Chap 8.4.

These data modules must describe the installation of a component, assembly, subassembly, unit, combination of parts, etc. and interrelated parts into the Product, and if applicable, any removal prerequisite operations that must be rectified such as closing of panels. The procedures must clearly describe the step-by-step operations in a logical work flow sequence as necessary to install the basic, and if applicable, access hardware.

All measurements or values (eg special torques) must be provided within the step-by-step text without reference to other sections.

Procedures must be accompanied by appropriate illustrations depicting the use of tools or equipment required. Each illustration must have its parts numerically highlighted (callout), with the step-by-step instructions referencing these numbers.

If a test is required as part of installation or reactivation procedures, the specific test must be included or referenced.

# Chapter 5.2.1.3.2

## *Maintenance information - Fault isolation*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product Fault Isolation (FI) information.

## 1.2 Scope

It covers the rules for preparation of information applicable to FI which will enable skilled personnel to analyze reports provided by:

- the centralized monitoring systems of the Product
- the crew/operators and/or maintenance personnel
- the result of post mission inspections

According to the level of accuracy of the data, analysis must be followed by:

- an inspection, check and/or test
- a corrective action
- or a fault isolation procedure

The FI information will contain the following topics:

- Isolated, detected, observed and correlated faults list
- Fault isolation procedures, text and diagrams
- Fault isolation task supporting data
- Fault code index (derived information)
- Maintenance message index (derived information)

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

- **Built in test (BIT):** An integrated capability of the mission system or equipment which provides an automated test capability to detect, diagnose, or isolate failures. A BIT is designed as an integrated part of the electronics system design. BIT functions are performed on-line by exercising devices within the electronic systems by use of software and hardware stimuli or monitoring circuits. BIT requires no external stimuli or measurement equipment to perform its functions.
- **Corrective action:** A maintenance process which makes a fault and its cause cease to exist.
- **Correlated fault:** A set of faults that are detected, filtered and grouped by the monitoring system as a unique fault with a unique reference to a fault isolation procedure.
- **Detected fault:** A fault which is detected by the monitoring system and is then automatically stored.
- **Fault:** Malfunction, impairment, or abnormal condition of the Product.
- **Fault code:** A code which uniquely identifies a fault in the FI information set.
- **Fault description:** A phrase which concisely describes a fault. For monitored faults and status messages, the fault description is the fault name as it appears on the display screen.
- **Fault isolation procedure:** The systematic process of identifying a malfunctioning element in the Product and determining the actions necessary to restore the system to its normal condition. Fault isolation procedure and troubleshooting are equivalent terms.
- **Isolated fault:** A fault which is detected and isolated by the monitoring system.

- **Maintenance message:** A message produced by an on-board maintenance computer to aid in determination of corrective action, but which is not normally made available for review by the crew.
- **Observed fault:** A fault detected by the crew or maintenance crew.
- **Symptom:** Event or phenomenon which reveals a fault.

# 2 Fault isolation

## 2.1 General

Faults are classified as follows (refer to Fig 1):

- isolated fault
- detected fault
- observed fault
- correlated fault

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*Fig 1 Trouble shooting process overview - Example*

## 2.2 Introduction

If required, the introduction data modules contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-018A-A (37 characters),

where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

## 2.3 Data module coding

To assist in the codification of data module, the rules which follow must be used in addition to those given in Chap 4.3.

Data module codes must be coded:

YY-Y-SS-YY-00-NNY-YYYA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-YYYA-A (37 characters),

where:

- "SS-YY-00" or "YSS-YY-0000" is the SNS to which the information, list or procedure is related
- "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed

## 2.4 Isolated fault list

These data modules list all maintenance messages relative to isolated faults which can be memorized by the air vehicle, land or sea system centralized monitoring system. The maintenance messages must list, at system level, the fault code.

Data modules must provide for each message the following information:

- the message identification as it is displayed to the maintenance crew
- a concise and/or a more detailed description
- the Line Replaceable Unit (LRU) which detected the failure (identification, name and abbreviation)
- the faulty LRU (identification, name and abbreviation)
- the corrective action to be performed to restore the system to its normal condition

If maintenance message allows it, faulty Shop Replaceable Unit (SRU) will be also pointed out.

Data modules must be coded:

YY-Y-SS-YY-00-NNY-411A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-411A-A (37 characters),

where:

- "SS-XX-00" thru "YSS-YY-0000", the SNS to which the information, list or procedure is related
- "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed

## 2.5 Detected fault list

These data modules list all maintenance messages relative to detected faults which can be stored by the Product monitoring system. The messages must be listed at system level.

Data module must provide for each message the following information:

- the message identification as it is displayed to the maintenance crew
- a concise and/or a more detailed description
- the LRU which detected the failure (identification, name and abbreviation)
- the list of potential faulty LRUs (identification, name and abbreviation)

For each potential faulty LRU, the following information must be provided:

- the confirmation test (test or BIT description or maintenance procedure data module reference)
- if fault is confirmed for this LRU, the corrective action to be performed to restore the system to its normal condition

If maintenance message allows it, faulty SRU will be also pointed out.

Data modules must be coded:

YY-Y-SS-YY-00-NNY-412A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-412A-A (37 characters)

## 2.6 Observed fault list

These data modules list all symptoms related to observed faults, which can be reported by crew/operators or observed by maintenance crew. Symptoms must be simply and non-ambiguously described. Symptoms must be listed at system level.

Data modules must provide for each symptom the following information:

- the symptom description as it appears to maintenance or operation crew (alarm description and occurrence conditions)
- the fault cause

If the fault is non-ambiguous (one LRU responsible for the fault), the fault cause will provide the faulty LRU or the fault reason (eg wiring failure, hydraulic leak on circuit 1) and the recovery action to be taken.

If the fault is ambiguous (several LRUs are likely to have caused the observed symptoms), fault cause will provide information needed to isolate the failure:

- air vehicle, land or sea system fault isolation procedure data module reference

or

- list of potential faulty LRUs

As previously described in the "detected fault" paragraph, for each potential faulty LRU, the following information must be provided:

- the confirmation test (test or BIT description or maintenance procedure data module reference)
- if fault is confirmed for this LRU, the corrective action to be performed to restore the system to its normal condition

Data modules must be coded:

YY-Y-SS-YY-00-NNY-413A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-413A-A (37 characters).

## 2.7 Correlated fault list

These data modules list all sets of maintenance messages which have been correlated and which can be recognized by the Product monitoring system.

Data modules must provide for each correlated fault the following information:

- a list of messages and associated warnings/malfunctions that have been correlated and introduced through their fault code. Optionally, for each unitary fault part of the correlated fault (ie a maintenance message or a warning/malfunction) data modules can contain:
  - a reference to the data module where the unitary fault has been introduced (for example, a "detected fault list" data module)
  - a concise and/or a detailed description of the fault
  - detection information
- isolation information for the whole correlated fault (either through a reference to an isolation procedure or through a list of potential faulty LRU)
- optional remarks

Data modules must be coded:

YY-Y-SS-YY-00-NNY-414A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-414A-A (37 characters)

## 2.8 Fault isolation procedure

### 2.8.1 General

Each fault isolation procedure must contain all operations needed to isolate the fault and must terminate with instructions for correcting it. The fault isolation procedures are the most direct and shortest method of isolating the fault and must not include any unnecessary steps.

One isolation procedure can be used for several fault codes provided each can be adequately isolated within the one procedure.

Fault isolation must be carried out to the level of component replacement or other action capable of being accomplished on the aircraft, land or sea system (ie wiring investigation, card replacement or adjustment).

Each data module contains complete fault isolation procedures for each fault code even though certain information is normally associated with several different data modules. The procedures will not refer the user to another data module in order to complete the isolation.

If more than one component could be involved in a given corrective action, then all the components must be listed in order of fault probability.

Data modules must be coded:

YY-Y-SS-YY-00-NNY-4(ZZA)-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-4ZZA-A (37 characters),

where "4(ZZ)" is a sequential number from 420 to 429.

### 2.8.2 Content

The fault isolation procedure data module contains the following parts:

- fault code
- fault description - a concise and/or a more detailed description of the fault

- prerequisite - any prerequisite steps which must be performed before starting the fault isolation procedure
- fault isolation procedure

A fault isolation procedure can be described with a fault isolation diagram (refer to Fig 2) and/or a structured sequence of isolation steps (refer to Chap 6.2.3.4).

Each isolation step contains:

- an action (What must be done?)
- followed by a question (What is the result of the action?)
- and possible answers

Each one referring to another isolation step.

## 2.9 Fault isolation task supporting data module

Fault isolation task supporting data modules are only to be produced when they are absolutely necessary. Whenever possible, use will be made of already available data modules (eg block diagrams, wiring diagrams, location drawing, access layout).

Data modules must be coded:

YY-Y-SS-YY-00-NNY-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-XXXA-A (37 characters),

where "XXX" must be 430 for specific fault isolation data modules when other data modules are not available.

## 2.10 Fault code index

The fault code index (refer to Table 2) will be a numerical-order list of all fault codes from the FI/(FR) for the applicable system. For each fault code, the fault code index will give one or more data module code references to fault isolation procedures.

The fault code index must contain:

- fault code
- fault description
- maintenance messages
- fault isolation reference

Data modules must be coded:

YY-Y-SS-YY-00-NNY-441A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-441A-A (37 characters)

*Table 2 Fault code index - Example*

| Fault code | Fault description | Fault isolation reference/DMC |
|---|---|---|
| 993-01 | Radio failed | JP-A-99-31-00-00A-421A-A |
| 993-02 | RW/LW failed | JP-A-99-32-00-00A-421A-A |
| 993-03 | CPU failed | JP-A-99-32-00-00A-422A-A |
| 993-04 | WARNING failed | JP-A-99-32-00-00A-423A-A |

| Fault code | Fault description | Fault isolation reference/DMC |
|---|---|---|
| 993-06 | AUDIO WARNING failed | JP-A-99-35-00-00A-421A-A |
| 993-07 | NO LIBRARY loading | JP-A-99-35-00-00A-422A-A |

## 2.11 Maintenance message index

The maintenance message index will be a numerical-order list of all maintenance messages. For each maintenance message, the maintenance message index will give one or more data module code references to fault isolation procedure.

The maintenance message index will contain:

- maintenance message
- maintenance message text
- fault isolation reference

Data modules must be coded:

YY-Y-SS-YY-00-NNY-442A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-YY-0000-NNYYY-442A-A (37 characters)

ICN-AE-A-004004-G-S3627-00188-A-01-1

*Fig 2 Fault isolation diagram - Example*

# Chapter 5.2.1.3.3

## *Maintenance information - Non-destructive testing*

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|---|---|
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| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product Non-Destructive Testing (NDT) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to NDT which provide instructions and guidance to skilled non-destructive testing technicians for the use of non-destructive testing techniques on systems, subsystems and their items. NDT information not only includes coverage for primary and secondary structures and proprietary items, but all NDT procedures for engines and items that can be tested "on-Product". For those Product items/equipment which have equipment manuals, "off-Product" NDT information is included in those publications. The off-Product NDT information for items/equipments which do not have equipment manuals is included in the NDT information set. The NDT information must contain the following topics:

- General information
- Dye penetrant
- Magnetic particle
- Eddy current
- X-ray
- Ultrasonic
- Gamma ray
- Resonance frequency

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

- **NDT**: A group of techniques (eg radiographic, ultrasonic) which examine items for faults without making them unserviceable.
- **NDT technicians**: Persons who have been trained in NDT of the Product and its support equipment items and have been approved by their national military and/or civil authority.
- **Critical area**: Determination of critical areas or items is based on:
  - safety of flight considerations (primary structure as defined in the Structural Repair (information set) (SR) information set and non-redundant subsystem items, the failure of which could cause loss of the Product)
  - mission essential considerations (secondary structure as defined in the SR information set and subsystem items, the failure of which would degrade the ability of the Product)
  - maintenance economy considerations (structure and subsystem items that would require extensive or repetitive disassembly to do visual inspection of internal areas)

  **Note**
  Critical areas are not necessarily limited to structural items. All subsystem components must be analyzed for criticality.

- **Technique**: The method used for non-destructive testing (eg X-ray, dye penetrant).
- **Test**: The performance of a technique on an item. It can comprise more than one procedure.
- **Standard heading**: The first level of paragraphing a test (eg Applicability, Item description, Procedures).
- **Non-relevant indication**: An equipment response that is due to factors other than discontinuities or faults of the tested item

# 2 Non-destructive testing

## 2.1 General requirements

The NDT information must include all instructions, procedures, and techniques for the Product. NDT techniques must be developed to test critical areas of items for potential service faults (eg cracks, corrosion, wear, deformation). NDT technique development is required whenever one or more of the following criteria are met:

- the NDT technique improves safe operation or reliability of the system or item
- a saving in maintenance costs or man hours will be realized by using NDT techniques
- operational effectiveness or life cycle costs will be favorable effected

Emphasis must be placed on development of NDT techniques that can be applied on the system or item with little or no disassembly (on-condition maintenance). When necessary, multiple NDT techniques can be developed for assembled (on-condition maintenance) and disassembled items.

Routine visual, magnifying glass, or boroscopic/fiber optic examinations that are normally accomplished by technicians must not be included in the NDT information but must be included in the applicable Product maintenance data modules. Special cases can be included at the request of the operators based on item criticality or of special preparation or test technique requirements. Visual or optical examinations can be included in the NDT information when used as a confirmation procedure and to identify the test area. The examinations need not be detailed procedures.

Other techniques, than those given in Para 1.2, can be included as necessary if they will provide significant improvements in inspection capability. Proposals for inclusion of techniques and equipment not presently used should be submitted to the publications authority as soon as identified. Support equipment requirements must be identified using relevant provisioning procedures.

## 2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-A-YY-YY-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-XXXA-A (37 characters).

Where:

- "YY-YY-YY" thru "YYY-YY-YYYY", the SNS code of item to be tested.
- "YYA" thru "YYAAA", the disassembly code must normally be "00" but can be used if required. Detailed rules for the use of disassembly code variant, see Chap 4.3.5.
- "XXX", the information code:
  - 350 - Structure test
  - 351 - Tests for surface cracks with dye penetrant
  - 352 - Tests for surface cracks with magnetic particles

- 353 - Test for cracks and other defects with eddy current
- 354 - Tests for cracks and other defects with X-rays
- 355 - Test for cracks and other defects with ultrasonics
- 357 - Gamma ray tests
- 358 - Resonance frequency tests

The item location code must be "A".

## 2.3 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.4 General information

General data modules must include, but not be limited to:

- reference data
- general applications

In the General application data module, short descriptions of all NDT techniques must be given. Also included must be short paragraphs defining non-destructive testing and the primary non-destructive test techniques (eg fluorescent penetrant Type I, Methods B, C and D with applicable test materials, or ultrasonic angle beam, straight beam tests etc with applicable search units, or manual/automatic eddy current test with applicable probes). The intention of these paragraphs must provide general information. Warnings, cautions and notes must be included relative to:

- the needs of skilled NDT technicians
- authorization to adjust equipment settings to obtain the necessary response
- radiation hazard warning

## 2.5 Non-destructive testing techniques

The NDT data modules must have the standard headings given in Para 2.6. Specific information requirements for each technique is given in Para 2.7.

## 2.6 Tests

Each test must be self-standing data module and must include a title and the following headings:

1 Applicability

2 Tools, equipment and materials

3 Item description

4 Preparation and cleaning

5 Test equipment adjustment

6 Procedures

7 Indication evaluation

8 Acceptance and rejection standards

9 Restoring the Product

**2.6.1 Title**

The data module title must contain the name of the item to be tested. The name of the item must be that given in the appropriate illustrated parts breakdown.

**2.6.2 Applicability**

- Identify and locate affected part or parts, using the methods described in Chap 3.4
- Provide part number, serial number, engine or airframe series model number and/or any other necessary identifiers to show the complete applicability of the procedure.

**2.6.3 Tools, equipment and materials**

- Give the minimum acceptable performance standards for instruments, equipment and materials required to do the procedure.
- If instruments, equipment and/or materials cannot be given by minimum performance standards, then list all manufacturer's units and/or products approved.
- If only one manufacturer's unit or product is approved, this must be listed with the reason why it is the only one.
- List the fixtures, probes, transducers, reference standards and special tools required to do the procedure and provide drawings for these items which can be made locally by the operator. Include recommended sources for any special materials.
- Describe the type of viewing light and/or lighting conditions required.
- Indicate the film size, type and container to be used for X-ray and gamma ray procedures.

**2.6.4 Item description**

The first section must describe and identify the item to be tested. The following information must be provided in the text and/or illustration.

When the test techniques are sensitive to surface condition, the text must include the material, heat treated condition, method of manufacture (eg casting, forging, extrusion, sheet) surface treatments, coatings, finishes. The backup procedure, if required must be stated.

Concise statement or summary of purpose, or function, of the item including the direction and type of loads, must be included when these factors have an effect on the test procedure.

The second section must be a description of the probable fault and its cause. The location of the fault must be shown on the illustration.

Symbols that must be used to represent NDT techniques and provide detail in illustrating test procedures must be shown in the List of symbols. Wherever possible, the symbol for the primary and confirmation method must be placed adjacent to the area to be inspected in the next higher assembly illustration.

**2.6.5 Preparation and cleaning**

- List the requirements for access to the part or area to be checked.
- Specify whether the electrical power must be on or off.
- Specify any special work stands required.
- List any requirements for fluid removal (eg fuel, water, hydraulic fluid) from the area to be checked.
- Specify any special cleaning requirements.

- Specify any surface coating removal requirements.
- Include all necessary warnings and cautions (eg radiation hazard protection).

**2.6.6 Test equipment adjustment**

The test equipment adjustment information for this heading is got from the different test procedures specified in Para 2.7.

**2.6.7 Procedure**

The procedural information for this heading is described in the different test procedures specified in Para 2.7.

Each test must, when necessary, specify a confirmation (backup) test procedure by another means to verify the initial case where the initial test results do not provide uncontestable data for determination of the serviceability of the item tested.

It is desirable to do the confirmation procedure by a technique employing direct visual examination (optical, magnetic particle, or dye penetrant) when the initial procedure is done by an instrument technique (X-ray, gamma ray, ultrasonic, resonance frequency or eddy current), providing it does not result in extensive disassembly. In those cases where direct examination techniques would require considerable disassembly, the use of a different instrument technique is the preferred means of confirmation. It can be necessary in isolated cases to disassemble for visual confirmation to provide the necessary information for determination of item serviceability.

**2.6.8 Indication evaluation**

This information is derived from the different test procedures in Para 2.7.

**2.6.9 Acceptance and rejection standards**

This information is derived from the different test procedures in Para 2.7.

**2.6.10 Restoring the Product**

If required, the information for this heading must describe how to restore the Product to its ready for operate condition (ie follow-on maintenance). Wherever possible, cross references must be made to other existing available information.

## 2.7 Specific information requirements for each technique

### 2.7.1 Dye penetrant technique

2.7.1.1 Test equipment adjustment

Specify the temperature restrictions, penetrant stock, developer stock, washing system, drying system, and the normal operating temperature of the applied fluids and developer.

2.7.1.2 Procedure

- Describe any treatment for the preservation of the part or for recording of a fault.
- Provide acceptable industry penetrant inspection standards whenever possible.
- If no acceptable industry standard exists, provide the following information:
  - Type of penetrant and sensitivity class must be given by noting its standard or equivalent standard, and whether it is visible or fluorescent.
  - List all acceptable penetrants by manufacturer's identification. Advise if any class IV penetrants are acceptable. If only one penetrant is acceptable, this must be stated and the reasons given.
  - Identify the required developer system. If only one developer is acceptable: state why.
  - When test standards are given, provide an illustration and/or instruction showing how to test the system sensitivity.
  - Describe the acceptable method for applying the penetrant material (dip, paint brush, aerosol, etc).
  - Describe the type and acceptable characteristics of the viewing light (long wave, short wave, visible, etc) and its specifications.

- Identify the washing media required before, and after, applying the penetrant material.
- Describe any required mechanical stress, application fixtures by part number, or give detailed illustrations.
- Include detailed procedures for cleaning, etching and finishing; references to other documents are not permitted.
- Describe critical washing or inspection steps where irrelevant indications can cause incorrect readings.
- Illustrate examples of anticipated faults and their possible locations.
- Describe the required lighting conditions for viewing, such as subdued light (measured value) and long wave ultraviolet light, in Angstroms, with the appropriate filter.

2.7.1.3 Indication evaluation
Describe the exact conditions by which faults must be measured.

2.7.1.4 Acceptance and rejection standards
- Describe the fault and specify required action.
- Include actual fault limits or cross refer to the limits section in the appropriate publication or associated data modules.

**2.7.2 Magnetic particle technique**

2.7.2.1 Test equipment adjustment
- Describe the exact orientation of the magnetizing coil, contact pads and magnetic poles. Include pictorial views and a schematic of the setup.
- Specify the use of residual or continuous method, as applicable.
- Include the formula and/or tables for magnetizing values required for each test.

2.7.2.2 Procedure
- Provide a detail illustration of the part showing the flux pattern and the areas of the part where irrelevant indication can occur. Also indicate where special attention needs to be applied due to weak flux fields. Include as many illustrations or tables indicating flux orientation type and magnitude as required.
- Describe the order of test sequences. Include in between demagnetization operations; include alternating current (AC) or direct current (DC) for each description as required.
- Describe the anticipated fault orientation. Include a description of irrelevant indications that can confuse the inspection.
- Describe any acceptable permanent magnets which can be used instead of portable equipment to do the procedure.
- Identify and describe any induced current cores, other magnetizing aids and special fixtures required to do the procedure.
- Specify the type and size of magnetic particles and its suspension medium (colloid).

2.7.2.3 Indication evaluation
Describe the exact standard by which the fault must be measured.

2.7.2.4 Acceptance and rejection standards
- Describe the fault and specify required actions.
- Include actual fault limits or cross refer to the limits section in the appropriate publication or associated data modules.

**2.7.3 Eddy current technique**

2.7.3.1 Test equipment adjustment
- Illustrate the probe sensor position in relation to the part and expected fault.
- Describe the scanning and indexing required.
- When high speed rotating probes are used, specify requirements, if any, to mechanically hold the scanner assembly.

2.7.3.2 Procedure

- Describe the scanning motion required.
- Describe the signal response expected.
- Describe any fixture operation necessary to do the procedure.
- Establish the threshold, low frequency (LF) for maximum penetration on given stack-up of material.
- Acceptable response data must be provided so locally-manufactured reference standards can be qualified (eg "Standard probe instrument combination must produce a 50% meter response when lift-off compensated for 0,15 mm in, and have a maximum noise level of 5% full scale"). The reference standard must be provided by the manufacturer for special applications.
- If an oscillographic recorder is required, full scale response time and chart speed must be provided.

2.7.3.3 Indication evaluation

- Describe the exact condition the fault is measured by.
- Include the acceptable noise level.

2.7.3.4 Acceptance and rejection standards

- Describe the fault or specify required actions.
- Include actual fault limits or cross refer to the appropriate limits section in the publication or associated data modules.

**2.7.4 Radiographic (X-ray/Gamma ray) technique**

2.7.4.1 Test equipment adjustment

- Describe by diagram, the source locations relative to the subject and film.
- Describe film placement relative to the parts being radiographed and the radiation source.
- Include all sizes and distances in International System (SI) units. If required, a conversion from SI units to non-SI units must also be given in brackets after the SI unit.
- Describe where to place the image quality indicator if used.
- In situations where the source to film distance can be varied, specify the maximum angle of incidence that can be varied relative to the subject.

2.7.4.2 Procedures

- X-ray intensity must be specified in kV and mA and times of exposure in minutes and/or seconds.
- Illustrations must identify any necessary supports, alignment fixtures and templates and show how they are used with the procedure.
- Film type must be specified in accordance with American Society for Testing Materials E-94, or equivalent. The relative film speed must also be given.
- Where a film type other than that specified is acceptable, the following statement must be included: "Alternative film speeds can be used provided they produce equal or better definition of the subject".
- Give the screen type and combination.
- Specify any required penetrometer in accordance with American Society for Testing Materials or equivalent.
- Whenever practical, include a reference radiograph with a sample fault.
- Expose radiograph at a definite value allowing for density adjustment (+) or (-) from a specified density on film.
- Describe the location on the radiograph where the density must be measured.
- Describe the minimum sensitivity required.

2.7.4.3 Indication evaluation

- Describe the lighting conditions the radiograph must be viewed under.
- Describe the faults anticipated and the location they will occur on the film.

- Describe all necessary measuring aids such as overlays or comparators.

2.7.4.4 Acceptance and rejection standards
- Describe the fault and specify required actions.
- Include actual fault limits or cross refer to the limits section in the appropriate publication or associated data modules.

**2.7.5 Ultrasonic technique**

2.7.5.1 Test equipment adjustment
- Illustrate the transducer position in relation to the part and expected fault and/or the standard fault.
- Describe the scanning required.
- Where angle beam testing is utilized, include the complete formula for the generation of the required angles.
- Describe the cause of any spurious signals that appear near the inspection window.
- When very specific procedures call for the ultrasonic instrument to be operated in a particular manner, provide detailed operating instructions.
- Specify requirements, if any, for reject gates or alarms.
- When adjusting the amplitude of the standard signal, describe any other signal amplitude to be maintained.
- Describe calibration amplitude by percent height of screen and by position, horizontal on the scope (eg optimize the signal from the standard and adjust the instrument gain to provide an 80% screen height standard signal at 30% on the horizontal base line).

2.7.5.2 Procedure
- Describe the scanning motion required.
- Describe the signal response expected.
- Describe any fixture operation necessary to the procedure.
- List acceptable transducers by characteristics.
- Identify any required amplitude blocks by type (area or distance) and reflector size.
- Illustrations and text must describe the setup for required "B" and "C" scan-type presentations.
- If interface materials (couplings) are required, they must be listed.

2.7.5.3 Indications evaluation
Describe the exact criteria the fault must be measured by.

2.7.5.4 Acceptance and rejection standards
- Describe the fault and specify required action.
- Include actual fault limits or cross refer to the limits section in appropriate publication or associated data modules.

**2.7.6 Resonance frequency technique**

2.7.6.1 Test equipment adjustment
As prescribed by industry standards.

2.7.6.2 Procedure
As prescribed by industry standards.

2.7.6.3 Indication evaluation
Describe the exact conditions the faults must be measured by.

2.7.6.4 Acceptance and rejection standards
- Describe the fault or specify required actions.

- Include actual fault limits or cross refer to the limits section in the appropriate publication or associated data modules.

# Chapter 5.2.1.3.4

## *Maintenance information - Corrosion control*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Corrosion Control (CC) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to the Product CC which will provide instructions and guidance to personnel, at all maintenance levels, for corrosion prevention and control. With some minor changes this detailed specification could serve as a guide for corrosion control for components and equipment.

The CC information set also includes repairs to corrosion damage which do not exceed the removal of the corrosion and the subsequent surface protection. For repairs exceeding this damage, reference is made to the air specific structural repair information set. Refer to Chap 5.2.2.2.

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate:

- **Corrosion prone items/areas**: Corrosion prone items/areas are those that are classified in one or more of the following:
  - Dissimilar metal contacts
  - Structural areas where moisture can collect
  - Drainage provisions
  - Magnesium alloy components
  - High strength steel (over 1200 N/mm$^2$)
  - Environmental conditions
  - Highly stressed parts
- **Critical items/areas**: Critical items/areas are those that are classified in one or more of the following:
  - Components critical to safety of operation
  - Components essential to mission completion
  - Components difficult to repair or replace
  - Expensive components
  - Plastic parts subject to wear

# 2 Corrosion control

## 2.1 General requirements

The CC information set contains the data and procedures required by maintenance personnel for determining the location and extent of corrosion damage to the air vehicle, land or sea system and its systems, and instructions for its classification, removal and treatment.

Wherever possible, cross-references must be made to data in general corrosion control publications if these are available to the customer. Cross-reference must also be made to the following information sets for the data given in each information set listed:

- Structural Repair (SR). Instructions for repair of specific items and sealing procedures
- Air vehicle, land or sea system Maintenance Instructions (MI) for gaining access to the corrosion, cleaning, temporary protection procedures, safety precautions and list of materials and equipment

- Non-Destructive Testing (NDT). Instructions for non-destructive inspection of corrosion prone and critical items/areas

The following requirements must be taken into account in the content of the CC information set:

- Safety precautions concerning the use of toxic materials and the hazards associated with their use must be included
- The CC must not refer to any contractor's process and/or material specification
- Special or proprietary equipment must not be specified in the CC

## 2.2 Technical content

The CC information set must be arranged as follows:

### 2.2.1 Introduction

If required, the introduction data modules contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-000-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

#### 2.2.1.1 General corrosion control

These data modules must contain data on the approved materials and procedures for general prevention and repair (detection, removal and/or repair and treatment) of corrosion on the Product structure and its systems. It must cover, but not be limited to, the following:

- General safety data (IC 012)
- General data on corrosion control (IC 010)
- Description of the Product corrosion control and prevention (IC 040) with data relative to:
  - Purpose of the corrosion control
  - Special materials/consumables used, including corrosion preventative compounds
  - Types of corrosion
  - Factors in corrosion control
  - Corrosion preventive maintenance
  - Major structural group breakdown
  - Corrosion prone systems/components
- Cleaning and surface preparation (IC 250)
- Paint removal for corrosion control (IC 251)
- Inspection of corrosion damage (IC 310)
- Mechanical removal of corrosion (IC 258)
- Chemical corrosion removal and surface treatment (IC 258 and/or IC 640). Where applicable, specific instructions must be included for the following metallic surfaces:
  - Aluminum alloys
  - Magnesium alloys
  - Stainless steel and nickel base alloys
  - Copper and copper base alloys
  - Titanium base alloys

  - Plated and phosphate surfaces
- Treatment of typical areas (IC 640)
- Corrosion prevention finish (IC 257) with data relative to application and touch-up of:
  - Primers
  - Enamels
  - Top-coatings
- Corrosion prevention sealant systems (IC 259)

**2.2.2 Systems corrosions control**

These data modules contain data on approved materials and procedures for corrosion control on specific systems/components/items eg:

- Fuel system
- Flight/operation controls
- Landing gear/chassis
- Engines
- External stores
- External markings
- Hulls
- Deck machinery

For each corrosion prone and critical item/area, the following corrosion control data modules must, where applicable, be produced:

- Clean/wash systems and temporarily protect specific items/areas
- Gain access to corrosion prone and critical items/areas
- Examine corrosion prone and critical items/areas, including the use of non-destructive testing
- Identify the type of corrosion
- Remove paint from corroded areas
- Evaluate corrosion damage
- Remove corrosion damage
- Repaint or touch-up the finish system after the corrosion has been removed
- Seal corrosion prone and critical items/areas
- Close access to corrosion prone and critical items/areas

**2.2.3 Structure corrosion control**

2.2.3.1 General

Structure corrosion control is the main aim of CC information. Each major structural component must be discussed and the data contained must be divided further to cover corrosion prone and critical items/areas, corrosion removal, material treatment, finish processes and corrosion prevention sealant processes.

For air vehicle systems corrosion control data must be presented for each of the following major structural items:

- Chapter 52 - Doors
- Chapter 53 - Fuselage
- Chapter 54 - Nacelles/pylons
- Chapter 55 - Stabilizers
- Chapter 56 - Windows and canopies
- Chapter 57 - Wings

Land and sea corrosion control data must be presented dependent on the type of equipment and must utilize the appropriate system number.

2.2.3.2 Component description (IC 041)
Descriptive data modules must be given for each of the major structural items (eg for air vehicles listed in Para 2.2.3.1). The data modules must also include corrosion prone and critical items/areas and where specific corrosion control data can be found.

2.2.3.3 Corrosion prone and critical items/areas (IC 350)
Descriptive data modules must be given for each major structural item. The data modules must include:

- location, access and inspection of corrosion prone and critical items/areas
- types of corrosion which can be found and where it is most likely to occur
- the cause of the corrosion which can be found in each item/area
- necessary safety precautions for critical structure
- preferred inspection method and/or reference to the NDT information

2.2.3.4 Corrosion removal (IC 258)
For items/areas defined in Para 2.2.3.3, the following corrosion removal data must be given:

- Factors to be considered during corrosion removal, such as safety precautions when you use the toxic materials and hazards associated with their use, and/or safety precautions when working in hazardous areas (propellant areas, fuel areas, etc)
- Specific corrosion removal instructions or cross-references to general corrosion removal procedures (refer to Para 2.2.1.1)
- Material removal limits or references to the structural repair information set

2.2.3.5 Material treatment and finish processes (IC 257)
These data modules must give descriptive information on the material treatment protective finish to be used and the procedures for preparation and application peculiar to the items/areas defined in Para 2.2.3.3. References to the maintenance information can be made. The original finish and alternate touch-up system must be identified for both exterior and interior surfaces of each item/area.

2.2.3.6 Corrosion prevention sealant processes (IC 259)
These data module must give the procedures for the preparation and application of corrosion preventive sealants to the item/area. The application of sealants which are primarily for other purposes, are contained in the structural repair information set. The identification of the sealant type and the sealing method must be included.

2.2.3.7 Special equipment and materials (IC 060 and 070)
These data modules give short descriptions of any special equipment and/or material used in the procedures called-up in Para 2.2.3.4 thru Para 2.2.3.6.

## 2.3 Illustrations and tables

### 2.3.1 General

Illustrations and related tables must be included in the CC information with such additions as can be necessary to illustrate corrosion control procedures.

For specific systems (refer to Para 2.2.2), illustrations and tables must be included in the CC information to identify the corrosion prone and critical items/areas. The area of a component which has a tendency to corrode must be highlighted, and a location key must be used as reference in the text.

Illustrations and tables must be included in each data module for major structural items (refer to Para 2.2.3).

### 2.3.2 Structural items with corrosion prone and critical items/areas

For each major structural group, one or more illustrations must be provided which identifies the structural items with corrosion prone and critical items/areas. A table must be provided giving an Item index of each major structural group. This table must follow the format given in Table 2. The table must show where the corrosion control information for each item is found. The table consists of the following:

1 Fig/Ref: All required structural items, shown on the appropriate illustration, must be listed in this column, in sequential order, beginning with Fig/Ref No. 1. For addition of variant items, numbers 1A, 1B, 1C etc must be used.

2 Area/Item name and Part No.: This column gives the name and part number of the structural component. The applicable corrosion control procedures must be listed in this column for each item.

3 Corrosion control references: This column gives the data module code of the detailed corrosion control procedure.

*Table 2 Major structural group component index - Example*

| Fig/ Ref (1) | Area/Item name and Part No. (2) | Corrosion control references (3) |
|---|---|---|
| 1 | Component XX, P/N XXXXXXXX | |
| | Corrosion prone and critical item/area | E1-A-52-10-00-00A-350A-B |
| | Corrosion removal | E1-A-20-00-00-00A-258C-B |
| | Material treatment/finish system | E1-A-20-00-00-00A-257A-B |
| | Corrosion prevention sealant system | E1-A-20-00-00-00A-259D-B |
| 2 | Component YY, P/N YYYYYYYY | |
| 3 | ..... | |

### 2.3.3 Corrosion prone and critical items/areas

One or more illustrations must be given to identify corrosion prone and critical items/areas. These items/areas must be inspected and protected. An arrow must be used on structural illustrations to show the grain flow. The area of a component which has a tendency to corrode must be highlighted and a location key used to coincide with a key in the text and in the Fig/Ref No. of the corrosion control tables. Listed below are the requirements for the columns in Table 3:

4 Fig/Ref: This column contains a Fig/Ref number for each corrosion prone and critical item/area which will be the key in the illustration and text. Critical areas can be identified with a "C" before the index number.

5 Name: This column gives the name of the items/areas shown in the appropriate illustration.

6 Type of corrosion: This column identifies the type of corrosion, or deterioration, anticipated such as oxidation, pitting, galvanic, flaking, etc. A detailed description of what the corrosion will look like on each specific item, based on the use/location/exposure of the item must be included in this column or a reference to the discussion of known corrosion problems given in the text. General statements such as "red rust" for steel parts or "white or grey powder" for aluminum parts are not adequate. Specific locations on the item where corrosion can be expected to start must be identified.

7 Inspection method: This column gives the preferred inspection method in a brief form. Detailed procedures must be included in the text body of the paragraph and must be referenced in the table. Where applicable, non-destructive inspection procedures must be referenced to the corresponding NDT data modules.

8 Probable cause and material specification: This column gives the probable cause of the corrosion normally encountered in the item/area and material types involved in the corrosion process.

*Table 3 Component corrosion prone and critical items/areas - Example*

| Fig/ Ref | Name | Type of corrosion | Inspection method | Probable cause and material specification |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| 1 | … | … | … | … |
| 2 | … | … | … | |
| 3 | … | … | | |
| 4 | … | | | |

### 2.3.4 Corrosion removal

A table containing the recommended corrosion removal procedures must be given. The table must be keyed to one or more illustrations and text for the corrosion prone and critical items/areas. The table must follow the format in Table 4 and consists of the following columns:

9 Fig/Ref: This column contains a Fig/Ref number for each corrosion prone and critical item/area which will be the key in the illustration and text. Critical areas can be identified with a "C" before the index number.

10 Name: This column gives the name of the items/areas shown in the appropriate illustration.

11 Recommended removal procedure: This column specifies the mechanical and chemical recommended corrosion removal procedures, in a brief form, for each corrosion prone and critical item/area. For repairs due to corrosion damage exceeding corrosion removal and treatment, the word "Repair" must be inserted and reference made to the structural repair information in the column "Specific procedures". If corrosion removal is not recommended the word "None" must be inserted in the relevant column.

12 Specific procedures: This column includes specific corrosion removal instructions, damage limits or references where the applicable data is contained. References to general corrosion removal procedures or to the structural repair data modules must be included. Any change of material as a result of a repair must be noted and the procedure for the new material also listed.

*Table 4 Component corrosion removal - Example*

| Fig/ Ref | Name | Recommended removal procedure (3) | | Specific procedures |
|---|---|---|---|---|
| (1) | (2) | Mechanical | Chemical | (4) |
| 1 | … | Repair | None | E1-A-… |

| Fig/ Ref | Name | Recommended removal procedure (3) | | Specific procedures |
|---|---|---|---|---|
| (1) | (2) | Mechanical | Chemical | (4) |
| C2 | … | | | |
| 2 | … | | | |

**2.3.5 Material treatment and protective finishes**

One or more illustrations and a table must be given for all types of protective finish required for all areas of the structural item; the exact area must be named. The table must follow the format given in Table 5 and must be keyed to the corresponding illustrations. The area/reference name for a specific corrosion prone area must be used in the table, where applicable. Both interior and exterior areas must be shown. Protective finishes application procedures in the general corrosion protective finish (refer to Para 2.2.1.1), must be referenced under the "alternate touch-up system" headings.

*Table 5 Material treatment and protective finishes - Example*

| Fig/ Ref | Name | Pretreatment | Primer | Topcoat |
|---|---|---|---|---|
| 1 | … | Exterior original finish system<br>Alternate touch-up system | | |
| 2 | … | Interior original finish system<br>Alternate touch-up system | | |

**2.3.6 Corrosion prevention sealant processes**

A table for corrosion prevention sealant processes must be given and follow the format in Table 6. The table gives the corrosion prevention sealant process for all items/areas of the structural item with area/reference key for a specific corrosion prone area used where applicable. Illustrations must be used if necessary. In the "Specific procedures" column of the table, cross-references must be made to the processes described under General corrosion control (refer to Para 2.2.1.1) and/or the structural repair data modules.

*Table 6 Component corrosion prevention sealant processes - Example*

| Fig/ Ref | Name | Type of sealing and material | Specific procedures |
|---|---|---|---|
| 1 | … | … | J1-A-… |
| 2 | … | | |

**2.3.7 Special equipment**

A table must be given listing all special equipment called up in the CC information set for corrosion inspections and control.

**2.3.8 Special materials**

A table must be given listing all the special materials called up in the CC information set for the corrosion inspections and control.

# Chapter 5.2.1.3.5

## *Maintenance information - Storage*

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| Chap No./Document No. | Title |
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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product storage information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to the Product storage which will enable skilled personnel at all maintenance levels to store the Product, including installed systems, equipment and components, inspect them during storage and remove them from storage. It does not cover preparation and shipment of new Products before they are delivered to a using organization. It does not cover spare parts, except when stored as part of the Product.

The storage information set covers the following topics:

- general requirements for Product storage
- product storage information and procedures

## 1.3 Standards

The standards given in this cahpter are applicable with no exceptions.

## 1.4 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

- temporary storage: A period of storage not exceeding 90 days
- extended storage: A period of storage which exceeds 90 days

# 2 Storage

## 2.1 General requirements

Illustrations, diagrams and related tables must be included in the data modules with such additions as can be required to illustrate the Product storage operations.

The Product storage information includes an overview illustration showing location of all preservation covers, areas to be protected and tie-down points for temporary and extended storage.

Illustrations must be provided for specific Product systems which require special storage operations.

The storage information set includes procedures for processing systems for:

- temporary storage not exceeding 30 days
- temporary storage from 30 to 90 days
- extended storage (over 90 days)
- inspection and treatments during storage
- removal from storage

– if required, instructions for movement following extended storage, which includes transportation by land, sea or air

## 2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-A-10-30-00-NNA-XXXY-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-XXXY-A (37 characters)

Where:

– "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed for the same information code.
– "XXX", is the information code, described in Para 2.4.

For detailed rules for the use of disassembly code variant refer to Chap 4.3.5.

## 2.3 Introduction

If required, the introduction data modules contain an explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They also contain any necessary information, of a general nature, which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-10-30-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", when more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

## 2.4 Storage data modules

Storage data modules contain all data required by maintenance personnel for storage, inspection during storage and removal from storage of individual Products.

In many cases, cross-reference to existing data modules is sufficient.

The storage information set covers, but is not limited to the following types of data modules:

– general product storage information which provides definitions of types of storage
– temporary storage
– extended storage
– preservation
– removal of preservation materials
– procedures to put items into containers
– procedures to remove items from containers
– procedures to keep items serviceable in storage
– moving of stored items to another location

- preparing of items for use after storage
- acceptance of items from storage before use
- life data of items in storage
- tie-down points and strength of cables needed to secure the Product during storage

### 2.4.1 General Product storage information

These data modules provide information on the purpose of the Product storage information, how to use it and standards of repetitive procedures on storage. As a source of further general information on storage, cross-references to other material are permitted. Information on the consumable materials, tools and equipment must be included with cross-references to appropriate (consolidated) lists. Definition of types of storage must be included.

Data modules must be coded:

YY-A-10-30-00-NNA-800Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-800Y-A (37 characters)

### 2.4.2 Temporary storage

These data modules provide information on how to protect the Product during temporary storage up to 30 days and from 30 to 90 days. This information must contain an overview illustration and instructions which include the following:

- items which must be removed from the Product before temporary storage, such as batteries, explosive devices, safety equipment, oxygen bottles
- location of protective covers and tie-down points
- any other procedures necessary to protect the Product during temporary storage

Data modules must be coded:

YY-A-10-30-00-NNA-800Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-800Y-A (37 characters)

### 2.4.3 Extended storage

These data modules provide information on how to protect the Product when stored for over 90 days. Extended storage is defined as a planned action from the first day of storage. This information must contain an overview illustration and instructions which include the following:

- items which must be removed from the Product before extended storage, such as batteries, explosive devices, safety equipment, oxygen bottles
- openings which must be sealed to prevent entry of rain, dust, birds or vermin to eliminate potential damage, corrosion and loose article hazards
- location of vent tubes or drain holes to ensure all areas of the Product are suitably ventilated
- location of acrylic windows or other surfaces which must be protected from sunlight
- general location of unpainted metal surfaces which need protection during extended storage
- any other procedure necessary to protect a specific system during extended storage

Data modules must be coded:

YY-A-10-30-00-NNA-800Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-800Y-A (37 characters)

**2.4.4 Preservation**

These data modules must provide information on how to make sure the Product stays serviceable when in storage.

Data modules must be coded:

YY-A-10-30-00-NNA-810Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-810Y-A (37 characters)

**2.4.5 Preparation for transport**

These data modules provide procedural information on how to prepare the Product for transport by land, sea or air.

Data modules must be coded:

YY-A-10-30-00-NNA-811Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-811Y-A (37 characters)

**2.4.6 Removal of preservation materials**

These data modules provide information on the procedures necessary to remove materials and parts used to keep the Product serviceable when in storage.

Data modules must be coded:

YY-A-10-30-00-NNA-820Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-820Y-A (37 characters)

**2.4.7 Procedures to put the Product into containers**

These data modules provide procedural information on how to install the Product in containers for storage or for transport by land, sea or air.

Data modules must be coded:

YY-A-10-30-00-NNA-830Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-830Y-A (37 characters)

**2.4.8 Procedures to load vehicle into another**

These data modules provide procedural information on how to load a vehicle into another one for transport by land, sea or air.

Data modules must be coded:

YY-A-10-30-00-NNA-831Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-831Y-A (37 characters)

**2.4.9 Procedures to remove the Product from containers**

These data modules provide procedural information on how to remove the stored Product from its containers, including the removal of material used for protection.

Data modules must be coded:

YY-A-10-30-00-NNA-840Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-840Y-A (37 characters)

**2.4.10 Procedures to unload vehicle from another**

These data modules provide procedural information on how to unload a vehicle from another one after transport by land, sea or air.

Data modules must be coded:

YY-A-10-30-00-NNA-841Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-841Y-A (37 characters)

**2.4.11 Procedures to keep the Product serviceable in storage**

These data modules provide procedural information on how to protect the stored Product during the time they are in storage. This includes all servicing or other periodic inspection and maintenance of the Product necessary to ensure it keeps the required level of efficiency during the time they are in storage.

Data modules must be coded:

YY-A-10-30-00-NNA-850Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY Y10-30-0000-NNAAA-850A-A (37 characters)

**2.4.12 Movement of stored Product to another location**

These data modules provide procedural information on how to move the stored Product by land, sea or air. These procedures also contain information regarding packaging, crating etc. where applicable to the items being transported.

Data modules must be coded:

YY-A-10-30-00-NNA-860Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-860Y-A (37 characters)

**2.4.13 Preparation of Product for use after storage**

These data modules provide information on the procedures necessary to prepare the Product for use after storage. This includes preparation for ferry after storage.

Data modules must be coded:

YY-A-10-30-00-NNA-870Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-870Y-A (37 characters)

**2.4.14 Preparation of Product for use after transport**

These data modules provide information on the procedures necessary to set on condition the Product after transport by land, sea or air.

Data modules must be coded:

YY-A-10-30-00-NNA-871Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-871Y-A (37 characters)

**2.4.15 Acceptance of Product from storage before use**

These data modules provide procedural information on how to accept the Product from storage before they are prepared for use.

Data modules must be coded:

YY-A-10-30-00-NNA-880Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-880Y-A (37 characters)

**2.4.16 Life data of Product in storage**

These data modules identify the length of time the Product can be kept in a given storage condition and stay safe/serviceable.

Data modules must be coded:

YY-A-10-30-00-NNA-890Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-30-0000-NNAAA-890Y-A (37 characters)

**2.4.17 Tie down points and cable information**

Information for tie down points and strengths of cables required to secure the Product during storage can be referenced from the maintenance procedures.

Data modules must be coded:

YY-A-10-20-YY-00A-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-20-YYYY-00AAA-XXXA-A (37 characters)

# Chapter 5.2.1.4

## *Common information sets - Wiring data*

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| Chap 8.2 | SNS information and learn codes - Maintained SNS - General |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for wiring data for the Product. Rules for preparation of page-oriented and interactive wiring publications are also given.

**Note**

An electronic copy of the wiring Schema and corresponding data module examples is available for download from the S1000D web site at www.s1000d.org.

## 1.2 Scope

This chapter covers the rules for the preparation of wiring information, which describes sufficiently the electrical circuits to enable skilled maintenance personnel to do fault isolation and maintenance of electrical systems on the Product. The specification describes the information and data that is necessary to prepare data modules for:

- Introduction (refer to Para 2.3.1)
- Descriptive information (refer to Para 2.3.2)

- Standard practices (refer to Para 2.3.3)
- Wiring diagrams (refer to Para 2.3.4)
  - Numeric index
  - Alphabetic index
  - Electrical and electronic wiring diagrams
- Harness drawings (refer to Para 2.3.5)
  - Harness installation drawings
  - Harness routing drawings
  - Harness flat layout drawings
- Equipment and panels locations (refer to Para 2.3.6)
- Electrical standard parts data (refer to Para 2.3.7)
- Electrical equipment information (refer to Para 2.3.8)
- Wire data (refer to Para 2.3.9)
- Harness data (refer to Para 2.3.10)

Additionally, special collections of wiring data, based on the data described in Para 2.3.7 thru Para 2.3.10 for easier access to the data, are described in:

- Generated data presentation (refer to Para 2.4)
  - Page-oriented wiring publications (refer to Para 2.4.2)
  - Interactive wiring publications (refer to Para 2.4.3)

For Interactive wiring publications the following functionalities are described in Para 2.5:

- Analysis of network
- Views and filters
- Data presentation

## 1.3 Wiring Schema

The wiring Schema provides a suitable structure to describe the electrical circuits of the Product.

**Note**

For additional wiring information, eg descriptive information, standard practices or harness drawings it can be necessary to use the descriptive or procedural Schema.

The wiring Schema consists of the wiring data Schema and the wiring data description Schema.

**Note**

It is not mandatory to use the wiring Schema. It is also possible to prepare wiring publication in form of tables and wiring diagrams by using the descriptive Schema. In this case, the interactive wiring publication functionalities (analysis of network, views and filters, context sensitive data presentation) are not available or required.

### 1.3.1 Wiring data Schema

The wiring data Schema is used to store wiring data information, such as wire data, harness data, electrical equipment information and electrical standard parts.

### 1.3.2 Wiring data description Schema

For each relevant element of the wiring data Schema an element field description is required. The wiring data description Schema describes for a project or an organization the specific configuration and usage of each element of the wiring data Schema.

The element field description can be used in an interactive wiring publication application as short information or for configuring and mapping the interactive wiring publication according to the specific naming conventions of a project or an organization.

The wiring data description Schema describes every relevant element of the wiring data Schema with the following three elements:

- The markup element <fieldName> contains project or organization specific name conventions.
- The markup element <descr> contains an explanatory description of the content of the element, eg project or organization specific defined values (the color of a wire can be red, yellow or green).
- The markup element <refs> contains the relevant reference to other data modules or technical publications for technical standard information etc.

The wiring data description data module containing the data structure must be based on the wiring data description Schema. Data modules must be coded:

YY-Y-YY-YY-00-00**Y**-029A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-00**YYY**-029A-A (37 characters)

where "**Y**" thru "**YYY**", in the disassembly code variant, is used if more than one data module is needed, eg for different languages.

The explicit coding of wiring data description data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment the wiring data description data modules must be coded:

YY-Y-91-00-00-00Y-029A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-00YYY-029A-A (37 characters)

## 1.4 Preparation process for wiring information

Fig 1 gives an overview of the standard preparation process for wiring information. The wiring data modules are typically produced from electric engineering source data.

ICN-C0419-S1000D0019-006-01

*Fig 1 Preparation process for wiring information*

# 2 Wiring data

## 2.1 General

The complete set of data modules for wiring data is specified in Para 2.3.

The data modules are produced from such sources as electric engineering source data (eg engineering data base, specifications, drawings/diagrams). These form the basic information for a wiring publication, which is capable to show all electrical information.

It is recommended to use engineering source data unchanged.

## 2.2 Standards and definitions

### 2.2.1 Standards

The standards given in this specification are applicable with no exceptions.

### 2.2.2 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate.

- **Panel:** This term covers all types of panels, eg instrument panels, circuit breaker panels, relay panels
- **Harness:** A cable harness is an assembly of wires and/or cables with all necessary end fittings and made on or off the Product, eg a harness for a power plant installation

– **Screen:** A device used as a shield to prevent wires from interference

## 2.3 Technical content

### 2.3.1 Introduction

If required, the introduction data modules contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They also contain any necessary information of a general nature, which is not detailed in any of the specific data modules.

The introduction data modules in wiring publications include eg an explanation of the make-up and use of the wiring data information set. They also include an explanation of the statements giving the configuration (eg pre mod, post mod) of the Product depicted on diagrams.

Data modules containing an introduction must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-00-**NN**A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-**NN**AAA-018A-A (37 characters)

where "**NN**", in the disassembly code, is a sequential number starting from "00" if more than one data module is needed.

The information code variant must be used to distinguish between the different Information sets.

The explicit coding of introduction data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment the introduction data modules must be coded:

YY-Y-91-00-00-**NN**A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-**NN**AAA-018A-A (37 characters)

### 2.3.2 Descriptive information

#### 2.3.2.1 Electrical identification system

A description must be given of the electrical identification system used on the Product. This also includes a list of the electrical and electronic/avionic systems of the Product with their system and subsystem codes.

Data modules containing descriptive information must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-00-01A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-01AAA-040A-A (37 characters)

The explicit coding of data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, data modules that describe the electrical identification system must be coded:

YY-Y-91-00-00-01A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-01AAA-040A-A (37 characters)

2.3.2.2 Connection units

A description can be given for all kinds of connection units used on the Product, such as connectors, terminal boards, modular terminal boards, splices, bonding, etc. The description must be accompanied by illustrations.

Data modules containing descriptive information must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-00-02A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-02AAA-040A-A (37 characters)

The explicit coding of data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, data modules that describe connection units must be coded:

YY-Y-91-00-00-02A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-02AAA-040A-A (37 characters)

2.3.2.3 Wires, harnesses and conductors

A description can be given for all types of wires and harnesses installed in the Product, such as single wires, multiple wires, shielded wires, twisted wires, etc. The description can also include, as necessary, illustrations and tables giving wire sizes, classification, conductors and wire types, etc.

Data modules containing descriptive information must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-00-03A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-03AAA-040A-A (37 characters)

The explicit coding of data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, data modules that describe wires, harnesses and conductors must be coded:

YY-Y-91-00-00-03A-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-03AAA-040A-A (37 characters)

**2.3.3 Standard practices**

These data modules must contain project or organization specific standard electrical maintenance practices and repair information, eg for the

- termination of wires
- installation of connectors and splices
- preparation of termination points for shielding, ground straps and ground studs and harnesses

The data modules must also contain any specific maintenance practices necessary for the

- installation
- maintenance
- repair

of electrical and electronic conductors, disconnects and termination points. The information to produce the data modules can be derived from project or organization specific specifications and instruction sheets.

The data modules must also contain information about tools and equipment needed to perform the work to be done. Standard practices such as

- continuity testing
- insulation testing
- voltage breakdown testing
- coaxial cable testing (time domain reflectometry)
- optical fiber testing
- MIL-Bus testing
- bonding testing

are produced in data module form as required.

Dependent on the requirements for the Product, data modules are prepared based on the procedural or descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-YY-YYY-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-XXXA-Z (37 characters)

The explicit coding of standard practices data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, standard practices data modules must be coded:

YY-Y-20-YY-YY-YYY-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y20-YY-YYYY-YYYYY-XXXA-Z (37 characters)

### 2.3.4 Wiring diagrams

2.3.4.1 General

For a page-oriented wiring publication, wiring diagram data modules must be provided for all electrical systems of the Product.

For an interactive wiring publication, pre-prepared wiring diagrams are optional. The possibilities of an interactive wiring publication application to generate wiring diagrams according to user needs at runtime are described in Para 2.5.

A wiring diagram data module must contain all sheets of the wiring diagram of an electrical or electronic system as defined by the SNS.

2.3.4.2 Numeric index (page-oriented publication)
For each system "**YY**" a numeric index must be provided, listing all diagrams and give information such as:

- Title: Title of the figure (name of diagram)
- Data module code: Referenced data module
- Fig No.: Figure number in referenced data module
- Applic: Applicability

Data modules containing numeric indexes must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-**YY**-YY-00A-013A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**YY**-YYYY-00AAA-013A-A (37 characters)

The explicit coding of numeric index data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, numeric index data modules must be coded:

YY-Y-91-YY-00-00A-013A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-YY-0000-00AAA-013A-A (37 characters)

An example is given in Table 2.

*Table 2 Numeric index - Example data module 1F-A-91-24-00-00A-013A-A*

| Title | Data module code | Fig No. | Applic |
|---|---|---|---|
| AC generation | 1F-A-91-24-20-00A-051A-A | 1 | All |
| DC generation | 1F-A-91-24-30-00A-051A-A | 1 | All |
| External power | 1F-A-91-24-40-00A-051A-A | 1 | All |
| AC electrical load distribution | 1F-A-91-24-50-00A-051A-A | 1 | All |
| DC electrical load distribution | 1F-A-91-24-60-00A-051A-A | 1 | Twin |
| DC electrical load distribution | 1F-A-91-24-60-00B-051A-A | 1 | Single |

2.3.4.3 Alphabetic index (page-oriented publication)
For each system "**YY**" an alphabetic index must be provided, listing all diagrams and give information such as:

- Title: Title of the figure (name of diagram)
- Data module code: Referenced data module
- Fig No.: Figure number in referred data module
- Applic: Applicability

Data modules containing alphabetic and alphanumeric indexes must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-**YY**-YY-00A-014A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**YY**-YYYY-00AAA-014A-A (37 characters)

The explicit coding of alphabetic index data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, alphabetic index data modules must be coded:

YY-Y-91-**YY**-00-00A-014A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**YY**-0000-00AAA-014A-A (37 characters)

2.3.4.4 Interactive wiring publication index
An interactive wiring publication application represents the wiring diagrams only in one order, either numeric (refer to Para 2.3.4.2) or alphabetic (refer to Para 2.3.4.3).

2.3.4.5 Electrical and electronic wiring diagrams
These data modules contain only wiring diagrams. The wiring diagrams (refer to Fig 2) show all

- terminating points
- wire identification codes
- equipment designators
- junction boxes
- shields
- internal jumpers
- ground connections
- etc

Each terminal point must be identified. At each point where a wire connects, the wire number must be indicated. Spare wires must be noted as "Spare". Wire connections between terminals and disconnect points and between electrical components must be drawn as direct as possible. Power distribution wiring diagrams must be provided for all primary and secondary busses up to and including the primary and secondary busses that feed the circuit breakers.

Data modules containing wiring diagrams must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-YY-00A-051A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-00AAA-051A-A (37 characters)

The explicit coding of wiring diagram data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, wiring diagram data modules must be coded:

YY-Y-91-**YY-YY**-00A-051A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**YY-YY**00-00AAA-051A-A (37 characters)

where "**YY-YY**" is the SNS-number referring to the system the wiring diagram is related to.

An exampleis shown in Fig 2.

### 2.3.5 Harness drawings

These data modules contain only the harness drawings and show, in each zone of the Product respectively across the Product the routings of harnesses naming them by the associated routes. These drawings can be simplified and route identification can be made, using perspective or orthographic views of the zone concerned, with identification to frames. Where possible, source drawings are used unchanged. As a general rule, the following types of illustrations are produced to satisfy the requirements:

- Harness installation
- Harness routing
- Harness flat layout (O)

For detailed information of the zoning of a Product refer to Chap 3.4.

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*Fig 2 Wiring diagram - Example*

2.3.5.1 Harness installation drawings

These data modules include illustrations. They must be produced for each major area, zone or sub-zone of the Product, as appropriate and must show the installation of each harness in the Product.

An example is shown in Fig 3.

Specific projects can have the requirement to produce information of harness installation as a list providing all harnesses that are installed in each of the major areas in textual form with a reference to the data modules that contain the information for each single harness routing installation within that major area. Illustrations need not be provided, where appropriate.

Data modules containing routing diagrams must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-**ZZ**-YY-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**ZZ**-YYYY-**NN**AAA-052A-A (37 characters)

where

- "**ZZ**" are the first two characters of the zone code (refer to Chap 3.4)
- "**NN**" is a sequential number starting from "00" if more than one data module is needed

The explicit coding of harness installation drawing data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

**Note**

The project or the organization must decide whether they use the coding of harness installation drawing data modules by using zone information. If they decide so, the structure of the data module code is possibly not appropriate. In this case the project or the organization must decide about changes of the proposed structure for their Product, eg use the zone information in the unit or assembly group of the SNS instead of the subsystem/sub-subsystem group.

For air vehicle, engines and equipment, data modules must be coded:

YY-Y-91-**ZZ**-00-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**ZZ**-0000-**NN**AAA-052A-A (37 characters)

2.3.5.2 Harness routing drawings

These data modules present a single harness illustration which shows the routing of the harness across the Product and all connectors at both ends in isometric view. The clipping points that fasten the harness to the Product's structure must also be included with their identification.

Examples are shown in Fig 3 and Fig 4.

Data modules containing routing diagrams must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-**ZZ**-YY-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**ZZ**-YYYY-**NN**AAA-052A-A (37 characters)

where

- "**ZZ**" are the first two characters of the zone code (refer to Chap 3.4)
- "**NN**" is a sequential number starting from "00" if more than one data module is needed

The explicit coding of harness routing drawing data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

**Note**

The project or the organization must decide whether they use the coding of harness routing drawing data modules by using zone information. If they decide so, the structure of the data module code is possibly not appropriate. In this case the project or the organization must decide about changes of the proposed structure for their Product, eg use the zone information in the unit or assembly group of the SNS instead of the subsystem/sub-subsystem group.

For air vehicle, engines and equipment, data modules must be coded:

YY-Y-91-**ZZ**-00-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**ZZ**-0000-**NN**AAA-052A-A (37 characters)

2.3.5.3 Harness flat layout drawings

The project or the organization must decide if harness flat layout drawing data modules are to be produced or not. These data modules provide harness flat layout illustrations shown as plan views across the Product with their segment lengths, sleeve codes, etc. An example is shown in Fig 5.

Data modules containing routing diagrams must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-YY-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-**NN**AAA-052A-A (37 characters)

where "**NN**" is a sequential number starting from "00" if more than one data module is needed.

The explicit coding of harness flat layout drawing data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, harness flat layout drawing data modules must be coded:

YY-Y-91-00-00-**NN**A-052A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-**NN**AAA-052A-A (37 characters)

ICN-C0419-S1000D0016-001-01

*Fig 3 Harness installation and routing - Example*

ICN-C0419-S1000D0015-001-01

*Fig 4 Harness routing - Example*

ICN-C0419-S1000D0017-002-01

*Fig 5 Harness flat layout - Example*

### 2.3.6 Equipment and panels locations

The project or the organization must decide if separate data modules containing equipment and panels location illustrations are to be produced or not. These illustrations (refer to Fig 6) show the locations of major electrical and electronic components or groups of components, which are not contained in the location illustrations of the relevant system documentation. These locations must be identified by reference to major panels or station lines, water line and buttocks line or an equivalent locating system. The components illustrations include items such as panels, junction boxes, equipment and racks.

Data modules containing location diagrams must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-YY-**NN**A-055A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-**NN**AAA-055A-A (37 characters)

where "**NN**" is a sequential number starting from "00" if more than one data module is needed.

The explicit coding of equipment and panels locations data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, data modules must be coded:

YY-Y-91-**YY**-00-**NN**A-055A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**YY**-0000-**NN**AAA-055A-A (37 characters)

where

- "**YY**" is the system code of the SNS
- "**NN**" is a sequential number starting from "00" if more than one data module is needed

ICN-C0419-S1000D0018-001-01

*Fig 6 Equipment and panels' location - Example*

### 2.3.7 Electrical standard parts data

The project or the organization must decide if data modules containing electrical standard parts data are to be produced or not. The electrical standard parts data include an extract of the technical information for each defined standard part and is based on technical standards. Numbering is based on a general or a project or organization specific specification number which is different to the manufacturer's part number.

Data modules containing electrical standard parts data must be prepared based on the wiring data Schema. These data modules must be coded:

YY-Y-YY-YY-YY-**XX**A-031A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-**XX**AAA-031A-A (37 characters)

where "**XX**", in the disassembly code, shows the technical information as follows:

- 01 = Connectors including switches
- 03 = Distribution parts
- 04 = Wires
- 05 = Accessories
- 06 = Solder sleeves
- 07 = Shrink sleeves
- 08 = Identification sleeves
- 09 = Conduits

The explicit coding of electrical standard parts data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, standard parts data modules must be coded:

YY-Y-91-00-00-**XX**A-031A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-00-0000-**XX**AAA-031A-A (37 characters)

*Table 3 Standard parts list - Connectors, Example data module 1F-A-91-00-00-01A-031A-A*

| Part number | Alternatives (Supplier) | Number of contacts | Accessory | Applicability |
|---|---|---|---|---|
| JN1003FG1004SN | STTG06 RT1004SN014 (Amphenol Ltd) | 4 | JN1003S16JN1003K10 | All |
| JN1003FG1606PN | STTG06RT1606PN014 (Amphenol Ltd) | 6 | JN1003P12JN1003K16 | All |
| JN1003FG2235PN | STTG06RT2235PN014 (Amphenol Ltd) | 100 | JN1003P22JN1003K22 | All |

*Table 4 Standard parts list - Identification sleeves, Example data module 1F-A-91-00-00-08A-031A-A*

| Part number | Length | Mass | Diameter min / max | Applicability |
|---|---|---|---|---|
| JN1009-048A | 48 mm | 0,0001 kg | 2,4 mm / 0,8 mm | All |

| Part number | Length | Mass | Diameter min / max | Applicability |
|---|---|---|---|---|
| JN1009-095A | 47 mm | 0,0003 kg | 9,5 mm / 4,8 mm | All |
| JN1009-180A | 42 mm | 0,0005 kg | 9,5 mm / 4,8 mm | All |

### 2.3.8 Electrical equipment information

2.3.8.1 General

For each electrical or electronic item of equipment that has electrical connections, the project or the organization must define the required equipment information. The equipment information includes plugs and receptacles, terminals, splices, ground connections, switches, relays, lights, resistors, diodes and other electrical and electronic equipment with reference designators. The information can be reduced to a single system code.

2.3.8.2 Electrical equipment information

These data modules must include all relevant information that is necessary to describe the Product's equipment. An electrical equipment information data module must be produced for each zone of the Product including all equipment installed. The electrical equipment must be listed with the reference designator in alphanumeric order. Table 5 gives an example of data to be presented in electrical equipment lists.

General information must be given as an equipment list in tabular format. For an example refer to Table 6.

*Table 5 Data elements in equipment lists - Example*

| Data element | Markup element | |
|---|---|---|
| Each electrical equipment information consists of: | | |
| - Reference designator | `<referenceDesignator>` | M |
| - Part number | `<partNumber>` | O |
| - Equipment description | `<equipDescrRef>` | O |
| - Location | `<installationLocation>` | O |
| - Illustration, eg reference to equipment and panels location data module (refer to Para 2.3.6) | `<illustrationRef>` | O |
| Electrical equipment applicability: | | |
| - Applicability of the Product | `<applic>` as referenced by attribute `applicRefId` | O |

(M) Mandatory, (O) Optional, (C) Conditional

Data modules containing equipment lists must be prepared based on the wiring data Schema. These data modules must be coded:

YY-Y-YY-**ZZ**-YY-**NN**A-056A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**ZZ**-YYYY-**NN**AAA-056A-A (37 characters)

where

– "**ZZ**" are the first two characters of the zone code (refer to Chap 3.4)
– "**NN**" is a sequential number starting from "00" if more than one data module is needed

The explicit coding of electrical equipment information data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

**Note**

The project or the organization must decide whether they use the coding of electrical equipment information data modules by using zone information. If they decide so, the structure of the data module code is possibly not appropriate. In this case the project or the organization must decide about changes of the proposed structure for their Product, eg use the zone information in the unit or assembly group of the SNS instead of the subsystem/sub-subsystem group.

For air vehicle, engines and equipment, electrical equipment information data modules must be coded:

YY-Y-91-**ZZ**-00-**NN**A-056A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**ZZ**-0000-**NN**AAA-056A-A (37 characters)

*Table 6 Equipment list - Example data module 1F-A-91-22-00-00A-056A-A*

| Reference designator | Part number | Equipment description | Location<br>Shown in data module | Applicability |
|---|---|---|---|---|
| K1 | 9274-6686 | 1F-A-24-21-01-00A-042A-C | 221BL<br>1F-A-91-24-00-12A-055A-A | All |
| K2 | 9274-6686 | 1F-A-24-21-02-00A-042A-C | 221BL<br>1F-A-91-24-00-12A-055A-A | All |
| K3 | 6042H92 | 1F-A-30-41-01-00A-042A-C | 223AR<br>1F-A-91-30-00-05A-055A-A | 0001 - 0012 |
| K4 | 9128-1Z-C7C-4-001 | 1F-A-30-41-03-00A-042A-C | 223AR<br>1F-A-91-30-00-05A-055A-A | 0013 - 9999 |
| K5 | BACR-13CD3 | 1F-A-30-41-04-00A-042A-C | 224FZ<br>1F-A-91-30-00-15A-055A-A | All |

### 2.3.9 Wire data

These data modules must include all relevant information that is used eg in the assembly of the Product's wiring. A wire list data module must be produced for each system of the Product as defined by the SNS including all wires installed. The wires must be listed with the wire identification in alphanumeric order. Table 7 gives an example of data to be presented in wire lists.

*Table 7 Data elements in wire lists - Example*

| Data element | Markup element | |
|---|---|---|
| For wire identification: | | |
| - Circuit code | `<circuitIdent>` | O |
| - Wire identification number | `<wireNumber>` | M |

| Data element | Markup element | |
|---|---|---|
| - Wire section identification | <sectionIdent> | O |
| For wire information: | | |
| - Harness identification | <harnessIdent> | O |
| - Color | <wireColor> | O |
| - Length | <length> | O |
| - EMC Code | <emcCode> | O |
| For wire connection (the wire connection includes the wire end information): | | |
| - From equipment | <fromEquip> | M |
| - To equipment | <toEquip> | O |
| Each wire end information consists of: | | |
| - Equipment identification | <referenceDesignator> | M |
| - Contact | <contactInfo> | O |
| - Screen | <screenGroup> | O |
| Wire applicability: | | |
| - Applicability of the Product | <applic> as referenced by attribute applicRefId | O |

Spare wires must be indicated as shown in Table 8. Wire preparation information is linked to standard practices airframe systems (refer to Para 2.3.3).

Data modules containing wire lists must be are prepared based on the wiring data Schema. These data modules must be coded:

YY-Y-YY-YY-YY-**NN**A-057A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-**NN**AAA-057A-A (37 characters)

where "**NN**" is a sequential number starting from "00" if more than one data module is needed.

The explicit coding of wire data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, wire data modules must be coded:

YY-Y-91-**YY**-00-**NN**A-057A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**YY**-0000-**NN**AAA-057A-A (37 characters)

where

– "**YY**" is the system code of the SNS
– "**NN**" is a sequential number starting from "00" if more than one data module is needed

*Table 8 Wire list - Example data module 1F-A-91-94-00-00A-057A-A*

| Wire identification | Harness | Color | Length | Side 1: RFD | Contact | Side 2: RFD | Contact | Applic ability |
|---|---|---|---|---|---|---|---|---|
| AG0001FA | 3001VB | C | 1000 | 1AGA | A | 2AGB | 3 | All |
| AG0002FA | 3001VB | R | 500 | 1AGA | B | 100VR | 1 | All |
| AG0002FB | 3005VB | R | 1500 | 100VP | 1 | 3AGC | G | All |
| AG0003FA | 3001VB | B | 500 | 1AGA | C | 100VR | 2 | All |
| AG0003FB | 3005VB | B | 1500 | 100VP | 2 | 3AGC | H | All |
| AG0004FA (Spare) | 3001VB | C | 1000 | 1AGA | STOW | 2AGB | STOW | All |

### 2.3.10 Harness data

These data modules must include all relevant information that is necessary to describe the Product's harnesses. A harness data module must be produced for the installed harnesses in each zone of the Product. The harnesses must be listed with the harness identification in alphanumeric order. Table 9 gives an example of data to be presented in harness lists.

*Table 9 Data elements in harness lists - Example*

| Data element | Markup element | |
|---|---|---|
| Each harness information consists of: | | |
| - Harness identification | <harnessIdent> | M |
| - Part number | <partNumber> | O |
| - Dash number | <harnessVariantIdent> | O |
| - Issue | <harnessVariantIssue> | O |
| - Illustration, eg reference to harness drawing (refer to Para 2.3.5) | <illustrationRef> | O |
| Harness applicability: | | |
| - Applicability of the Product | <applic> as referenced by attribute applicRefId | O |

Data modules containing harness lists must be prepared based on the wiring data Schema. These data modules must be coded:

YY-Y-YY-**ZZ**-YY-**NN**A-058A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-**ZZ**-YYYY-**NN**AAA-058A-A (37 characters)

where

– "**ZZ**" are the first two characters of the zone code (refer to Chap 3.4)
– "**NN**" is a sequential number starting from "00" if more than one data module is needed

The explicit coding of harness data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

**Note**

The project or the organization must decide whether they use the coding of harness data modules by using zone information. If they decide so, the structure of the data module code is possibly not appropriate. In this case the project or the organization must decide about changes of the proposed structure for their Product, eg use the zone information in the unit or assembly group of the SNS instead of the subsystem/sub-subsystem group.

For air vehicle, engines and equipment, harness data modules must be coded:

YY-A-91-**ZZ**-00-**NN**A-058A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-**ZZ**-0000-**NN**AAA-058A-A (37 characters)

*Table 10 Harness list - Example data module 1F-A-91-21-00-00A-058A-A*

| Harness identification | Part number | Issue | Routing<br>Shown in data module | Applicability |
|---|---|---|---|---|
| 3001VB | 91223001-405 | A | 1F-A-91-21-00-00A-052A-A | All |
| 3002VB | 91223002-401 | D | 1F-A-91-21-00-01A-052A-A | All |
| 3003VB | 91223003-421 | C | 1F-A-91-21-00-02A-052A-A | All |

## 2.4 Generated data presentation

### 2.4.1 General

Generated data presentation shows wiring information of the Product. It is based on and prepared from source data stored in the wiring data data module instances. The source data can be used to generate this information for a page-oriented wiring publication or within an interactive wiring publication.

Source data are wire data, harness data, electrical equipment information, electrical standard parts data (refer to Para 2.3) and they must include all pertinent information that is used in the assembly of the Product, junction boxes and pylons.

### 2.4.2 Page-oriented wiring publications

For page-oriented wiring publications, the information for generated data presentation, eg harness wire lists, connection lists, is generated from source data, as described above, in a pre-processing. The result of the pre-processing must be stored in data modules.

Data modules must be prepared based on the descriptive Schema. These data modules must be coded:

YY-Y-YY-YY-YY-NNA-**XXX**A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-NNAAA-**XXX**A-A (37 characters)

where

"**XXX**" is the information code, which gives the contained technical information as follows:

- 031 = Electrical standard parts data
- 056 = Equipment lists
- 057 = Wire lists
- 058 = Harness lists

Use "**A**", "**B**"….."**Z**" in the information code variant, if more than one type of lists as shown in Para 2.4.2.1 thru Para 2.4.2.3 is needed.

The explicit coding of page-oriented wiring publication data modules concerning the system, subsystem and in some cases the sub-subsystem is different for air, land and sea systems. It is based on the SNS of the Product. Maintained SNS are listed in Chap 8.2.

For air vehicle, engines and equipment, page-oriented wiring publication data modules must be coded:

YY-A-91-YY-00-NNA-**XXX**A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y91-YY-0000-NNAAA-**XXX**A-A (37 characters)

**Note**

The generated lists described in Para 2.4.2.1 thru Para 2.4.2.3 can contain data from different main elements of the wiring data Schema, eg wires and harnesses. Therefore it is recommended to use the descriptive Schema to provide generated lists in page-oriented wiring publications. It is also possible to use the wiring data Schema.

Examples of generated information for a page-oriented wiring publication such as harness wire lists, connection lists and hook-up lists are given in Para 2.4.2.1 thru Para 2.4.2.3.

2.4.2.1 Harness wire lists

A harness wire list data module can be produced for the Product listing all harness conductors for each harness, in alphanumeric order and providing the following information:

- harness identification
- wire identification
- harness installation and routing drawing data module where the installation and routing is shown (refer to Para 2.3.5.1 and Para 2.3.5.2).
- harness flat layout installation data module where the layout is shown (refer to Para 2.3.5.3)
- applicability of the Product

*Table 11 Harness wire list - Example data module 1F-A-91-00-00-00A-057B-A*

| Harness identification | Wire identification | Harness routing | Applicability |
|---|---|---|---|
| 3001VB | AG0001FA | 1F-A-91-21-00-00A-052A-A | All |
| 3001VB | AG0002FA | 1F-A-91-21-00-00A-052A-A | All |
| 3001VB | BD0001FA | 1F-A-91-21-00-00A-052A-A | All |
| 3002VB | YD0001FA | 1F-A-91-21-00-00A-052A-A | All |
| 3002VB | YD0001FB | 1F-A-91-21-00-00A-052A-A | 0001 - 0012 |

2.4.2.2 Connection lists

A connection list data module can be produced for the Product, listing all used wires for one plug/receptacle in alphanumeric order and providing the following information:

- Plug and receptacle number
- Contact (used)
- Wire identification
- Harness identification
- Applicability of the Product

*Table 12 Connection list - Example data module 1F-A-91-00-00-00A-057C-A*

| Connector (Mating connector) | Contact | Wire identification | Harness identification | Applicability |
|---|---|---|---|---|
| 100VP (100VR) | A | AG0001FA | 3001VB | All |
| 100VP (100VR) | C | BD0001FA | 3001VB | All |
| 100VP (100VR) | D | BD0002FA | 3001VB | 0001 - 0012 |
| 100VR (100VP) | A | AG0001AA | 1013VB | All |
| 100VR (100VP) | C | BD0001AA | 1013VB | All |

2.4.2.3 Hook-up lists

The hook-up list data modules can comprise the following information:

- Plug and receptacle lists
- Terminal lists
- Splice lists
- Earth point lists

*2.4.2.3.1 Plug and receptacle lists*

This list can comprise the following information:

- Plug and receptacle numbers
- Contact (used and unused)
- Wire identification
- To/from routing
- Location
- Wiring diagram data modules on which the plugs and receptacles are shown
- Applicability of the Product

*Table 13 Plug and receptacle list - Example data module 1F-A-91-00-00-00A-057D-A*

| Connector | Contact | Wire identification | to RFD | Contact | Location | Applicability |
|---|---|---|---|---|---|---|
| 100VP | A | AG0001FA | 1AGA | 1 | 231 | All |
| 100VP | B | | | | 231 | All |
| 100VP | C | BD0001FA | 1BDA | A | 231 | All |
| 100VP | D | BD0002FA | 1BDA | B | 231 | 0001 - 0012 |
| 100VP | D | | | | 231 | 0013 - 9999 |
| 100VR | A | AG0001AA | 2AGB | 5 | 135 | All |
| 100VR | B | | | | 135 | All |

*2.4.2.3.2 Terminal lists*

This list can comprise the following information:

- Terminal number
- Contact (used and unused)
- Wire identification
- Wiring diagram data modules on which the terminal is shown
- Specific location of the terminal
- Applicability of the Product

*Table 14 Terminal list - Example data module 1F-A-91-00-00-00A-057E-A*

| Terminal number | Contact | Wire identification | Wiring diagram | Location | Applicability |
|---|---|---|---|---|---|
| 1001VEA | 1 | AG0001FA | 1F-A-91-94-00-00A-051A-A | 231 | All |
| 1001VEA | 2 | AG0001FB | 1F-A-91-94-00-00A-051A-A | 231 | All |
| 1001VEA | 3 | | 1F-A-91-94-00-00A-051A-A | 231 | All |
| 1001VEA | 4 | | 1F-A-91-94-00-00A-051A-A | 231 | All |
| 1001VEB | 1 | BD0011FB | 1F-A-91-93-00-00A-051A-A | 212 | 0013 - 0022 |
| 1001VEB | 2 | BD0011FC | 1F-A-91-93-00-00A-051A-A | 212 | 0013 - 0022 |

*2.4.2.3.3 Splice lists*

This list can comprise the following information:

- Splice number
- Contact (used and unused)
- Wire identification
- Wiring diagram data modules on which the splice is shown
- Specific location of the splice
- Applicability of the Product

*Table 15 Splice list - Example data module 1F-A-91-00-00-00A-057F-A*

| Splice number | Contact | Wire identification | Wiring diagram | Location | Applicability |
|---|---|---|---|---|---|
| 1001VS | 1 | AG0001FA | 1F-A-91-94-00-00A-051A-A | 231 | 0013 - 0022 |
| 1001VS | 2 | AG0001FB | 1F-A-91-94-00-00A-051A-A | 231 | 0013 - 0022 |
| 1002VS | | BD0011FA | 1F-A-91-93-00-00A-051A-A | 212 | All |
| 1002VS | | BD0011FB | 1F-A-91-93-00-00A-051A-A | 212 | All |
| 1002VS | | BD0011FC | 1F-A-91-93-00-00A-051A-A | 212 | All |

*2.4.2.3.4 Earth point lists*

This list can comprise the following information:

- Earth point number
- Wire identification
- Wiring diagram data modules on which the earth point is shown
- Specific location of the earth point

– Applicability of the Product

*Table 16 Earth point list - Example data module 1F-A-91-00-00-00A-057G-A*

| Earth point number | Wire identification | Wiring diagram | Location | Applicability |
|---|---|---|---|---|
| 100VN | AG0001FA | 1F-A-91-94-00-00A-051A-A | 231 | 0013 - 0022 |
| 100VN | AG0001FB | 1F-A-91-94-00-00A-051A-A | 231 | 0013 - 0022 |
| 103VN | BD0011FA | 1F-A-91-93-00-00A-051A-A | 212 | All |
| 103VN | BD0011FB | 1F-A-91-93-00-00A-051A-A | 212 | All |
| 103VN | BD0011FC | 1F-A-91-93-00-00A-051A-A | 212 | All |

### 2.4.3 Interactive wiring publications

For interactive wiring publications, generated data presentation must be based on the wiring data data module instances as described in Para 2.3.7 thru Para 2.3.10. The information is generated by interactive wiring publication functionalities. It is therefore not part of the data exchange. No data module code is allocated. This generated information within an interactive wiring publication is described in Para 2.5.

## 2.5 Interactive wiring publication functionalities

The following paragraphs describe functionalities for an interactive wiring publication.

### 2.5.1 Analysis of network

2.5.1.1 General

When starting from selected electrical/electronic equipment a network can be generated for each connected wire following the wire segment information up to the end of the signal. All affected junction boxes can be shown. Another network can be generated for all wires and connectors/terminals between two defined equipment.

2.5.1.2 Network information

The network gives information starting with the contacts of selected electrical/electronic equipment and the wires connected to them. In accordance with the wire end information the next electrical/electronic equipment can be shown fan-shaped with the identified contacts on eg a terminal bus. This procedure can be repeated until the end equipment is reached. Basic information is:

– Reference designators for all shown equipment
– Graphic of the shown electrical/electronic equipment with contact information, wire identification, harness information and change information

2.5.1.3 Switching across electrical components

If the end equipment is a relay, switch etc. it is possible to select a contact. All related wires to the contact can be generated.

2.5.1.4 IETP specific elements for network analysis

To increase the performance of the network analysis additional elements are introduced for IETP purposes only. The element <`wireConnectionCode`> (O) and the element <`networkAnalysisCode`> (O) are part of the wiring data Schema.

The element <`wireConnectionCode`> contains in child elements coded information about the individual connection of a wire end, contact structure, multiple contact connections,

shield information, sort information and/or layout information. For detailed information on coding refer to Chap 3.9.5.2.9.2.

The element <networkAnalysisCode> contains information about the connection parts behavior (element <connectionListClass>) taking into account the specific connection situation. Thus, the <networkAnalysisCode> information states if a desired network analysis can be achieved automatically, with manual interaction or not at all across the respective connection part.

To provide detailed information about the equipment in an auto-generated plan of a network analysis, the element <electricalLogic> with the child elements <electricalEquipState>, <electricalEquipConnection> and <electricalStateDescr> was introduced.

The element <electricalEquipConnection>, a child element of the element <electricalEquipState>, describes the electrical connections of the states of equipment, eg a relay, a switch, etc. The attribute connectionType on element <electricalEquipConnection> describes the type of the connection. The element <electricalStateDescr> represents, if applicable, the switch or relay position.

If applicable, the additional information can be used to show more detailed equipment symbols and to support more interactive analysis through switches and relays.

### 2.5.2 Views and filters

2.5.2.1 Views

Views allow to change the data presentation eg wire data in order of harness number, view of twisted wires, view of screened wires. It is recommended to implement all views context sensitive.

2.5.2.2 Filters

Filters reduce the presented data dependent on data fields eg only wires of one harness connected on an electrical equipment of a zone. This data reduction applies to all further functionalities until filter changes.

### 2.5.3 Context sensitive data presentation

Context sensitive extract of basic electrical data can be displayed for all generated information and other interactive wiring publication functionalities.

Context sensitive data presentation in interactive wiring publications means that additional information is provided to the user by the wiring publication, depending on the item of the wiring that is in focus of the user.

For example, in a generated network all wires are shown with their wire identification only, equipment with the reference designator. If the user needs additional information, eg for a specific wire, the wiring publication application provides additional information such as wire type, gauge, color, etc for this specific wire. The additional information can be shown when the user moves the mouse over the wire or clicks on the wire.

In generated lists it can be favorable to provide the references to data modules containing harness installation or routing drawings, wiring diagrams or preparation and finishing information etc as a hidden link on a pre-defined list element. For example, by clicking on the harness identification to which a wire belongs, the references to harness installation or routing drawings for this harness are shown by the wiring publication application.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the wiring Schema.** The project or the organization must decide whether the wiring data Schema and the wiring data description Schema are to be used or not. Interactive wiring publication functionalities as described in Para 2.5 are only available if the wiring Schema is used.

**Use of the wiring data description Schema**. The project or the organization must decide how the element field description of the wiring data description Schema is to be used in an interactive wiring publication (refer to Para 1.3.2).

**Preparation of introduction data modules**. The project or the organization must decide whether introduction data modules are to be produced or not. If required, the scope of these introduction data modules must be defined (refer to Para 2.3.1).

**Optional descriptive information**. The project or the organization must decide whether descriptive information for connection units, wires and harnesses including illustrations and tables is to be produced or not (refer to Para 2.3.2.2 and Para 2.3.2.3).

**Wiring standard practices data modules**. The project or the organization must define the source and scope of wiring standard practices data modules. The project or the organization must also decide if this standard wiring practice information is to be prepared as procedural or descriptive data modules (refer to Para 2.3.3).

**Wiring diagrams in an interactive wiring publication**. The project or the organization must decide whether wiring diagrams are to be produced for an interactive wiring publication or not (refer to Para 2.3.4.1). Possibilities to generate wiring diagrams on the fly in an interactive wiring publication environment are described in Para 2.5.

**Harness routing drawings**. The project or the organization must decide if harness routing drawings are to be simplified or not and how their layout must look like (refer to Para 2.3.5).

**Harness installation information**. The project or the organization must decide if harness installation information is to be provided for each major area in list form in addition or instead of harness installation and routing drawings (refer to Para 2.3.5.1).

**Optional harness flat layout drawings**. The project or the organization must decide whether harness flat layout drawing data modules are to be produced or not (refer to Para 2.3.5.3).

**Equipment and panels locations**. The project or the organization must decide if separate data modules containing equipment and panels location illustrations are to be produced or not (refer to Para 2.3.6).

**Electrical standard parts data**. The project or the organization must decide if data modules containing electrical standard parts data are to be produced or not (refer to Para 2.3.7).

**Required equipment information**. The project or the organization must define the required information for each electrical or electronic item of equipment that has electrical connections (refer to Para 2.3.8.1).

**Coding of data modules with zone information**. The project or the organization must decide how zone information is to be given in electrical equipment information, harness data, harness installation and harness routing drawing data module codes (refer to Para 2.3.5.1, Para 2.3.5.2, Para 2.3.8.2 and Para 2.3.10).

**Generated lists**. The project or the organization must decide if and how harness wire list, connection list and hook-up list data modules are to be generated for a page-oriented or an interactive wiring publication from the wiring data modules that are based on the wiring Schema (refer to Para 2.4.2).

# Chapter 5.2.1.5

## *Common information sets - Illustrated parts data*

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| Chap 5.3.1.3 | Common requirements - Illustrated parts data |

## 1 General

This chapter contains references to the rules for the preparation and coding of data modules for IPD.

## 2 IPD

It covers the rules for the publication of spare parts information. By project decision, the IPD can be provided not as stand alone publication but as a part of another publication, eg part of an equipment maintenance publication. In this case, an information set is to be produced and integrated in the publication process. The rules for the preparation of the information sets are the same as the preparation of IPD publications. Refer to Chap 5.3.1.3.

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**IPD as a stand alone publication**. The project or the organization must decide whether produce IPD data as a stand alone publication, as part of an equipment maintenance publication, or both.

# Chapter 5.2.1.6

## *Common information sets - Maintenance planning information*

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# 1 General

## 1.1 Scope

This chapter covers the rules for the preparation of information applicable to product maintenance planning which will enable skilled personnel to manage the maintenance of the Product. It contains information about the necessary rule for preventive check and maintenance (scheduled and unscheduled). The Maintenance Planning (MP) information contains the following topics:

- time limits
- maintenance/Inspection task list
- scheduled and unscheduled checks
- acceptance and functional check flight

The data and information are based on technical analyses using the objectives of an efficient maintenance program.

Individual requirements and frequency of such rules are normally derived from analysis using standard methods for air vehicles such as Maintenance Steering Group (MSG), Reliability Centered Maintenance (RCM).

## 1.2 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for MP information.

## 1.3 Standards

The standards given in this chapter are applicable with no exceptions.

## 1.4 Terms

The following terms and those stated in Chap 9.2 must be used as appropriate.

- Check Maintenance (CM): Manufacturers' recommended thresholds (such as periodicity, rounds fired, etc.) for inspections and maintenance checks (both scheduled and unscheduled.).
- Scheduled maintenance check: A maintenance check or inspection on the product, its systems and sub-assemblies dictated by a threshold or interval.
- MSG: An organization which developed a standard method to determine scheduled maintenance programs (ATA Document MSG-3).
- RCM: A standard method, similar to MSG-3, to determine preventive maintenance requirements. The results of an RCM analysis, which is part of the LSA process, are normally stored in the LSA data base.
- Unscheduled maintenance check: a maintenance check or inspection on the product, its systems and units that is dictated by special or unusual conditions not related to a threshold or interval.

# 2 Maintenance planning information

## 2.1 Introduction

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

The zoning arrangement of the Product is covered by reference to the relevant data module (for air vehicles SNS 06-30-XX).

A list of terms must be included which defines conditions (eg "excessive"), damage (eg "crack") and other relevant terms (eg inspection types).

Data modules must be coded:

YY-Y-05-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.2 Data module coding

To assist in the codification of data modules the rules which follow must be used in addition to those given in Chap 4.3.

### 2.2.1 Time limits

Data module codes must be coded:

YY-Y-05-10-SS-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-10-SS00-NNAAA-000A-A (37 characters)

Where:

- "SS", the system to which data and information are applicable. Refer to Chap 8.2. "00" is used if data and information are applicable to the system as a whole.

– "NN", the subsystem (refer to Chap 8.2) if it is necessary to split the system into several subsystems (if not, use "00").

Example:

– Data and information about time limits for parts of the landing gear system (32) must be coded: 1Y-A-05-10-32-00A-000A-A

### 2.2.2 Maintenance/Inspection task lists

Data module codes must be coded:

YY-Y-05-20-SS-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-20-SS00-NNAAA-000A-A (37 characters)

Where:

– "SS" is the system to which data and information are applicable. Refer to Chap 8.2. "00" is used if data and information are applicable to the system as a whole.
– "NN" is the subsystem (refer to Chap 8.2) if it is necessary to split the system into several subsystems (if not, use "00").

Example:

– Data and information about maintenance/inspection tasks of the landing gear system (32) are coded: 1Y-A-05-20-32-00A-000A-A

### 2.2.3 Check definitions

Data module codes must be coded:

YY-Y-05-SS-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-SS-0000-NNAAA-000A-A (37 characters)

Where:

– "SS" gives the inspection type:
  - "40": Scheduled check (eg Preflight inspection). Example, refer to Fig 1.
  - "50": Unscheduled check (eg Inspection after hard landing)
  - "60": Acceptance and functional check flight
– "NN" is a sequential number to identify a specific check.

Example:

– The definition of a check after hard landing could be coded: 1F-A-05-50-00-18A-000A-A

## 2.3 Time limits

Each data module must contain a list of equipment in the specified system, which must be replaced with serviceable items at the end of a number of cycles, or an interval of a specified time.

– Each line entry is built up from the items defined below.
– Each item is filled up as necessary in accordance with the description given.
– Only one value is given for each item. If items are subject to various values, as many line entries as values are provided.

### 2.3.1 Equipment

The following information identifies the item that has to be replaced:

2.3.1.1 Name
The name of the system.

2.3.1.2 Identification number
Identification number of a specific part or component (eg part number).

2.3.1.3 CSN
Additional IPD that will help to identify the specific item.

2.3.1.4 Item Sequence Number (ISN)
Additional IPD that will help to identify the specific item.

**2.3.2 Quantity**
Total number of the specific hardware installed on the next higher assembly.

**2.3.3 Category**
Defined by the project or the organization, eg replaced for safety reasons.

**2.3.4 Time limit**
Time after which the item has to be replaced.

Chap 3.9.6 gives the attribute values.

*Table 2 Units of measurement for the threshold interval*

| Unit of measurement | Definition |
|---|---|
| FH | Flight hours |
| FC | Flight cycles |
| M | Months |
| W | Weeks |
| Y | Years |
| D | Days |
| S | Supersonic cycles |
| P | Pressure cycles |
| E | Engine cycles |
| ENG CNG | Engine change |
| SHP VSP | Shop visit |
| APU CNG | Auxiliary power unit change |
| LDG CNG | Landing gear change |
| WHL CNG | Wheel change |
| ENG STA | Engine start |
| OC | On condition |
| OPC | Operation cycles |
| OPH | Operating hours |

### 2.3.5 Applicability

For applicability attributes refer to Chap 3.9.5.3. The applicability annotation is given to each line entry in Table 3.

*Table 3 Time limits - Examples*

| Name | Part number | CSN | Time limit | Qty | Cat | Applicability |
|---|---|---|---|---|---|---|
| Shock strut, LH MLG | 564-POL-801 | | 1600 FH (-50 FH + 0 FH) | 1 | I | Serial No. =1 |
| Shock strut, LH MLG | 564-POL-805 | | 2000 FH (-50 FH + 0 FH) | 1 | I | Serial No. = [2-5] |
| Mounting assy | | 43-22-09-000B-10C | 10 FH after LDG CNG | 16 | II | All |

## 2.4 Maintenance/Inspection task lists

Each data module must contain a list of maintenance/inspection tasks in the specified system, which must be carried out during one or more different checks (eg for air vehicles Post flight inspection).

- Each line entry is built up from the items defined below.
- Each item is filled up as necessary in accordance with the description given.
- Only one value is given for each item. If items are subject to various values, as many line entries as values are provided (except items where several values are allowed).

### 2.4.1 Task

A short description of the actions to be made for this task. Refer to Chap 3.9.5.2.5.

### 2.4.2 PMD

Production management data. Refer to Chap 3.9.5.2.1.9.

### 2.4.3 Preliminary requirements

Preliminary requirements for this task. Refer to Chap 3.9.5.2.1.9.

**Note**

Instead of task, PMD and preliminary requirements reference can be used.

### 2.4.4 Reference

Reference to a data module or publication that describes the maintenance/inspection task.

### 2.4.5 Name

The name of the system.

### 2.4.6 Equipment

Information identifying the item or system.

### 2.4.7 Supervise

Information about the required supervisor. Coding of the different entries are defined by the project or the organization.

### 2.4.8 Check interval/Limit

Time or cycles after which the task has to be performed. This item should only be used, if no check interval or limit data for check definitions are available.

### 2.4.9 Applicability

For applicability attributes refer to Chap 3.9.5.3. The applicability annotation is given to the whole line entry.

*Table 4 Maintenance/Inspection tasks - Examples*

| Reference data module code | Name | Task | Check interval/Limit | Applicability |
|---|---|---|---|---|
| 1Y-A-32-00-00-00A-240A-A | Landing gear system | Check visually | | Serial No. = [GS004-GS158] |
| 1Y-A-32-00-00-00B-240A-A | Landing gear system | Check visually | | Serial No. = [GS159-GS255] |
| 1Y-A-32-20-00-00A-240A-A | Nose landing gear | Visual examination and lubrication of contacting surface | Every 15 FH | All |
| 1Y-A-32-43-10-00A-240A-A | Wheel brake units (LH and RH) | Ensure heat pack rotors are free to rotate | | All |
| 1Y-A-32-60-10-00A-271A-A | Position and warning | Position and warning Examinations, tests and checks | | Serial No. = [GS004-GS158] |
| 1Y-A-32-60-10-00B-271A-A | Position and warning | Position and warning Examinations, tests and checks | | Serial No. = [GS159-GS255] |

### 2.4.10 Related task

This identifies a related Scheduled Maintenance Task, which is related to a specific Scheduled Maintenance Task. These relationships are not mandatory but provide an opportunity to gain economic advantage. A specific description attribute `relatedTaskDescr`, as defined in Table 5 indicates the relationship of one task to another task.

*Table 5 Task relationship codes*

| Code | Description | Definition |
|---|---|---|
| A | After | Perform maintenance requirement AFTER related requirement is started. |
| B | Before | Perform maintenance requirement BEFORE related requirement. |

| Code | Description | Definition |
|---|---|---|
| C | Complied | Maintenance requirement is COMPLIED by related requirement. |
| F | Finished | Cannot finish maintenance requirement until related requirement is FINISHED. |
| P | Precludes | Maintenance requirement PRECLUDES related requirement. |
| S | Started | Cannot finish maintenance requirement until related requirement is STARTED. |
| W | With | Perform maintenance requirement WITH related requirement. |

## 2.5 Scheduled and unscheduled checks

There must be one data module for each check. Each data module must consist of two parts. One containing information about the specific check and another containing a list of maintenance/inspection tasks (refer to Para 2.6) that are carried out during this check.

Each data module contains the following information:

### 2.5.1 Limit

Time, cycles or event after which the check has to be made. A value of the attribute `limitTypeValue` giving the limit type is added. The attribute values must be selected from:

- "PO" = Perform once
- "OC" = On condition
- "PE" = Perform periodically

### 2.5.2 Remarks

Remarks about the check described.

### 2.5.3 Requirement source

Requirement source gives the source from which the requirement derives. Refer to Chap 3.9.5.2.5.

### 2.5.4 Remarks

Gives notes and descriptions that apply to the task. Refer to Chap 3.9.5.2.5.

### 2.5.5 Equipment information

Gives a statement of the equipment associated with the task. For structural items that do not have an equipment number, give the equipment name. Refer to Chap 3.9.5.2.5.

### 2.5.6 List of maintenance/inspection tasks

Each data module contains a list of tasks that are necessary for this check.

- Each line entry is built up from the items defined below.
- Each item is filled up as necessary in accordance with the description given.
- Only one value is given for each item. If items are subject to various values, as many line entries as values are provided.

#### 2.5.6.1 Reference

A reference to a data module or the publication that describes the maintenance/inspection task.

2.5.6.2 Task
A short description of the actions to be made for this task. This item is only used if no limit data from task definitions is available.

2.5.6.3 Applicability
For applicability attributes refer to Chap 3.9.5.3. The applicability annotation is given to the whole line entry. Applicability in Check definitions need not to be the same as those in Maintenance/Inspection tasks.

## 2.6 Acceptance and pre-operational checks/acceptance and functional check flight for air vehicles

This section consists of data modules containing information on conditions and criteria for preoperational checks/acceptance check flights. The data modules only contain references to the description of the specific preoperational checks/acceptance check flights. The description of the check/check flight itself, are not be contained in these data modules.

Data concerning preoperational checks/check flights are treated in the same way as those of other maintenance actions as described in Para 2.4 and Para 2.5 (eg a preoperational check/acceptance check flight could be a check or one task of a check).

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of category**. The project or the organization must define the categories. Refer to Para 2.3.3.

**Use of supervise**. The project or the organization must define coding of different entries. Refer to Para 2.4.7.

# 4 Example

Utopia Ministry of Defence **UNCLASSIFIED** **1B–A/AMSP–00–P**

## 1 Preflight inspection

**Limit**: Prior flight.

The preflight inspection is carried out prior to the first fligth of a day or any subsequent flights of the day if a turnaround has not been carried out. It includes those requirements that are subject to damage by outside forces (ground equipment, servicing crews etc). Items that require servicing or need for verification of servicing such as replenishments are included.

*Table 1*

| Reference (DMC) | Task | Applicability |
|---|---|---|
| 1B–A–10–23–43–00A–300A–A | Check safety pins MLG | All |
| 1B–A–10–23–43–00A–300A–A | Check safety pins MLG doors | All |
| 1B–A–32–43–14–00A–100A–A | Wheel brake on | All |
| 1B–A–27–15–10–00A–300A–A | | Serial No. = (GS144–GS255), (GT032–GT068) |
| ..... | | |

Effectivity: All **End of data module** **1B–A–05–40–00–09A–000A–A**

**UNCLASSIFIED** **1998–01–02 Page 1**

ICN-AE-A-050201-A-D0216-00068-A-001-01

*Fig 1 Check definitions - Example*

# Chapter 5.2.1.7

## *Common information sets - Mass and balance information*

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*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product Mass and Balance (MB) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to the Product Mass and balance which will enable skilled maintenance personnel to control the mass and balance of the air vehicle or sea system. The MB information must contain the following topics:

- leveling and weighing - General
- mass and balance
- leveling/trimming
- weighing
- mass and center of gravity data
- standards and definitions
- standards

# 2 Mass and balance information

## 2.1 Introduction

The standards and definitions given in this specification are applicable with no exceptions.

## 2.2 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-A-08-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.3 Leveling and weighing - General

### 2.3.1 Charts, forms and records

These data modules must provide examples of charts, forms and records used for mass and balance. The following list gives a number of data modules which can be developed to record mass and balance data:

- record of mass and balance personnel
- basic mass checklist record
- weighing record
- basic mass and balance record
- loading data
- mass and balance clearance form/mass and balance manifest

Data modules must be coded:

YY-A-08-00-1Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-00-1Y00-00AAA-000A-A (37 characters)

### 2.3.2 Mass and balance computers/Automated systems

These data modules must provide information about computer programs used for generation of mass and balance data, in lieu of the traditional mass and balance load adjusting and forms used to record the actual mass and balance status of an air vehicle or sea system, which ensures that mass and center of gravity are within limits during all stages of operation.

They must include, but are not limited to, the following elements:

- objective
- calculations
- software
- program changes
- ease of operation
- computational requirements
- accuracy
- authority for use
- instruction book
- computer use restrictions
- hardware requirements

Data modules must be coded:

YY-A-08-00-2Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-00-2Y00-00AAA-000A-A (37 characters)

## 2.4 Mass and balance

### 2.4.1 Principles

These data modules must discuss the principal elements which are important in controlling the platform during the several stages of handling (eg maintenance, loading, taxiing, flying).

The elements are:

- mass
- balance
- mass and balance effects
- mass and balance control
- performance effects

Data modules must be coded:

YY-A-08-10-1Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-10-1Y00-00AAA-000A-A (37 characters)

### 2.4.2 Control (management)

These data modules must discuss all elements which are required in the mass and balance management of an air vehicle or sea system. The requirements, procedures (and responsibilities) relative to the Product's mass and balance control system must be defined. The overall objectives of such a mass and balance control system is to provide current and correct information regarding the Product basic mass and moment and to maintain the Product mass and center of gravity within permissible limits during all stages of handling (maintenance, loading, taxiing/flying/sailing).

Such a system must include, but is not limited to, the following elements:

- mass and balance classes
- mass and balance publications
- mass and balance flight clearance
- weighing requirements (not the weighing itself)
- mass and balance charts and forms
- ballast statements

Data modules must be coded:

YY-A-08-10-2Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-10-2Y00-00AAA-000A-A (37 characters)

## 2.5 Leveling the Product

These data modules must give all the information required for the leveling/trimming of the platform.

Data modules must be coded:

YY-A-08-20-0Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-20-0Y00-00AAA-000A-A (37 characters)

## 2.6 Weighing the Product

### 2.6.1 Weighing

These data modules must give all the information required for the weighing of the Product and must include, but are not limited to, the following elements:

- weighing equipment
- weighing accessories
- weighing procedures
- dimensions required for the center of gravity location
- projection of points on the hangar floor (air vehicles)
- taking measurement
- recording mass and dimensions
- verifying of weighing results
- weighing checklist

Data modules must be coded:

YY-A-08-30-1Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-30-1Y00-00AAA-000A-A (37 characters)

### 2.6.2 Product reports

These data modules deal with all data special to one air vehicle or sea system. The form and style of the report can be free or specified by the project and will be made by the contractor as part of the Product delivery documents. The following data will be given:

- make, model, serial and registration identification
- actual date of weighing
- diagram identifying the Product divisions used in the breakdown of the equipment list
- record of certification weighing and all subsequent adjustments up to the time of delivery
- delivery departure mass and balance clearance form/manifest
- list of equipment and fluids to define the Product configuration, positive identification and cross-reference to the SNS, the mass and balance arm of each item
- the Product configuration clearly defined using a check (X) for each listed item in the Product and a check (0) for each listed item not present in the Product

Data modules must be coded:

YY-A-08-30-2Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-30-2Y00-00AAA-000A-A (37 characters)

## 2.7 Mass and center of gravity data

### 2.7.1 Center of gravity loading calculations

These data modules must describe the principles and calculations involved in:

- calculating the most forward and most aft center of gravity conditions for a particular Product mission (within permissible limits)
- determining appropriate methods of correction for a mission whose center of gravity is found to be outside of the allowable limits

They must include, but are not limited to, the following elements:

- lateral and vertical center of gravity
- loading principles
- loading data
- most forward and most aft center of gravity calculations

Data modules must be coded:

YY-A-08-40-1Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-40-1Y00-00AAA-000A-A (37 characters)

### 2.7.2 Load adjuster

These data modules must provide information about the load adjuster which is used to enable a pilot/crew, mechanic or loading personnel to direct load and control the center of gravity location of the particular Product.

They must include, but are not limited to, the following elements:

- description of the several types of load adjusters
- loading range
- load adjuster index
- loading scales
- using the loading scales

These data modules must also include a fully worked out example of a loading problem using the load adjuster.

Data modules must be coded:

YY-A-08-40-2Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-40-2Y00-00AAA-000A-A (37 characters)

### 2.7.3 Vector diagram

- determine if the mass and center of gravity are within the allowable limits
- record the mass and center of gravity changes which occur during flight/sail
- provide center of gravity controls which produce a desired center of gravity
- provide the user with a better understanding of center of gravity changes

They must include, but are not limited to, the following elements:

- description
- diagram construction
- diagram use

These data modules must also include a fully worked out example of a vector diagram.

Data modules must be coded:

YY-A-08-40-3Y-00A-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y08-40-3Y00-00AAA-000A-A (37 characters)

# Chapter 5.2.1.8

## *Common information sets - Recovery information*

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| Chap 5.2.1.14 | Common information sets - Battle damage assessment and repair information |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Recovery (R) information.

## 1.2 Scope

it covers the rules for the preparation of information applicable to recovery to enable skilled maintenance personnel to recover the Product. The R information must contain the following topics:

- introduction
- survey and preparation
- stabilizing/lifting the Product
- moving the Product
- support and recovery equipment

## 1.3 Standards and definitions

The standards and definitions given in this cahpter are applicable with no exceptions.

# 2 Recovery information

## 2.1 General

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

It must include references to general the Product data and characteristics, such as type of Product, mass, etc and cover, but is not limited to, the following contents:

- dimensions
- ground clearances
- jacking/lifting points
- station diagrams
- servicing point locations
- fuel tanks positions
- arrangements of payload/weapons/external stores
- strong points locations
- landing gear footprint dimension

Data modules must be coded:

YY-A-07-00-00-00A-018A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-0000-00AAA-018A-A (37 characters)

## 2.2 Survey and preparation

### 2.2.1 General and quick reference checklist

These data modules must contain the necessary administrative activities, which must be done before, or in sequence, with the recovery operation.

Data modules must be coded:

YY-A-07-4Y-YY-NNA-XXXA-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-4Y-YYYY-NNAAA-XXXA-A (37 characters)

where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed. "XXX" is set to either 121 or 125 for before, or in sequence with the recovery operation.

The information code variant is used to distinguish between the different Information sets.

### 2.2.2 Preliminary examination

These data modules must include information on how to do the initial survey of the Product damage. They must also include data on the Product structural condition, the ground condition of the crash site and their influence on the approach to the recovery problem.

Data modules must be coded:

YY-A-07-4Y-YY-00A-311A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-4Y-YYYY-00AAA-311A-A (37 characters)

### 2.2.3 Damage control and safety procedures

These data modules must contain the necessary data to avoid injury to persons or additional Product damage while the recovery procedures are done. This data must cover, but is not limited to, the following actions:

- To drain all the hazardous fluids (for air vehicles data modules must be coded YY-A-12-10-YY-00A-220A-A)
- To de-arm canopies, ejection seats, miniature detonating cords, capsules, crash recorders, etc (for air vehicles data modules must be coded YY-A-95-YY-YY-00A-500A-A)
- To release all gas and hydraulic fluid pressures (for air vehicles data modules must be coded YY-A-12-10-YY-00A-220A-A)
- To disconnect and remove batteries (for air vehicles data module must be coded YY-A-24-YY-YY-00A-500A-A)

References to applicable data modules or data in the maintenance information set must be made wherever possible. Refer to Chap 5.2.1.14.

### 2.2.4 Mass and center of gravity

These data modules must include charts giving the changes on the mass, the moment arm and the center of gravity of the Product, while payload (eg cargo air vehicles), weapons/external stores (eg military air vehicles) and/or fuel are removed. Lists with the mass of all the primary removable components must also be included. References to applicable data modules or data in the maintenance or mass and balance information sets must be made wherever possible. Refer to Chap 5.2.1.3 and Chap 5.2.1.7.

Data module must be coded:

YY-A-08-40-YY-00A-050A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y08-40-YYYY-00AAA-050A-A (37 characters)

### 2.2.5 Removal of payload, weapons and external stores

These data modules must contain data on the normal and manual opening of the cargo door, the removal of payload for different configurations and type of payload etc. For military Products, warnings on the handling of weapons/external stores and procedures for removal must also be included. Wherever possible, references to the data modules of the weapon loading or cargo loading information set must be made. Refer to Chap 5.2.1.10 or Chap 5.2.1.11.

Data modules must be coded:

YY-A-94-10-YY-00A-520A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y94-10-YYYY-00AAA-520A-A (37 characters)

### 2.2.6 De-fueling

These data modules must contain illustrated de-fueling procedures (under probable circumstances), including abnormal Product attitudes, with or without the Product electrical power and for air vehicles from over-wing. All special adapters required must be listed. Fuel which cannot be removed due to various Product recovery attitudes must be listed. Cross-references to data modules of the maintenance information set must be made wherever possible. Refer to Chap 5.2.1.3.1.

Data modules must be coded:

YY-A-12-10-YY-00A-221A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y12-10-YYYY-00AAA-221A-A (37 characters)

### 2.2.7 Removal of primary components

These data modules must contain the removal procedures for any primary components which are not covered by data modules of the maintenance information set. The removal of all other primary components must be cross-referred to the appropriate data modules in the maintenance, information set. Refer to Chap 5.2.1.3.1.

Data modules must be coded:

YY-A-YY-YY-YY-00A-520A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-00AAA-520A-A (37 characters)

## 2.3 Stabilizing/lifting the Product

### 2.3.1 General

If necessary, all general data must be included in these data modules.

Data modules must be coded:

YY-A-07-00-YY-00A-010A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-YYYY-00AAA-010A-A (37 characters)

**2.3.2 Preparation**

These data modules must contain lists of all the special equipment (ie steel-plates, air bags, etc) and data on such things as build-up between the air bags and the structure/surface etc.

Data modules must be coded:

YY-A-07-00-YY-00A-070A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-YYYY-00AAA-070A-A (37 characters)

**2.3.3 Stabilizing procedures**

These data modules must contain data on the procedures which can be used to stabilize the Product to prevent unwanted movement during the recovery procedures.

Illustrations/tables showing the effects of the prevailing winds on the Product during the recovery must also be included.

If necessary, other data such as the tensile strength of the cables for adequate restraint must be included.

Data modules must be coded:

YY-A-07-10-YY-00A-100A-A

and

YY-A-07-20-YY-00A-100A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-10-YYYY-00AAA-100A-A (37 characters)

and

YYYYYYYYYYYYYY-YYYY-Y07-20-YYYY-00AAA-100A-A (37 characters)

**2.3.4 Lifting the damaged Product**

These data modules must include methods and procedures to:

- lift the Product
- position the vehicle on lifting jacks (for air vehicles so that either the landing gear can be lowered or other means used to move the air vehicle)
- davit lifting
- vehicle slinging

For air vehicles the following damaged or collapsed landing gear cases must be considered:

- nose landing gear damaged or collapsed
- one main landing gear damaged or collapsed
- nose landing gear and one main landing gear damaged or collapsed
- all main landing gear damaged or collapsed
- nose and all main landing gear damaged or collapsed
- others (ie air vehicle inverted)

Data modules must be coded:

YY-A-07-30-YY-00A-100A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-30-YYYY-00AAA-100A-A (37 characters)

## 2.4 Moving the Product

### 2.4.1 General preparation

These data modules must list all special equipment or material required to move the Product.

Data modules must be coded:

YY-A-07-40-YY-00A-061A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-40-YYYY-00AAA-061A-A (37 characters)

### 2.4.2 Towing, winching and dragging-off in abnormal conditions

These data modules must contain the procedures on how to attach cables and ropes. Illustrations must be given of the maximum forces permitted to apply to a landing gear or other attaching points. Towing, winching and dragging-off procedures must also be given unless they can be cross-referred to data modules in the maintenance information set. Refer to Chap 5.2.1.3.1.

Data modules must be coded:

YY-A-07-40-YY-00A-100A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-40-YYYY-00AAA-100A-A (37 characters)

### 2.4.3 Transportation of the damaged Product

These data modules must include data on:

- preparing the Product for transportation
- transporting an air vehicle when landing gears are unserviceable (using flatbeds, transportation sledges, pallets, etc)
- preserving the systems/primary components for shipping
- packing of components into shipping containers
- how to make shipping containers including illustrations

Cross-references to data modules in the storage information set must be made wherever possible. Refer to Chap 5.2.1.3.5.

Data modules must be coded:

YY-A-07-50-YY-00A-100A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-50-YYYY-00AAA-100A-A (37 characters)

## 2.5 Support and general recovering equipment

### 2.5.1 General

These data modules must include data applicable to support and general recovering equipment.

Data modules must be coded:

YY-A-07-00-YY-00A-060A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-YYYY-00AAA-060A-A (37 characters)

**2.5.2 Special-to-type support equipment**

These data modules must list all the special-to-type support equipment and recovering equipment for the particular Product.

Data modules must be coded:

YY-A-07-00-YY-00A-061A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-YYYY-00AAA-061A-A (37 characters)

**2.5.3 General support and recovering equipment**

These data modules must list all the general support and recovering equipment normally required during the recovery operations.

Data modules must be coded:

YY-A-07-00-YY-00A-062A-A (17 characters)

or

YYYYYYYYYYYYYY-YYYY-Y07-00-YYYY-00AAA-062A-A (37 characters)

# Chapter 5.2.1.9

## *Common information sets - Equipment information*

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| Chap 5.2.1.17 | Common information sets - Material data |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for:

- Support Equipment (SE) information
- Training Equipment (TE) information
- Component Maintenance (CM) information

## 1.2 Scope

It covers the rules for the preparation of information applicable to:

- SE and TE which will enable skilled personnel to prepare, operate and maintain them
- components which will enable skilled personnel to maintain components removed from the Product

CM information is also applicable for maintaining components removed from SE or TE when the project or the organization decides not to include the maintenance of the components in SE or TE information sets.

## 1.3 Standards

The standards given in this chapter are applicable with no exceptions.

## 1.4 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate.

Lists of consumables and material: Lists cover several data modules. They must contain for each item the following elements (refer to Fig 2):

- the code number of the item
- its supplier code (part number and its manufacturer code)
- its description

Reference to the material data information (refer to Chap 5.2.1.17) for dangerous items must be given under the heading "Remarks".

**Note**

If these lists cover only one data module, they are provided in the data modules content Para.

Lists of special SE, tools and software: Lists covering several data modules. They must contain for each item the following elements (refer to Fig 3):

- the code number of the item
- its part number and its manufacturer code
- its description

For special items locally made, the mention "locally made" must be indicated under the heading of the list "Remarks".

**Note**

If these lists cover only one data module, they are provided in the data module content Para.

Lists of standard SE and tools: Lists covering several data modules. They must contain for each item the following elements (refer to Fig 4):

- the code number of the item
- its description
- its characteristics (so as the operator can select and use the most appropriate equipment)

They can be divided into nature of items, such as:

- tools
- test and calibration equipment

**Note**

If these lists cover only one data module, they are provided in the data module content Para.

- Major part: Significant item, part, sub-assembly or assembly to which a disassembly code and variant are given.
- Part Identifier (PI): Code defined by the manufacturer identifying an item in a procedure and on the relevant figures (call-out). To have an easier reading of the procedures, it is recommended to give the PI a group of numbers (eg rotables PI 300, expendables PI 600). If major parts are listed, their PI must be the disassembly code and it's variant.
- Parts list: List covering several data modules. It provides the user with information on items (eg parts, subassemblies, collections of associated parts) which are identified in the procedures.

The parts list (refer to Fig 5) must indicate for each item:

- the PI
- its part number and its manufacturer code

– its description

Additional information defined by the project or the organization can be provided as required under the heading "Remarks" (eg modification number applicable to the item).

Parts lists can be supported by illustrations as required. Each item must be identified on the illustration by its PI.

**Note**

If these lists cover only one data module, they are provided in the data module content Para.

Utopia Ministry of Defence

CLASSIFICATION

| STEP | PROCEDURE |
|---|---|
| 100 | HOW TO PREPARE THE REAR COVER ASSY FOR INSTALLATION (Fig. 1) |
| 101 | Remove the protection sleeves (M0307) from the bearings. |
| 102 | Apply CODEX P23 petrolatum (P0167) on the rollers. |
| 103 | Push the rollers in the operation position. |
| 104 | Apply grade-M HYLOMAR SQ32 sealing compound (P0219) on the mating surfaces of the housing assy (19) and of the rear cover assy (18). |
| 105 | Install 4 pins (M0351) (Ref. No. B) in the housing. |
| 106 | Install the lubricating nozzle (32) in the housing. |
| 107 | Install the preformed packing (615) on the flange of the lubricating nozzle. |
| | NOTE : Make sure you do not put sealing compound on the lubricating nozzle. |
| 200 | INSTALLATION OF THE REAR COVER ASSY ON THE HOUSING ASSY (Fig. 2) |
| 201 | CAUTION : MAKE SURE YOU DO NOT CAUSE DAMAGE TO THE ROLLERS. |
| | Put the rear cover (18) on the housing. |
| 202 | Slowly lower the rear cover. Make sure the gears engage correctly with the roller bearings. |
| 203 | Remove the 4 pins (M0351). |
| 204 | Install 48 bolts (312) and 48 washers (313). |
| 205 | Install 4 bolts (314) and 4 washers (315). |
| 206 | Torque the 52 bolts to 5 N.m, in a cross pattern. |

Effectivity: All

CLASSIFICATION

ICN-AE-A-050201-A-D0216-00013-A-01-1

*Fig 1 Job instruction - Example*

Utopia Ministry of Defence | Unclassified | TA-KO387-00405-00-P

## Hydraulic test stand BBKing

### *Lists of consumables and materiel*

*Table 1 List of consumables and materiel*

| Code | Supplier code | Name | Remarks |
|---|---|---|---|
| P0167 | F3512 | SF3 Diluants | Refer to DSM |
| P0219 | FA268 | Hymolar AO32M | |

Effectivity: All | TA-A-00-00-00-00A-901A-A

**End of data module**

Unclassified | 2006-10-02 Page 1

ICN-AE-A-050201-G-S3627-00399-A-01-1

*Fig 2 List of consumables and material - Example*

Utopia Ministry of Defence | Unclassified | TA-KO387-00405-00-P

## Hydraulic test stand BBKing

### *Lists of special SE, tools and software*

*Table 1 List of special SE, tools and software*

| Code | Manufacturer code | Part number | Name |
|---|---|---|---|
| M0351 | F0301 | 853-202-050-0 | Fitting guide and tooling bolts |
| M0307 | F0301 | 853-200-799-0 | Bearing protective bushing |
| M0364 | F0301 | 853-202-239-0 | Guide pin |

Effectivity: All | TA-A-00-00-00-00A-904A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-AE-A-050201-G-S3627-00400-A-01-1

*Fig 3 List of special SE, tools and software - Example*

Utopia Ministry of Defence | Unclassified | TA-KO387-00405-00-P

## Hydraulic test stand BBKing

### *Lists of standard SE and tools*

*Table 1 List of standard SE and tools*

| Code | Name | Characteristics |
|---|---|---|
| E0207 | AC motor | Power supply: 115 V, 400 Hz<br>No-load: 9500 rpm<br>Starting torque: 160 cm/dN min |
| E0227 | Stabilized DC power supply unit | DC output voltage adjustable from 0 to 32 V<br>Max output; 0,5 A<br>Stability with respect to supply voltage +/- 2 mV for supply variation of + 10 %.<br>Stability with respect to temperature +/- 1 mV/ºC from -10 to 60 ºC. |

Effectivity: All | TA-A-00-00-00-00A-905A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-AE-A-050201-G-S3627-00401-A-01-1

*Fig 4 List of standard SE and tools - Example*

Utopia Ministry of Defence | Unclassified | TA-KO387-00405-00-P

## Hydraulic test stand BBKing

### *Parts list*

*Table 1 Parts list*

| Part identifier | Manufacturer code | Part number | Name | Remarks |
|---|---|---|---|---|
| 01A | F0301 | 301-150-100-0 | Accessory gearbox | |
| 02A | F0301 | 303-152-102-0 | Cover | |
| 02B | F0301 | 303-152-103-0 | Cover | Mod 021 |
| 03A | F0301 | 303-158-001-0 | Tensioner attaching part | |
| 04A | F0301 | 303-158-201-0 | Flange | |
| 05A | F0301 | 303-158-101-0 | Ring assy, outer | |
| 06A | F0301 | 303-074-304-0 | Clamp | |
| 07A | F0301 | 303-147-002-0 | Housing, seal | |
| 08A | F0562 | 801157 | Seal, mechanical | |
| 32A | F0301 | 303-147-601-0 | Lubricant nozzle | |
| 301A | F0111 | 22237CM060028 | Bolt, drilled double hexag head | |
| 302A | F0301 | 650-341-013-0 | Washer, flat | |
| 304A | F0301 | 303-156-301-0 | Spacer | |
| 308A | F0301 | 303-075-401-0 | Sleeve, spacer | |
| 601A | F0301 | 650-391-061-0 | Packing, performed | |
| 602A | F0301 | 650-788-035-0 | Packing, performed | |
| 603A | F0301 | 650-391-051-0 | Packing, performed | |
| 603B | F0301 | 650-391-051-0 | Packing, performed | Mod 3-18 |
| 604A | F0301 | 650-391-070-0 | Packing, performed | |
| 615A | F0301 | 650-391-019-0 | Packing, performed | |
| 654A | F0301 | 650-788-026-0 | Packing, performed | |
| 657A | F0301 | 303-753-700-0 | Ring | |

Effectivity: All | TA-A-00-00-00-00A-907A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-AE-A-050201-G-S3627-00402-A-01-1

*Fig 5 Parts list - Example*

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| DOCUMENT No | DESIGNATION OF OPERATIONS |
|---|---|
| C2-A-72-63-00-00A-061D-C | LIST OF SPECIAL TOOLS - INSPECTION |
| C2-A-72-63-00-00A-061F-C | LIST OF SPECIAL TOOLS - ASSEMBLY |
| C2-A-72-63-30-00A-700A-C | INSTALLATION OF THE FRONT COVER ASSY |
| C2-A-72-63-20-00A-700A-C | INSTALLATION OF THE HOUSING ASSY AND FRONT COVER ASSY |
| C2-A-72-63-00-18A-720A-C | INSTALLATION OF THE REAR COVER ASSY |
| C2-A-72-63-00-09A-720A-C | INSTALLATION OF THE SPLINED SHAFTS IN THE GEARSHAFTS |
| C2-A-72-63-00-20A-720A-C | INSTALLATION OF THE MECHANICAL SEAL (23) ON THE GEARSHAFT No. 5 (1) |
| C2-A-72-63-00-30A-720A-C | INSTALLATION OF THE OIL MANIFOLD (25), THE LUBRICATING NOZZLE (28) AND THE OIL DRAIN FITTING ADAPTER (24) |
| C2-A-72-63-00-01A-720A-C | INSTALLATION OF EQUIPMENT PARTS ON THE ACCESSORY GEARBOX |
| C2-A-72-63-00-00A-333A-C | INSTALLATION OF THE ACCESSORY GEARBOX ON THE BENCH BEFORE THE TEST |
| C2-A-72-63-00-00A-363A-C | LAST CHECK OF THE TOTAL FLOW RATE AND OF THE NOZZLE OIL JETS |
| C2-A-72-63-00-00A-334A-C | REMOVAL OF THE ACCESSORY GEARBOX FROM THE BENCH AFTER THE TEST |
| C2-A-72-63-00-00A-364A-C | AIR LEAK CHECK |
| C2-A-72-63-00-31A-720A-C | LAST INSTALLATION PROCEDURE (2) |
| C2-A-72-63-00-00A-031C-C | INSPECTION FOLLOW-UP SHEET |
| | REFERENCED DOCUMENTS : |
| C2-A-72-63-00-21A-655A-C | (1) ADJUSTMENT OF THE SHIM (21) TO THICKNESS E3 (3) (4) (5) (6) (7) |

Effectivity: All

CLASSIFICATION

ICN-AE-A-050201-A-D0216-00018-A-01-1

*Fig 6 Work sheet - Example*

# 2 Equipment information

## 2.1 General

The complete sets of SE, TE and CM data modules are specified in Para 2.2, Technical content, and subsequent paragraphs.

The complete set of CM data modules is specified in Para 2.2, Technical content, and subsequent paragraphs, Para 2.4 Operation excluded.

## 2.2 Technical content

### 2.2.1 General requirements

The technical content provides three categories of information:

- Technical data and descriptions (refer to Para 2.3)
- Operation (refer to Para 2.4)
- Maintenance (refer to Para 2.5)

### 2.2.2 Introduction

The introduction data modules must contain an explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They are also to contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-YY-YY-YY-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

### 2.2.3 Data module coding

To assist in the codification of data modules, information codes are given and supplemented by additional specific requirements and/or explanations in subsequent paragraphs in addition to the rules given in Chap 4.3.

## 2.3 Technical data and descriptions

### 2.3.1 Technical data

These data modules contain a brief outline of the nature of the item. They also provide all special or important physical, electrical/electronic, mechanical and operational characteristics and performances. These characteristics and performances must be supported by illustrations as required.

Critical values and special precautions must be provided.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-030A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-030A-Z (37 characters)

### 2.3.2 Description of how it is made and its function

These data modules contain a description of how an item is made and its function when the item requires limited information.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-040A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-040A-Z (37 characters)

**2.3.3 Description of how it is made**

These data modules provide the user with the means of becoming familiar with the item and of locating the main assemblies, modules, components or parts complying with the maintenance concept applied in the procedures.

For CM, the location of a component in the system where it is installed is not be mentioned.

Attention must be drawn to manufacturing or adjustment procedures, (eg rotation in one direction only).

Illustrations must support the description so as to simplify, shorten or make it easier to understand. They describe the main elements and parts which have a particular importance.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-041A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-041A-Z (37 characters)

**2.3.4 Description of function**

These data modules provide the user with information and data to explain the functions of

- a SE or a TE as a whole
- assemblies, components, etc

The description of function is not provide "how to operate an item".

For a SE or a TE, "how to operate it" is given in Para 2.4.3 "Operation procedures".

The function must be described accurately and, whenever possible, illustrated with any of the following functional diagrams and/or lists enabling the user to understand and follow the fault isolation procedures:

- Block diagram used to simplify complex circuits to facilitate failure isolation. It allows understanding the function and operation of the system, subsystem, etc. It shows the arrangement of the system components and current/signal flow through the system. The test and measurement points as well as terminal points mentioned in the procedures must be represented.
- Schematic diagram which can replace block diagram for simple items or complete it for complex items when required. In the latter case, references must enable to cross-refer easily from the block diagram to the schematic diagram and vice versa.
- Wiring diagram provided to identify the terminal points, interconnections and components in order to easily detect any failure in the item.
- List of all wires shown on a wiring diagram for complex components. It must be arranged in termination order and give the following information: pin number (whether used or not), wire number, reference of the wiring diagram on which they appear, to-from routine and effectivity. Unused and spare wires must be identified.
- Circuit diagram for visual identification of components on the item.

All input/output signals must be identified.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-042A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-042A-Z (37 characters)

## 2.4 Operation

Operation is only applicable to SE and TE.

### 2.4.1 Controls and indicators

These data modules describe the effect of operating SE or TE devices.

The information can be arranged by indicators of a same function or by sequential order when operating the item.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-11XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-11XA-Z (37 characters)

### 2.4.2 Pre-operation procedures

These data modules must provide:

- Job Instructions (JI) to pre-operate SE or TE.
- Work Sheets (WS), as required, for the workflow of the instructions necessary to perform pre-operation procedures such as checks, serviceability tests, pre-operations themselves.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-12XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-12XA-Z (37 characters)

### 2.4.3 Operation procedures

These data modules must provide data and information to operate SE or TE.

If automatic and manual operations are applicable to items, both procedures must be given.

Job instructions are only to deal with the devices (switches, pumps, etc) to be actuated during operation. The effect of those devices are described under "Controls and indicator." Refer to Para 2.4.1.

Operation procedures must not include emergency procedures. They must be given in "Emergency procedures." Refer to Para 2.4.4.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-13XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-13XA-Z (37 characters)

### 2.4.4 Emergency procedures

These data modules must provide Job instructions dealing with special controls and switches which must be operated when emergency actions are performed.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-14XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-14XA-Z (37 characters)

### 2.4.5 Post-operation procedures

These data modules provide:

- job instructions to post-operate the SE or TE,
- work sheets, as required, for the workflow of the instructions to perform post-operation procedures such as tests, de-activation of systems (eg pressure release), servicing, checks, post-operations themselves

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-15XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-15XA-Z (37 characters)

## 2.5 Maintenance

All the work sheets provided as required are only to define the mandatory workflow to perform the work.

Any other use of the WS in this annex is excluded (eg work management in the workshop).

### 2.5.1 Setting up parts lists

Parts lists (refer to Para 1.4) are set up as required for maintenance procedures and are relative to a given SNS.

Depending on the complexity of the item, the project or the organization will define which level of detail is applicable to the SNS. An example of setting-up parts lists is given hereafter.

Example 1:

Coding of a parts list for a simple component:

- Component AV-A-29-12-00-00A-000A-Z
- Parts list AV-A-29-12-00-00A-075A-Z

Example 2:

Coding of parts lists for a complex component, a hydraulic test stand and each of its sub-assemblies:

- Hydraulic test stand T5-A-BC-01-00-00A-000A-A
- Parts list T5-A-BC-01-00-00A-075A-A
- Hydraulic pump T5-A-BC-01-02-00A-000A-Z
- Parts list T5-A-BC-01-02-00A-075A-Z
- Alternator T5-A-BC-01-03-00A-000A-Z
- Parts list T5-A-BC-01-03-00A-075A-Z
- etc

### 2.5.2 Setting up other lists

Depending on the volume of the information set and/or the complexity of the environment to apply procedures, the other lists defined in Para 1.4 can be provided in one of the two following types:

- Consolidated lists applicable to the total content of the information set

– Dedicated lists

A dedicated list is set up for a given SNS, except for repair (IC 600) for which procedures are related to individual parts. In this case, lists set up for the IC 600 are applicable to the couple SNS-disassembly code and variant.

Example:

Coding of dedicated lists for special SE and tools required to assemble a hydraulic test stand and each of its sub-assemblies:

– Hydraulic test stand T5-A-BC-01-00-00A-000A-A
– Dedicated list T5-A-BC-01-00-00A-704A-A
– Hydraulic pump T5-A-BC-01-02-00A-000A-Z
– Dedicated list T5-A-BC-01-02-00A-704A-Z
– etc

where, in the information code "704", the Primary Code "7" indicates "Assemble" and "04" the list of Special SE and tools (used when assembling).

### 2.5.3 Servicing

These data modules contain:

– job instructions for the servicing itself
– work sheets, as required, for the workflow of the instructions necessary to perform servicing such as opening of panels for access, filling, checking, operation test

Clean and apply surface protection (IC 250) must provide the methods specific to the items, otherwise refer to standard practices, if any.

Paint and varnish removals must be included in cleaning. Cleaning procedures must take the repairs previously applied to the item into account such as bounded or brazed parts.

**Note**

The following subparagraphs dealing with inspections (IC 280) are not applicable to the CM information set. This information is provided in the Product maintenance planning information set. Refer to Chap 5.2.1.6.

For each item requiring inspection such as the SE or TE itself, their components, assemblies, etc, the following data must be tabled:

– description of the item
– part number
– limit
– Data module code of the procedure to be performed when the limit is reached

Limit must provide:

– the nature of the limit such as life limit, inspection intervals, time limit, shelf life
– the value and the unit (eg 1000 starts, 2 years, 500 running hours, 15000 cycles)
– the tolerance applicable to the limit, as required

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-2XXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-2XXA-A (37 characters)

**2.5.4 Examinations, tests and checks**

2.5.4.1 Visual examinations

These data modules provide the methods specific for examining items. Otherwise, referencing to engine standard practices is the preferred method.

Procedures must provide:

- job instructions for the examination itself such as borescope examination
- work sheets, as required, for the workflow of the instructions necessary to perform examinations such as removal of harnesses or pipes for access, equipment calibration, close-up actions

Based on the results of visual examinations, the following status must be given in the procedure:

- acceptance for continued operation
- complementary checks to be performed in accordance with referenced data modules in the procedure
- repairable in accordance with repair procedures referenced in the procedure
- no longer serviceable or repairable

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-31XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-31XA-Z (37 characters)

2.5.4.2 Operation tests

These data modules must provide:

- procedures and data to check the capability of a SE or a TE to operate correctly before its use or its delivery
- checks and tests when a failure occurs in service

Self standing and performance tests must be provided, such as:

- check for freedom of movement of mechanical actions
- general operations such as actuator stroke length, voltage, current, continuity

The procedures must provide:

- job instructions to perform the tests themselves
- work sheets, as required, for the workflow of the instructions necessary to perform operation tests such as test preparation, removal of parts, etc

Operation tests are generally not to require special tests equipment other than those installed on the item.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-32XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-32XA-Z (37 characters)

2.5.4.3 Test preparation

These data modules contain the procedures and data to be carried out on an item, its assemblies or components before installation/connection on and/or removal from a test bench or a test equipment.

The procedures must provide:

- job instructions for simple tests preparation
- work sheets, as required, for the workflow of the instructions necessary to perform tests preparation such as removal of blanking, checks of connectors, checks of short circuits to avoid damage of the test bench, checks of connections (pneumatic, hydraulic, etc)

If there is more than one test, each individual test must have its own test preparation.

If insulation tests are required, they must precede the function tests.

When test assembly diagrams are required, they must indicate all the standard equipment needed (oscilloscope, flow meter, power supply, etc) with their name or their code given in the list of standard equipment. Refer to Para 1.4.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-33XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-33XA-Z (37 characters)

2.5.4.4 Function tests

These data modules contain tests to evaluate as required the operational efficiency and integrity of an item after maintenance actions.

Function tests must provide:

- job instructions describing the tests and providing acceptance limits
- work sheets, as required, or charts (refer to Fig 7 and Fig 8) for the workflow of the instructions necessary to perform function tests and to close up such as test preparation, calibrating, servicing

Special conditions applicable to the test must be specified and their characteristics given such as climatic conditions, room temperature, relative humidity, dust protection.

If the item requires a complex environment for function tests, dedicated lists must be provided as required, in accordance with Para 2.5.2:

- special SE, tools and software (IC 304)
- standard SE (IC 305)
- consumables and materials (IC 301 and IC 302)

Standard tools are not to be listed. Their use must be mentioned by the sentence "Tools normally used in workshop".

The identifier of standard SE must be mentioned in the test procedure each time they are used.

The various power sources must be indicated with their characteristics and tolerances.

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*Fig 7 Testing - Basic principle (Example)*

ICN-AE-A-050201-A-D0216-00020-A-01-1

*Fig 8 Testing - Example (Sheet 1 of 2)*

ICN-AE-A-050201-A-D0216-00021-A-01-1

*Fig 8 Testing - Example (Sheet 2 of 2)*

2.5.4.5 Structure tests, checks

These data modules contain the detailed procedures needed to determine the status of parts, ie repairable, to be scrapped, serviceable (refer also to visual examination in Para 2.5.4.1).

The different levels of serviceability must be covered where acceptability standards depending on the maintenance process exist.

The procedures must provide:

- job instructions for structure tests or for checks such as dye penetrant test (IC 351), check of an actuator stroke length (IC 361)
- work sheets, as required, for the workflow of the instructions necessary to be performed to check the item

Only procedures specific to the item must be described, otherwise refer to standard practices, if any. Illustrations must be used to indicate critical stress zones, to locate and to identify defects. Defects can be coded and the procedure must refer to these codes whenever those defects are mentioned..

Any systematic or as-required measurements must be located on an illustration as simple as possible for easy reading. If dimensions, tolerances and clearances are coded on the illustration, their values must be given on a separate table.

Permissible in-service/service wear tolerances and clearances must be provided.

Based on the known results of the structure test or of the check, the following status of the item must be given in the procedure:

- acceptance for continued operation
- repairable in accordance with repair procedures which must be referenced in job instructions
- no longer serviceable or repairable

Measurements, clearances and torques which are specific to assembly procedures are not to be mentioned in check procedures but in the relevant content such as ensuring assembly clearance by machining a spacer to length.

Structure tests Data modules must be coded:

YY-Y-YY-YY-YY-YYA-35XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-35XA-Z (37 characters)

Design data/tolerances checks Data modules must be coded:

YY-Y-YY-YY-YY-YYA-36XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-36XA-Z (37 characters)

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*Fig 9 Illustration of defects - Example*

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| Figure | Dimension | Limit (mm) Minimum | Maximum |
|---|---|---|---|
| 506 | DIA A | 11,957 | 11,984 |
| 506 | DIA B | 4,300 | 4,318 |
| 506 | DIA C | 6,965 | 6,987 |
| 506 | DIA D | 13,107 | 13,150 |
| 506 | DIM A | 14,923 | 14,950 |

Figure 506

Effectivity: All

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*Fig 10 Dimensions checks - Table and illustration (Example 1)*

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| Figure | H0 (mm) | H1 (mm) | delta H (mm) | F1 (N) | delta F (N) | X (mm) | Y (mm) |
|---|---|---|---|---|---|---|---|
| 80 | 54,35 | 46 | - | 10±0,5 | - | 0,82 | 1,09 |
| 60 | 32,51 | 25 | - | 10±0,5 | - | 0,48 | 0,65 |

Effectivity: All

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ICN-AE-A-050201-A-D0216-00024-A-01-1

*Fig 11 Dimensions checks - Table and illustrations (Example 2)*

### 2.5.5 Failure isolation procedures

These data modules contain the procedures required to detect presumed malfunctions in the item and to isolate the faulty component or part in order to proceed with its replacement or repair.

Failure isolation must make possible to detect the faulty item in order to:

- remove it without systematic disassembly. However removals can result in the possible disassembly of peripheral parts
- make any adjustments in situ required by repair or replacement of an item
- carry out overall testing of sub-assemblies or items after repair

The content must be written essentially as a function of the following criteria:

- clear specification of values and tolerances applicable to in-service items
- rapid failure isolation in order to minimize the item turn-around time
- limiting of repair work to the absolute minimum

The procedures must be provided in form of Job instructions. They must be arranged in such a manner that they will progressively isolate and identify each assembly, subassembly or parts.

Whenever possible, failure isolation procedures must make maximum use of built-in self-test features and must require a minimum of test equipment and repair tools. If built-in test equipment (BITE) is installed, specific procedures of the BITE ate to be provided and must precede the detailed performance test procedure.

Job instructions are preferably to be presented by flow charts (refer to Fig 12 and Fig 13) except where tabular forms, descriptive language or any combination of these three forms as well as computer language presentation is more appropriate.

A single combined testing and failure isolation is not permissible.

Procedures must be provided using a test point/location method of testing rather than tests used by the manufacturer for item specification approval. These methods must identify the minimum tests points/locations and must indicate the range for input and output parameters such as flow rate, pressures, ratings, voltages, wave shapes, etc, needed to insure the proper functioning and integrity of the item. Time constants to be observed between the application of an input parameter and the measurement of its output or between two steps of the procedures must be clearly indicated.

The choice of the procedure to be used is essentially governed by the design of the item.

Repairs to be done during the failure isolation process must refer to relevant data modules or to standard practices (if any), except if they are simple (eg fuse change). In this case, repair information must be given at the applicable step in the procedure.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-4XXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-4XXA-Z (37 characters)

ICN-AE-A-050201-A-D0216-00025-A-01-1

*Fig 12 Failure isolation - Basic principle*

ICN-AE-A-050201-A-D0216-00026-A-01-1

*Fig 13 Failure isolation - Example (Sheet 1 of 2)*

ICN-AE-A-050201-A-D0216-00027-A-01-1

*Fig 13 Failure isolation - Example (Sheet 2 of 2)*

### 2.5.6 Disconnect, remove and disassemble procedures

These data modules contain:

- job instructions for the disconnection, removal or disassembly itself of a given item. All measurement and/or values that are documented prior to an individual action being performed must be provided in the applicable step in the Job instructions. Matched set must be indicated.
- work sheets, as required, for the workflow of the instructions necessary to gain access with the minimum of disturbance, to disconnect or remove other serviceable items and subsequently remove the given item. No unnecessary actions must be carried out such as opening of permanent joints, unsoldering of connections, etc.

Cleaning of items before any disassembling must be referenced.

Procedures can be supported by illustrations or sequence charts as required.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-5XXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-5XXA-Z (37 characters)

### 2.5.7 Repair and locally make procedures and data

These data modules contain detailed repair processes and data required to restore a worn or damaged part to serviceable conditions.

The process applied to a part is not to change the interchangeability:

- of the repaired part

or

- of the assembly repaired with a repair size part such as a sleeve, a piston in a component.

Each repair must be identified. This identifier is not to be changed or reused. A reference between the identifier and the data module code of the procedure to perform the repair must be provided.

If several repairs are applicable to the same part, a table can be provided to select the sequence of job instructions so that the instructions are not duplicated unnecessarily.

This table must be subject of a data module.

The procedures must provide:

- job instructions for the repair itself of the item. It must include illustrations, drawings, machining specifications, dimensions, etc, as required for carrying out work correctly.
- work sheets, as required, for the workflow of the instructions necessary to perform the repair.

Only procedures specific to the item must be provided, otherwise, refer to standard practices, if any.

Repair parts must be listed in the parts list set up in accordance with Chap 3.9.5.2.7. The procedure must refer to the Parts Identifiers (PI) whenever those parts are mentioned.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-6XXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-6XXA-Z (37 characters)

Where "6XX", the information codes from 610 thru 659.

Procedures must state where repaired parts must be marked.

"How to mark" on the repaired parts must be included in the procedure for simple marking, otherwise it must refer to relevant data modules or standard practices, if any.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-691A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-691A-Z (37 characters)

If parts can be locally manufactured, procedures must provide all dimensional data, materials, processing and QA data.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-670A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-670A-Z (37 characters)

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| DOCUMENT No. | PROCESS APPLICABILITY CASE No. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
| C2-A-73-21-03-03Y-628A-C (1) | X | | | | | | | | | | | | | | |
| C2-A-73-21-03-03Y-624A-C (2) | | X | | | | | | | | | | | | | |
| C2-A-73-21-03-03Y-624B-C (3) | X | X | | | | | | | | | | | | | |

REFERENCED DOCUMENTS :

(1) C2-A-70-00-57-120-000A-C

(2) C2-A-70-00-56-140-000A-C

(3) C2-A-70-00-53-150-000A-C

Effectivity: All

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*Fig 14 Repair table - Example*

**2.5.8 Assemble, install and connect procedures**

These data modules must provide:

- job instructions for the assembly, installation or connection itself of the item
- work sheets, as required, for the workflow of the instructions necessary to have the desired assembled, installed or connected item such as checks, assembling, storage fluid replacement, closing up areas opened to get access

Assembly fits and clearances, adjustments and torque values must be given in the applicable steps. Matched set must be detailed.

Procedures must be supported by illustrations or flow charts as required.

If the use of special tools is not self-explanatory, data modules must provide data and information for their utilization.

Only special locking procedures must be described. They must be provided at the applicable step. However, if an item requires complex or numerous locking operations, a separate procedure could be given in accordance with Para 2.5.9 Locking procedure. In this case, reference to this relevant locking procedure must be made in the assembly procedure.

Calibration or tests which cannot be performed after final assembly or which are easier to perform during assembly must be given at the applicable step.

Steps which are not to be accomplished:

- until after testing
- until after item installation on the SE, TE or Product

must be clearly indicated.

Instructions to put on a tag on the item specifying the incompletion of the tasks must be mentioned in the procedure.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-7XXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-7XXA-Z (37 characters)

**2.5.9 Locking procedures**

These data modules are applicable to items requiring complex or numerous locking operations.

Job instructions must provide step-by-step instructions necessary to secure that each part is locked on the item.

Illustrations must be provided to allow the user to visually identify the parts to be locked. Each part must be listed. This list must enable the user to record that each locking operation has been correctly carried out (eg signature, stamp).

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-712A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-712A-Z (37 characters)

**2.5.10 Storage procedures and data**

These data modules must provide:

- job instructions for the storage and the removal of storage itself of an item
- work sheets, as required, for the workflow of the instructions necessary to perform the work

The procedures must provide the detailed instructions:

- to apply preservation when packing an item and to remove this preservation when unpacking it such as wrapping, blanking, consumable spraying. Data and instructions relative to air pressurization, humidity, temperature control, etc, must be provided.

2.5.10.1 Applying preservation packing
Data modules must be coded:

YY-Y-YY-YY-YY-YYA-81XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-81XA-Z (37 characters)

2.5.10.2 Removing preservation packing
Data modules must be coded:

YY-Y-YY-YY-YY-YYA-82XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-82XA-Z (37 characters)

2.5.10.3 Putting an item in a container
Data modules must be coded:

YY-Y-YY-YY-YY-YYA-830A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-830A-Z (37 characters)

2.5.10.4 Removing an item from a container
Data modules must be coded:

YY-Y-YY-YY-YY-YYA-840A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-840A-Z (37 characters)

2.5.10.5 Extending the shelf lives
Data modules must be coded:

YY-Y-YY-YY-YY-YYA-85XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-85XA-Z (37 characters)

2.5.10.6 Transporting items installed in containers
Only special handling must be provided

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-86XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-86XA-Z (37 characters)

2.5.10.7 Preparation of items in storage

Data modules that include procedures to prepare items for removal from storage prior to introduction to service must provide the required workflow of instructions necessary to prepare the item such as:

- build-up of the item from several other items removed from storage
- replacement of storage fluids, filling, etc
- tests applicable when preparing the item. These tests must be specific tests to prepare the item, otherwise they must be referenced to the relevant test. Refer to the example in Para 2.5.4.4, function test.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-87XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-87XA-Z (37 characters)

To decide, after the checks of the condition of storage of an item and its physical integrity when remove from storage:

- if it is acceptable to be prepared before introduction into service
- what maintenance actions must be taken depending on the condition of the container, of blanking, etc

This information can be given in the form of textual description, table or flow charts. Refer to Fig 15.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-88XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-88XA-Z (37 characters)

**Note**

On-condition maintenance cannot be applied to an item subject to this type of maintenance if it is removed from a damaged container.

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*Fig 15 Removal from storage - Incoming checks - Example*

**2.5.11 Data of items in storage**

Shelf lives and Inspection Intervals when in storage must be listed.

The list must contain:

- the description of the item
- its manufacturer code and part number
- the shelf life or Inspection Interval (value and unit)
- the data module code of the procedure to be performed when limits are reached

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-89XA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-89XA-Z (37 characters)

# Chapter 5.2.1.10

## *Common information sets - Weapon loading information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Weapon Loading (WL) information.

## 1.2 Scope

This chapter covers the rules for the preparation of information applicable to Product Weapon loading which will enable skilled personnel to load and offload munitions and to check the armament systems which are used to control/fire/release. The WL information must contain the following topics:

- basic information
- supplementary information
- loading procedures
- offloading procedures
- loading and offloading procedures checklists
- integrated combat turnaround procedures
- integrated combat turnaround procedures checklists
- cross servicing checklists

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

- Accessory: An item which is required to mate the munitions to the Product and which remains as an integral part of the system (eg pylon, missile launcher and adapter, multiple ejector racks, etc).
- Singular: In this specification the expression "The context of all steps must be singular" means that even if more than one identical action (such as checking that multiple safety pins are fitted) could take place, each action must be a separate step. Do not use a plural step such as "Verify all safety pins are fitted".
- Plural: Similarly to the definition of singular, the expression "The context of all steps must be plural" means that the steps must contain those identical actions applicable to more than one item (such as performing a no-volt test at both holders).

# 2 Weapons loading information

## 2.1 General

The complete set of weapons loading data modules is specified in Para 2.2.

## 2.2 Technical content

### 2.2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-14-40-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-40-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

### 2.2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data module codes must be coded:

YY-Y-14-4Y-SS-NNA-YYYA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-4Y-SS00-NNAAA-YYYA-Z (37 characters)

Where "14-4Y", the codes are given in Chap 8.2. According to the nature of the information given, the WL information is further subdivided into subsections as follows:

- 14-41 - Basic information
- 14-42 - Supplementary information
- 14-43 - Loading procedures
- 14-44 - Offloading procedures
- 14-45 - Loading and offloading procedure checklists
- 14-46 - Integrated combat turnaround procedures
- 14-47 - Integrated combat turnaround procedures checklists
- 14-48 - Cross servicing checklists

Where:

- "SS", in the subject code, identifies the store number. "00" identifies all stores, "01" store No. 1. "02" store No. 2 etc.
- "NN", in the Disassembly code, is a sequential number starting from "00", if more than one data module is needed. For instance, in a loading procedure, the following data modules could apply to "Store 04": Munitions preparation (DC 01), Cartridge installation (DC 02), Store loading (DC 03), Fuzing (DC 04), etc.
- "Z" is the item location code as described in Chap 4.3.8.

### 2.2.3 Basic information

The basic information includes the following descriptions.

#### 2.2.3.1 General

All equipment and munitions, for which loading and offloading procedures information are required, must be described in sufficient detail for loading and offloading purposes.

#### 2.2.3.2 Product description

These data modules must contain descriptive information showing how the concerned Product's systems are made. Their function within the context of munitions loading/offloading must be provided for

- the Product controls
- munitions release or control systems
- any other equipment of direct concern to the loading crews, such as pylons, light and heavy duty ejector release units, adapters

Data module codes must be coded:

YY-Y-14-41-00-NNA-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-41-0000-NNAAA-040A-A (37 characters)

2.2.3.3 Munitions description
These data modules must contain descriptive information regarding how the munitions is made and its function must be provided for all types of munitions and their components approved for loading on the Product. The fuse compatibility for each fused munitions must be shown, specifically identifying those authorized for prefusing and retention of fuse on the munitions while offloading.

Data module codes must be coded:

YY-Y-14-41-SS-NNA-040A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-41-SS00-NNAAA-040A-C (37 characters)

2.2.3.4 Support Equipment (information set) (SE) description
These data modules must contain descriptive information regarding how the SE is made and its function must be provided for testers, handling and loading or offloading equipment listed in the "Tools and equipment lists" in the loading/offloading procedures.

Data module codes must be coded:

YY-Y-YY-YY-YY-00A-040A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-00AAA-040A-C (37 characters)

**2.2.4 Supplementary information**
The supplementary information must contain, as a minimum, the following. Additional information can be defined by the project or the organization.

2.2.4.1 General safety requirements
These data modules must contain general safety requirements pertinent to preparation, handling, loading and offloading of munitions.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-012A-A (37 characters)

2.2.4.2 Product controls and indicators
These data modules must illustrate those controls and indicators of the Product used by the loading crew.

Data module codes must be coded:

YY-Y-YY-YY-YY-YYA-110A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-110A-A (37 characters)

2.2.4.3 Product preparation
These data modules must contain all steps required to prepare the basic Product for functional or no-volt tests and munitions loading. A standardized set of steps must be used for all individual munitions loading procedures.

Data module codes must be coded:

YY-Y-14-42-00-NNA-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-0000-NNAAA-330A-A (37 characters)

2.2.4.4 Emergency procedures
These data modules must contain emergency procedures related to the authorized munitions and the Product loaded with these munitions; they consist of actions to be taken if munitions are involved in a fire. Procedures must be preceded by a brief explanation of actions to be accomplished by the loading crew. Information containing emergency procedures must be adequately marked and the words "Emergency procedures" must be included in the title.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-140A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-140A-Z (37 characters)

2.2.4.5 Installed accessory preparation
These data modules must contain all procedures to prepare each installed munitions accessory, eg racks, launchers, pods, etc for functional tests. It must also contain those procedures required to prepare the accessories for loading the munitions.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-330A-A (37 characters)

2.2.4.6 Functional tests
These data modules must contain all functional test procedures applicable to the control/release and jettison system or mechanisms for the munitions.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-340A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-340A-A (37 characters)

2.2.4.7 No-volt tests
These data modules must contain all necessary procedures to perform no-volt test of stores control/release and jettison systems or mechanisms for the munitions.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-369A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-369A-A (37 characters)

2.2.4.8 Standard procedures
These data modules must contain general information which is applicable to more than one procedure, operation or step; eg checking a multi-meter for proper operation, Product grounding procedures, marking of impulse cartridges, etc.

Each procedure must be assigned an individual data module. The information code must be applicable to the context of the procedure.

Data module codes must be coded:

YY-Y-14-42-SS-NNA-YYYA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-42-SS00-NNAAA-YYYA-Z (37 characters)

**2.2.5 Loading procedures**

2.2.5.1 General

A general data module must be prepared for every authorized munitions, group of munitions, or combination of munitions as applicable. Each one of these data modules must list, in the correct sequence of operations, all the data modules which form a complete loading procedure. The titles of these general data modules must identify the applicable munitions, eg "Bombs, general purpose, 500-pound MK82 - Snakeye I".

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-A (37 characters)

Munitions preparation. These data modules must include procedures required to inspect and prepare each munitions, including any applicable component. They must include procedures required to assemble and install authorized fuses prior to munitions loading. Procedures must be included to verify the safety of each fused munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Cartridge installation prior to loading. These data modules must include procedures required to install cartridges in those components that must have cartridges installed prior to loading the munitions.

The following steps are applicable:

1 Do required no-volt tests.

2 Do a test on impulse cartridges for serviceability.

3 Install impulse cartridges.

The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Loading. These data modules must include procedures required to load the munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Fusing. These data modules must include procedures required to test the prefused munitions and install those fuses that are not authorized to be installed prior to loading munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Postloading. These data modules must include procedures required to ensure the safety and electrical compatibility of the munitions and its accessories. The context of all the steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Cartridge installation after loading. These data modules must include procedures required to install cartridges that must be fitted only after loading the munitions. The following steps are applicable:

4 Do required no-volt tests.

5 Do a test on impulse cartridges for serviceability.

6 Install impulse cartridges.

The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Postloading inspection. These data modules must include procedures which ensure that all necessary safety devices have been removed or installed as required, bombs and fuses are installed properly, and fuse safety devices have been removed or installed as required. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Delayed operation or alert. These data modules must include procedures required to make safe the Product components, munitions and impulse cartridges when the Product is placed on delayed operation or alert. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

Immediately prior to launch. These data modules must include procedures required to place the safe Product in a launch configuration. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-720A-C (37 characters)

2.2.5.2 Specific safety requirements
These data modules must contain all specific safety requirements pertaining to the munitions loading procedures.

Data module codes must be coded:

YY-Y-14-43-SS-NNA-012A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-012A-Z (37 characters)

2.2.5.3 List of tools and support equipment
These data modules must list the special tools and support equipment that are required to accomplish the requirements of the Loading procedures (refer to Para 2.2.5) and the Offloading procedures (refer to Para 2.2.6).

Data module codes must be coded:

YY-Y-14-43-SS-NNA-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-43-SS00-NNAAA-060A-A (37 characters)

**2.2.6 Offloading procedures**

2.2.6.1 General
A general Data Module must be prepared for every authorized munitions, or group of munitions, as applicable. Each one of these Data Modules must list, in the correct sequence of operations, all the Data Modules which form a complete offloading procedure. The titles of these general Data Modules must identify the applicable munitions; eg "Bomb", General purpose, 500-pound MK82 - Snakeye I".

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

Making safe. These data modules must include essential procedures required to make the Product munitions safe and to install the required safety devices. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-720A-A (37 characters)

Pre-offloading. These data modules must include procedures required to make the Product's munitions safe for offloading. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

Fuse removal. These data modules must include procedures required to make safe and to remove fuse or fuses from the munitions. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

Removal of cartridges. These data modules must include procedures required to remove cartridges from the munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

2.2.6.2 Offloading

These data modules must include procedures required to offload the munitions from the Product. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

2.2.6.3 Post-offloading

These data modules must include information on post-offloading actions, such as fitting pylon sole plates, installing dummy cartridges, etc. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

**2.2.7 Loading and offloading procedure checklists**

2.2.7.1 General

The loading and offloading procedure checklists must contain specific safety requirements derived from the original loading/offloading procedures.

Any procedural step that applies only to a specific munitions Product configuration or accessory must be prefixed for identification. Torque values, preset dimensions, orifice identifiers, etc, included in the original procedure must be placed in the checklist.

Paragraph headings used in the checklist must be presented as in the original procedure.

2.2.7.2 Detailed requirements

All required steps must be included for Product preparation and no-volt tests. Steps for other procedures must be kept to a minimum. Steps considered routine actions on the entire Product during loading and offloading procedures and within the capabilities of a trained technician can be omitted. Redundant actions/checks must be omitted. However, to assure maximum safety, separate procedures for each fuse combination must be included under appropriate subordinate headings, when applicable.

Steps must be shortened by the elimination of excess words and by the use of abbreviations so that one-line entries can be utilized to the greatest extent possible, but still be written to ensure ease of reading and interpretation. Steps must follow the same order as they appear in the original procedure and must be numbered in sequence. Warnings and cautions in the original procedure must be included in the checklist. Notes can be included if considered necessary.

Illustrations must be included, if directed by the project.

2.2.7.3 Coding of loading and offloading procedure checklists

The checklist data modules must have the same data module code as its "original" procedure except for the subsection number which must be "5".

Examples, loading procedure:

- "Original" data module code - YY-A-14-44-03-01A-720A-A
- Checklist data module code - YY-A-14-45-03-01A-720A-A

**2.2.8 Integrated combat turnaround procedures**

2.2.8.1 General

The integrated combat turnaround procedures are used by qualified personnel to service, maintain and load/offload munitions on the Product under combat or combat training, turnaround conditions. Procedures must be preceded by a brief explanation of actions to be accomplished by the turnaround crew.

2.2.8.2 Precautionary information

General safety requirements. These data modules must contain safety requirements which apply Product servicing, munitions-loaded Product loading and offloading of munitions.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-012A-A (37 characters)

Emergency procedures. These data modules must be adequately marked and the words "Emergency Procedures" must be included in the title. They must contain all applicable emergency procedures. When more than one type of munitions is included and withdrawal distances differ, emergency procedures data modules must be provided for each type of munitions.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-140A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-140A-A (37 characters)

2.2.8.3 Pre-positioning and munitions preparation
The pre-positioning and munitions preparation data modules must contain information covering tool and support equipment, pre-positioning/inspection and munitions preparation.

List of tool and support equipment. These data modules must list the special tools and support equipment that are required to accomplish an integrated combat turnaround (excluding fire fighting and refueling equipment).

Data module codes must be coded:

YY-Y-14-46-SS-NNA-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-060A-A (37 characters)

Pre-positioning/inspection. These data modules must include the specific requirements for items which need to be positioned and inspected. All steps must be singular.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-310A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-310A-A (37 characters)

Munitions preparation. These data modules must include munitions and pre-loaded launcher inspections for serviceability and safety prior to the Product loading. All steps must be singular.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-072A-C (37 characters)

2.2.8.4 Product servicing/munitions loading and offloading
Cursory inspection. These data modules must include, as a minimum, the requirement to ensure the Product is secured/safe, operator/groundcrew communication has been established, the Product is operational and ammunitions/fuel requirements have been determined prior to Product preparation. All steps must be plural.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-280A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-280A-A (37 characters)

Product preparation. These data modules must include all procedures to ensure the Product is serviceable and is prepared for munitions loading/unloading.

Data module codes must be coded:

YY-Y-14-46-SS-00A-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-00AAA-330A-A (37 characters)

Munitions offloading. These data modules must include the requirements to make safe, to remove fuses and to offload munitions from the Product. All steps must be singular.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-520A-A (37 characters)

Gun loading. These data modules must contain gun loading procedures.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-720A-A (37 characters)

Final cockpit/crew station preparation. These data modules must include all the procedures to prepare the cockpit/crew station for the Product servicing/munitions loading. These procedures can include towing and positioning of the Product, if applicable. All steps must be singular.

Data module codes must be coded:

YY-Y-14-46-SS-00A-120A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-00AAA-120A-A (37 characters)

Product servicing/munitions preparation. These data modules must include all the procedures for tank installation, refueling, servicing and loading of munitions. All steps must be singular.

Data module codes must be coded:

YY-Y-14-46-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-SS00-NNAAA-720A-A (37 characters)

Final Product preparation. These data modules must include procedures to ensure safety devices have been removed or installed as required, tools and equipment have been removed, and the Product is ready for operating. All steps must be plural.

Data module codes must be coded:

YY-Y-14-46-00-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-0000-NNAAA-720A-A (37 characters)

Immediately prior to launch. These data modules must include all steps required to place the Product in a launch configuration.

Data module codes must be coded:

YY-Y-14-46-00-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-46-00-NNAAA-720A-A (37 characters)

**2.2.9 Integrated combat turnaround procedure checklists**

The integrated combat turnaround checklists must meet the requirements detailed in Para 2.2.7. except as specifically noted below.

Paragraph headings used in the checklist must be presented the same as in the integrated combat turnaround procedures.

Data module codes must be coded:

YY-Y-14-44-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-44-SS00-NNAAA-520A-A (37 characters)

**2.2.10 Cross servicing checklists**

2.2.10.1 General

The cross servicing checklists must include the servicing procedures of the Product which enable the Product to carry out its operational mission.

The checklists must contain emergency procedures and loading/offloading procedures. Steps must be numbered in sequence under each heading.

All the abbreviations appearing in the checklist, together with the meaning of each, must be listed in alphabetical order.

Illustrations must convey location, if applicable, and dimensional data with tolerance information. The illustrations must be limited to the equipment upon which the tasks must be performed, plus sufficient surroundings to allow a technician to easily locate the equipment item.

Procedural steps that are applicable to a specific item must be prefixed for identification.

2.2.10.2 General safety requirements

These data modules must contain all general safety requirements necessary for preparation, handling, loading and offloading of munitions.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-012A-A (37 characters)

2.2.10.3 Emergency procedures

These data modules must contain emergency procedures related to munitions loaded Product.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-140A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-140A-Z (37 characters)

2.2.10.4 Product general arrangement
These must contain the Product general arrangement in an illustrated form, showing the location of panels and switches used by loading crews.

Data module codes must be coded:

YY-Y-14-48-00-NNA-110A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-0000-NNAAA-110A-A (37 characters)

2.2.10.5 Product preparation
These data modules must include procedures which must be accomplished for munitions loading. The steps must give procedures for preparation of the Product and installed accessories for loading and a no-volt check for munitions/accessories as required. A configuration chart depicting authorized loading configuration for the specific munitions will be shown. The steps must include details to make safe any munitions item which might be on the Product prior to no-volt checks, ie make safe missile motors, disconnect missile igniter cables, etc.

Data module codes must be coded:

YY-Y-14-48-00-NNA-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-0000-NNAAA-330A-A (37 characters)

2.2.10.6 List of tools and support equipment
These data modules must list the special tools and support equipment that are required to accomplish munitions loading.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-060A-A (37 characters)

2.2.10.7 Specific safety requirements
These data modules must contain all specific safety requirements pertaining to the munitions loading procedures of the specific munitions.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-012A-A (37 characters)

2.2.10.8 Loading procedures
Munitions preparation. These data modules must include procedures for each single munitions and pre-loaded accessory, it must include steps required to assemble and install authorized fuses prior to munitions loading. Procedures must be included to verify the safety of each fused munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-C (37 characters)

Cartridge installation prior to loading. These data modules must include steps required to check and install impulse cartridges in those accessories that must have cartridges installed prior to loading munitions. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-C (37 characters)

Loading. These data modules must include steps required to load the munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-A (37 characters)

Fusing. These data modules must include steps required to test pre-fused munitions and/or install those fuses that are not authorized to be installed prior to loading munitions. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-A (37 characters)

Cartridge installation. These data modules must include procedures required to test impulse cartridges for serviceability and to properly install cartridges in all accessories as required. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-C (37 characters)

Post-loading inspection. These data modules must include steps required to ensure that accessory safety devices are installed. Bombs and fuses are installed as required and fuse safety devices have been removed or installed as required. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-C (37 characters)

2.2.10.9 Offloading procedures

Making safe. These data modules must include essential steps required to make safe the Material/munitions and the installed associated safety devices. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-720A-A (37 characters)

Pre-offloading. These data modules must include procedures required to make the Product safe for offloading. All steps required making the Product/munitions safe must be repeated in these procedures. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-520A-A (37 characters)

Fuse removal. These data modules must include procedures required to make safe and to remove the fuses from the munitions. The context of all steps must be plural.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-520A-A (37 characters)

*Offloading.* These data modules must include procedures required to offload the munitions from the Product. The context of all steps must be singular.

Data module codes must be coded:

YY-Y-14-48-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-48-SS00-NNAAA-520A-A (37 characters)

# Chapter 5.2.1.11

## *Common information sets - Cargo loading information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for the Product Cargo Loading (CL) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to the Product Cargo loading which will enable skilled personnel to do the load planning and the loading/offloading of the Product equipped for carrying cargo. The CL information must contain the following topics:

- Cargo
- The Product - General
- Load planning
- Loading/Offloading

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Cargo loading information

## 2.1 General

### 2.1.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-14-20-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-20-0000-NNAAA-018A-A (37 characters)

"NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

### 2.1.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-A-14-2X-00-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-2X-0000-NNAAA-XXXA-A (37 characters)

Where:

- "14-2X", the codes are given in Chap 8.2. According to the nature of the information given, the CL information is further subdivided into subsections as follows:
  - 14-20 - Cargo
  - 14-21 - Product general
  - 14-22 - Load planning
  - 14-23 - Loading/Offloading procedures
- "NN", the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

## 2.2 Technical content

### 2.2.1 Cargo

These data modules must give a general description of cargo planning, loading and off loading and provides an introduction to the successive information.

Data modules must be coded:

YY-A-14-20-00-NNA-040A-A A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-20-0000-NNAAA-040A-A (37 characters)

### 2.2.2 The Product - General

These data modules must provide the general data required for loading/offloading of the Product. Information must include, but is not limited to, the following context:

- General
- Dimensions and areas
  - compartment sizes and layout
  - door sizes
- Location and strength of tie-down points
- Safety precautions.

Data modules must be coded:

YY-A-14-21-00-NNA-YYYA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-21-0000-NNAAA-YYYA-A (37 characters)

### 2.2.3 Load planning

These data models must provide the data required for planning the loading and offloading of the Product, and the distribution of cargo mass in the compartments of the Product. Information must include, but is not limited to, the following context:

- General
- Compartment loading:
  - General  description
  - Maximum allowed floor loads
  - Maximum allowed integrated loading
  - Maximum package dimensions
- Equipments required to load/offload the cargo:
  - General (description)
  - Types of lashing devices
  - Types of containers/pallets etc
  - Conveyance systems - latches, splitters, guides etc
  - Types of tie down devices
- Centre of gravity limits:
  - Operation (eg Takeoff, flight and landing)
  - Tipping limits
  - Determination of the centre of gravity location
  - Permissible range of container/pallet load centre of gravity
- Mass and balance limits
- Methods of stowing and securing:
  - General
  - Bulk loading
  - Required restraint
  - Effective restraint
  - Required number of tie down devices
  - Container/pallet loading:
    - Operation of conveyance systems/pallet loading systems equipments
    - Maximum pallet loads
    - Securing the pallet load

Data modules must be coded:

YY-A-14-22-00-NNA-YYYA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-22-0000-NNAAA-YYYA-A (37 characters)

### 2.2.4 Loading/Offloading

These data modules must provide the data required for carrying out the loading and offloading. Information must include, but is not limited to, the following context:

- preparation of the Product for loading/offloading
- door operating instructions
- installation of lashing devices
- installation of tie down devices
- conveyance system operating instructions
- loading and securing containers/pallets etc
- loading ramp operating instructions
- examples of loading techniques

Data modules must be coded:

YY-A-14-23-00-NNA-160A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-23-0000-NNAAA-160A-A (37 characters)

# Chapter 5.2.1.12

## *Common information sets - Stores loading information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Product Stores Loading (SL) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to Product stores loading which will enable personnel, who can be unfamiliar with the specific Product, to safely load or offload non-munitions stores (such as external fuel tanks, reconnaissance packs, etc) which form part of the configuration of the Product. The SL information must contain the following topics:

- basic information
- supplementary information
- loading procedures
- offloading procedures
- loading and offloading procedures checklists

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate:

- **Singular:** In this specification the expression "The context of all steps must be singular" means that even if more than one identical action (such as checking that multiple safety pins are fitted) could take place, each action must be a separate step. Do not use a plural step such as "Verify all safety pins are fitted".
- **Plural:** Similarly to the definition of singular, the expression "The context of all steps must be plural" means that the steps must contain those identical actions applicable to more than one item (such as performing a no-volt test at both holders).

# 2 Stores loading information

## 2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They must also

contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-14-30-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-30-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

## 2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-14-3X-SS-NNA-YYYA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-3X-SS00-NNAAA-YYYA-Z (37 characters)

Where:

- "14-3X", the codes given in Chap 8.2. According to the nature of the information given, the store loading information is further subdivided into subsections as follows:
  - 14-31 - Basic information
  - 14-32 - Supplementary information
  - 14-33 - Loading procedures
  - 14-34 - Offloading procedures
  - 14-35 - Loading and offloading procedure checklists
- "SS", in the subject code, identifies the store number. "00" identifies all stores, "01" store No. 1. "02" store No. 2 etc.
- "NN", in the Disassembly code, is a sequential number starting from "00", if more than one data module is needed. For instance, in a loading procedure, the following data modules could apply to "Store 04": Store preparation (DC 01), Cartridge installation (DC 02), Store loading (DC 03), Post loading (DC 04), etc.
- "Z" is the item location code as described in Chap 4.3.8.

## 2.3 Basic information

### 2.3.1 General

All equipment and stores, for which loading and offloading procedures information are required, must be described in sufficient detail for loading and offloading purposes.

### 2.3.2 Product description

These data modules must contain descriptive information showing how the concerned Product systems are made. Their function within the context of stores loading/offloading must be provided for:

- Product controls
- stores release or control systems
- any other equipment of direct concern to the loading crews, such as pylons, light and heavy duty ejector release units, adapters

Data modules must be coded:

YY-Y-14-31-00-NNA-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-31-0000-NNAAA-040A-A (37 characters)

**2.3.3 Stores description**

These data modules must contain descriptive information regarding how the store is made and its function must be provided for all types of stores and their components approved for loading on the Product.

Data modules must be coded:

YY-Y-14-31-SS-NNA-040A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-31-SS00-NNAAA-040A-C (37 characters)

**2.3.4 Support equipment description**

These data modules must contain descriptive information regarding how the support equipment is made and its function must be provided for testers, handling and loading or offloading equipment listed in the "Tools and equipment lists" in the loading/offloading procedures.

Data modules must be coded:

YY-A-AA-YY-YY-00A-040A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YAA-YY-YYYY-00AAA-040A-C (37 characters)

**2.3.5 Supplementary information**

This must contain, as a minimum, the following. Additional information can be defined by the project or the organization

**2.3.6 General safety requirements**

These data modules must contain general safety requirements pertinent to preparation, handling, loading and offloading of stores.

Data modules must be coded:

YY-Y-14-32-SS-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-012A-A (37 characters)

**2.3.7 Product controls and indicators**

These data modules must illustrate those controls and indicators of the Product used by the loading crew.

Data modules must be coded:

YY-A-YY-YY-YY-YYA-110A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-110A-A (37 characters)

**2.3.8 Product preparation**

These data modules must contain all procedures required to prepare the basic Product for functional or no-volt tests and stores loading. A standardized set of steps must be used for all individual stores loading procedures.

Data modules must be coded:

YY-Y-14-32-00-NNA-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-0000-NNAAA-330A-A (37 characters)

**2.3.9 Emergency procedures**

These data modules must contain emergency procedures related to the authorized stores and the Product loaded with these stores. The data modules consist of actions to be taken if stores are involved in eg a fire. Procedures must be preceded by a brief explanation of actions to be accomplished by the loading crew. Information containing emergency procedures must be adequately marked and the words "Emergency procedures" must be included in the title.

Data modules must be coded:

YY-Y-14-32-SS-NNA-140A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-140A-Z (37 characters)

**2.3.10 Installed accessory preparation**

These data modules must contain all procedures to prepare each installed store accessory, eg light/heavy duty ejector release units, pods, for functional tests. It must also contain those procedures required to prepare the accessories for loading the stores.

Data modules must be coded:

YY-Y-14-32-SS-NNA-330A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-330A-A (37 characters)

**2.3.11 Functional tests**

These data modules must contain all functional test procedures applicable to the control/release and jettison system or mechanisms for the stores.

Data modules must be coded:

YY-Y-14-32-SS-NNA-340A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-340A-A (37 characters)

**2.3.12 No-volt tests**

These data modules must contain all necessary procedures to perform no-volt test of stores control/release and jettison systems.

Data modules must be coded:

YY-Y-14-32-SS-NNA-369A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-369A-A (37 characters)

**2.3.13 Standard procedures**

These data modules must contain general information which is applicable to more than one procedure, operation or step, eg checking a multi-meter for proper operation, Product grounding procedures, marking of impulse cartridges.

Each procedure must be assigned an individual data module. The information code must be applicable to the context of the procedure.

Data modules must be coded:

YY-Y-14-32-SS-NNA-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-32-SS00-NNAAA-XXXA-Z (37 characters)

## 2.4 Loading procedures

**2.4.1 General**

A general data module must be prepared for every authorized store, group of stores, or combination of stores as applicable. Each one of these data modules must list, in the correct sequence of operations, all the data modules which form a complete loading procedure. The titles of these general data modules must identify the applicable store or stores, eg "Conformal long range fuel tank with externally mounted infrared reconnaissance pack".

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-A (37 characters)

2.4.1.1 Stores preparation

These data modules must include procedures required to inspect and prepare each store, including any applicable component. Procedures must be included to verify the safety of each store. The context of all steps must be singular.

If separate data modules are needed these must be coded:

YY-Y-14-33-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-C (37 characters)

2.4.1.2 Cartridge installation prior to loading

These data modules must include procedures required to install cartridges in those components that must have cartridges installed prior to loading the stores.

The following steps are applicable:

1 Do required no-volt tests.

2 Do a test on impulse cartridges for serviceability.

3 Install impulse cartridges.

The context of all steps must be plural.

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-C (37 characters)

2.4.1.3 Loading
These data modules must include procedures required to load the stores. The context of all steps must be singular.

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-A (37 characters)

2.4.1.4 Post loading
These data modules must include procedures required to ensure the safety and electrical compatibility of the stores and its accessories. The context of all the steps must be plural.

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-A (37 characters)

2.4.1.5 Post loading inspection.
These data modules must include procedures which ensure that all necessary safety devices have been removed or installed as required, and which verify that stores are installed properly. The context of all steps must be plural.

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-A (37 characters)

2.4.1.6 Immediately prior to launch.
These data modules must include procedures required to place the air vehicles in a launch configuration. The context of all steps must be plural.

Data modules must be coded:

YY-Y-14-33-SS-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-720A-A (37 characters)

**2.4.2 Specific safety requirements**
These data modules must contain all specific safety requirements pertaining to the stores loading procedures.

Data modules must be coded:

YY-Y-14-33-SS-NNA-120A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-120A-A (37 characters)

**2.4.3 List of tools and support equipment**

These data modules must list the special tools and support equipment that are required to accomplish the requirements of the loading procedures (refer to Para 2.4) and the offloading procedures (refer to Para 2.5).

Data modules must be coded:

YY-Y-14-33-SS-NNA-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-33-SS00-NNAAA-060A-A (37 characters)

## 2.5 Offloading procedures

**2.5.1 General**

A general data module must be prepared for every authorized store, or group of stores, as applicable. Each one of these data modules must list, in the correct sequence of operations, all the data modules which form a complete offloading procedure. The titles of these general data modules must identify the applicable store or stores, eg "Conformal long range fuel tank with externally mounted infrared reconnaissance pack".

Data modules must be coded:

YY-Y-14-34-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-34-SS00-NNAAA-520A-A (37 characters)

2.5.1.1 Pre-offloading

These data modules must include procedures required to prepare the Product stores for offloading. The context of all steps must be plural.

Data modules must be coded:

YY-Y-14-34-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-34-SS00-NNAAA-520A-A (37 characters)

2.5.1.2 Removal of cartridges

These data modules must include procedures required to remove cartridges from stores. The context of all steps must be singular.

Data modules must be coded:

YY-Y-14-34-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-34-SS00-NNAAA-520A-A (37 characters)

### 2.5.2 Offloading

These data modules must include procedures required to offload the stores from the Product. The context of all steps must be singular.

Data modules must be coded:

YY-Y-14-34-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-34-SS00-NNAAA-520A-A (37 characters)

### 2.5.3 Post-offloading

These data modules must include information on post-offloading actions, such as fitting pylon sole plates, installing dummy cartridges, etc. The context of all steps must be singular.

Data modules must be coded:

YY-Y-14-34-SS-NNA-520A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-34-SS00-NNAAA-520A-A (37 characters)

## 2.6 Loading and offloading procedure checklists

### 2.6.1 General

If loading and offloading procedure checklists are required by the project, the following apply:

- The loading and offloading procedure checklists must contain specific safety requirements derived from the original loading/offloading procedures.
- Any procedural step that applies only to a specific store, Product configuration, or accessory must be prefixed for identification. Torque values, preset dimensions, orifice identifiers, etc, included in the original loading procedure must be placed in the checklist.
- Paragraph headings used in the checklist must be presented as in the original procedure.

### 2.6.2 Detailed requirements

All required steps must be included for the Product preparation and no-volt tests. Steps for other procedures must be kept to a minimum. Steps considered routine actions on the Product during loading and offloading procedures and within the capabilities of a trained technician can be omitted. Redundant actions/checks must be omitted. However, to assure maximum safety, separate procedures must be included under appropriate subordinate headings, when applicable.

Steps must be shortened by the elimination of excess words and by the use of abbreviations so that one-line entries can be utilized to the greatest extent possible, but still be written to ensure ease of reading and interpretation. Steps must follow the same order as they appear in the original procedure and must be numbered in sequence. Warnings and cautions in the original procedure must be included in the checklist. Notes can be included if considered necessary.

Illustrations must be included if directed by the project.

### 2.6.3 Coding of loading and offloading procedure checklists

The checklist data modules must have the same data module code as its "original" procedure except for the section number which must be "35".

Examples:

- "Original" data module code - YY-Y-14-34-03-01A-720A-A
- Checklist data module code - YY-Y-14-35-03-01A-720A-A

# Chapter 5.2.1.13

## *Common information sets - Role change information*

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| Chap 8.2 | SNS information and learn codes - Maintained SNS - General |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Product Role Change (RC) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to Product Role change which will enable skilled maintenance personnel to change the role of the Product.

The RC information set must cover the following topics:

– Change of role - General

- Role change lists
- Role change procedures
- First installation procedures

### 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

## 2 Role change information

### 2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-16-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00" if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

### 2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-16-XX-00-NNA-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-XX-0000-NNAAA-XXXA-Z (37 characters)

Where:

- "16-XX", the codes are given in Chap 8.2. According to the nature of the information given, the role change information is further subdivided into subsections as follows:
  - 16-00 - Change of role - General
  - 16-11 - Role change lists
  - 16-12 - Role change procedures
  - 16-13 - First installation procedures
- "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.
- "XXX", in the information code, must be those given below.
- "Z" is the item location code as described in Chap 4.3.8.

Note

Where data modules are already written they can be reused as part of a procedure to achieve the change of role, rather than writing new data modules with an SNS of 16-12-YY.

## 2.3 Change of role - General

These data modules must contain the definition of each role. All the components and equipment necessary to make up the required configuration must be listed. The special support equipment and/or specific materials necessary to carry out the change of role must also be included.

Data modules must be coded:

YY-Y-16-00-00-NNA-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-00-0000-NNAAA-XXXA-Z (37 characters)

Where "XXX" must be:

- 000 General
- 060 Support equipment, tools and software
- 070 Consumables, material and expendables

## 2.4 Role change lists

These data modules must detail the different roles of the Product and must list, in a logical sequence, the procedures to be done to achieve the desired configuration (Refer to Table 1). Each list must contain the references to the relevant role change procedures in Chapter 16-12 (eg passenger-to-freighter, strike-to-trainer). Each role must be illustrated.

For Products with a large number of roles (eg military air vehicle with multiple-mission roles), the work packages must be listed in matrix format (Refer to Table 3). All of these roles must be illustrated.

Data modules must be coded:

YY-Y-16-11-00-NNA-000A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-11-0000-NNAAA-000A-Z (37 characters)

*Table 2 Role change list - Passenger-to-freighter - Example*

| Role change procedures | Data module |
|---|---|
| Preparation | F9-A-16-12-00-00A-000A-A |
| Removal of curtains and curtain rails | F9-A-16-12-00-01A-000A-A |
| Removal of cabin attendant seats equipment stowages | F9-A-16-12-00-02A-000A-A |
| Removal of partitions | F9-A-16-12-00-03A-000A-A |
| Removal of passenger seats | F9-A-16-12-00-04A-000A-A |
| Removal of carpets | F9-A-16-12-00-05A-000A-A |
| Removal of galley and toilet | F9-A-16-12-00-06A-000A-A |
| Removal of non-textile floor covering | F9-A-16-12-00-07A-000A-A |
| Removal of passenger service units | F9-A-16-12-00-08A-000A-A |
| Removal of overhead stowage compartments | F9-A-16-12-00-09A-000A-A |
| Removal of overhead stowage compartments supports | F9-A-16-12-00-10A-000A-A |

| Role change procedures | Data module |
|---|---|
| Installation of cargo handling system | F9-A-16-12-00-11A-000A-A |
| Installation of the winch | F9-A-16-12-00-12A-000A-A |
| Adjustment/test and close-up | F9-A-16-12-00-13A-000A-A |

## 2.5 Role change procedures

These data modules must contain the individual procedures to cover all changes from any role to any other role. Preparation, removal, installation, adjustment and test are examples of procedures to be included.

Cross-references to applicable data modules or data in the Product maintenance, weapon loading or stores loading information sets must be made, wherever possible. Data on those items to be reused, discarded or stored must also be included.

Data modules must be coded:

YY-Y-16-12-00-NNA-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-12-0000-NNAAA-XXXA-Z (37 characters)

Where "XXX" must be, eg:

- 120 - Preparation
- 270 - Adjustment
- 300 - Test
- 500 - Removal
- 700 - Installation

*Table 3 Role change matrix to configuration "A" - Example*

| Data module | Description | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| G6-A-16-12-00-00A-120A-A | Preparation | X | X | X | X | | X | | |
| G6-A-YY-YY-YY-YYA-500A-A<br>See note | Remove passenger seats | X | | X | X | X | | X | X |
| G6-A-16-12-00-10A-500A-A | Remove overhead stowage compartment supports | | X | X | | X | X | X | |
| G6-A-16-12-00-17A-700A-A | Install protective covers | X | | X | | X | | X | |
| G6-A-16-12-00-26A-700A-A | Install ZZZZ | X | X | | X | X | | X | |
| G6-A-16-12-00-43A-700A-A | Install VVVVV | X | X | X | X | | X | X | |

**Note**

In this example, the procedure for the removal of the passenger seats is written as an existing procedure, where the SNS (YYY-YY-YY) is the SNS for the passenger seats.

## 2.6 First installation procedures

These data modules must detail all procedures necessary to prepare units for the first installation, ie where assemblies must be assembled from delivered items and thereafter removed/installed as a complete unit.

Data modules must be coded:

YY-Y-16-13-00-NNA-710A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-13-0000-NNAAA-710A-Z (37 characters)

# Chapter 5.2.1.14

## *Common information sets - Battle damage assessment and repair information*

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*Table 1 References*

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|---|---|
| Chap 3.9.5.2.9.3 | Wiring data - Harness |
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| Chap 4.3 | Information management - Data module code |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Battle Damage Assessment and Repair (BDAR) information. Rules for preparation of page-oriented BDAR Publications (BDARP) and interactive BDARP are also given.

## 1.2 Scope

it covers the rules for the preparation of specific-to-type information applicable to Product battle damage assessment and repair, which will enable skilled maintenance personnel to assess and repair the Product. These data must sufficiently describe the information and data necessary to:

- mark the damaged zones or items
- access to the damaged area
- assess the damage
- decide on the action to be carried out (to repair, to isolate, to leave in damage state) taking its impact on the operation/mission into account
- repair or isolate items
- ensure, as required, the efficiency of the actions (function tests)
- be fully aware of the content of the battle damage repair kit

# 2 Battle damage assessment and repair information

## 2.1 Standards and definitions

### 2.1.1 Standards

The standards given in this chapter are applicable with no exceptions.

In addition the following guidelines must be used:

- to identify data and information which are common on different positions, the information code variant must be used and the title of the data module must describe the position
- the item subject to BDAR data/information must use the same hardware coding as used in other data modules in the CSDB as defined in Chap 4.3

In exceptional cases where the data/information cannot be allocated to a defined hardware, then system code 00-90 must be used, especially for first identification and assessment of zones, which contain more than one hardware system (where "system" could be the product frame for example).

### 2.1.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate:

- **Alternative material:** Material which can be used for the battle damage repair of an item and which has an ultimate tensile strength equal to or greater than the original
- **As received damage:** Designates battle damage on a specific Product in the original condition.
- **Battle Damage Repair (BDR):** The repair of battle damage on the Product within a maximum elapsed time defined by the project or the organization in order to restore it to a condition which will allow it to fulfill the requirements of at least one mission (operation, eg for air vehicle a ferry flight)
- **Battle damage repair kit:** A kit containing tools, test equipment, expendables, materials, etc. necessary to perform BDR in autonomous conditions on a battlefield
- **Cleaned out damage:** Designates battle damage on the Product that has been trimmed to a regular shape
- **Component function ability, imperative:** The function of a component is imperative if its destruction or isolation prohibits any utilization of the product frame or engine
- **Component function ability, optional:** The function of a component is optional if its destruction or isolation does not affect the operation of the product frame or engine. It can however affect the information shown to the operator (eg oil pressure indication)
- **Component function ability, performance:** The function of a component is performance if its destruction or isolation implies restrictions on the performance of the product frame or engine or one of their systems
- **Fire or overheat damage:** Damage caused by burning combustibles, hot gas leakage and/or burning munitions
- **Minimum undamaged edge distance:** The minimum acceptable distance between the edge of the damage area and the nearest load input point, for instance the centerline of the nearest integral rib or fastener line
- **Structural damage, category 1:** Damage on load bearing items that can be tolerated and cannot be repaired or replaced in BDR conditions. This damage is less than the specified limit and has no effect on the ability of the Product to complete at least one mission. Tolerated damage requires only clean-out or stop drilling of cracks
- **Structural damage, category 2:** Damage on load bearing items that must be repaired or replaced when damage exceeds the specified limit
- **Structural damage, category 3:** Damage on items that are not loads bearing but which need repair for aerodynamic reasons or to seal the structure
- **Structural damage limit, penetration:** Damage caused by penetration of a projectile.
- **Structural damage limit, fragmentation:** Damage caused by the explosion of a missile or shrapnel

- **Substitute material:** A material which has less ultimate tensile strength than the original but which can be used for the BDR of an item by adapting it
- **Product frame:** Term designating the whole Product without engine

## 2.2 Technical content

### 2.2.1 General requirements

The BDAR information is intended for battlefield/combat environments. Therefore it must be self-standing. There must be no reference to other publications, other than a general BDR publication and no requirement for special tools or special ground equipment. BDR must be supported by a BDR kit (refer to Para 2.2.9).

Additional information for wiring harnesses can be given (refer to Para 2.2.5.7).

In this chapter:

- the information is applicable to the entire Product unless it is required for the product frame or engine specifically
- "NN" represents the coding of a zone in a data module (zone for a product frame, assembly/module for an engine)
- the item location Z is used by this specification as a generic code to indicate that A, B, C or D can only be defined when writing the data module

### 2.2.2 Introduction

The introduction data modules contain explanations of the purpose, scope, structure, special format and use of the technical content of the BDAR information set. They also contain any necessary information of a general nature that is not detailed in any of the specific data modules.

Example content of an introduction data module:

- the zone concept used for the product frame and engine
- how to find data/information in the BDAR publication
- how to use the BDAR publication

Use of illustrations and/or diagrams is preferred (refer to Fig 1).

The introduction must be prepared in three separate data modules:

1 Information common for product frame and engine

2 Information specific for the product frame

3 Information specific for the engine

This allows the publication to be separated in product frame and engine BDAR information if required by the project or the organization. A note must be given in the introduction.

If a general BDR publication is jointly used with the BDAR publication, its reference and purpose must be given in the introduction.

Data modules must be coded:

YY-Y-00-90-00-**NN**A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-**NN**AAA-018A-A (37 characters)

where "**NN**", in the disassembly code, is a sequential number starting from "00" if more than one data module is needed.

The information code variant is used to distinguish between the different publications.

ICN-S3627-S1000D0355-002-01

*Fig 1 Flow chart on "How to use the page-oriented publication" (Sheet 1 of 2)*

ICN-S3627-S1000D0356-002-01

*Fig 1Flow chart on "How to use the page-oriented publication" (Sheet 2 of 2)*

### 2.2.3 Repair symbol marking

**Note**

If the content described under this heading is available in an existing general BDR publication, BDAR procedures refer to the relevant data modules contained in the general BDR publication.

Repair symbol marking data modules (information code 681) provide the rules and symbols that must be used to clearly mark the damaged zones, areas, components and parts. The information is further broken down into marking of structure and marking of systems as follows.

2.2.3.1 Marking of structures

These data modules describe the symbols, codes and colors that must be used to mark on the structure of the product frame or the engine, the category of damage (refer to Para 2.2.5.2) and the type of action to be performed on the damaged area following the damage assessment.

Data modules must be coded:

YY-Y-00-90-00-00A-681A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-00AAA-681A-A (37 characters)

2.2.3.2 Marking of systems

These data modules describe:

- the tags, stickers and their colors
- the symbols and codes

These are used to mark a system or a component and the action that must be performed following the damage assessment.

Data modules must be coded:

YY-Y-00-90-00-00A-681B-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-00AAA-681B-A (37 characters)

### 2.2.4 Identification of damaged hardware

These data modules (information code 682) provide a precise identification of damaged hardware (structure, system, harness) and a reference to a data module that provides damage assessment data.

This heading provides data and information to identify:

- product frame zones
- product frame systems
- engine assemblies and/or modules
- product frame and engine components
- product frame and engine wiring harnesses

2.2.4.1 Identification of product frame zones

A data module must be provided showing the zoning arrangement and giving the zone numbers of the Product. A related table gives the zone identifier (description) and the data module code for more information on the single zones (refer to Chap 3.9.5.2.11.4).

ICN-S3627-S1000D0357-001-01

*Fig 2 Identification of air vehicle system frame zones - Example*

*Table 2 Identification of zones*

| Zone no. | Description | Data module |
|---|---|---|
| 21 | Left main landing gear compartment | YY-A-00-90-00-21A-682A-A |
| 22 | Right main landing gear compartment | YY-A-00-90-00-22A-682A-A |
| 23 | Center fuselage | YY-A-00-90-00-23A-682A-A |
| 24 | Left fuselage | YY-A-00-90-00-24A-682A-A |
| 25 | Right fuselage | YY-A-00-90-00-25A-682A-A |
| 26 | Upper fuselage | YY-A-00-90-00-26A-682A-A |
| ... | | |

Data modules must be coded:

YY-Y-00-90-00-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-00AAA-682A-A (37 characters)

2.2.4.2 Identification of product frame systems

Separate data modules must be provided for each zone. Each data module contains the data module code for description of significant structure in this zone. A related table contains for each zone its zone number, its description and the data module code for identification of systems in this zone (refer to Chap 3.9.5.2.11.4).

*Table 3 Identification of systems*

| **Zone 21 - Left main landing gear compartment** | | |
|---|---|---|
| **System** | **Applicable** | **Data module** |
| Landing gear system and arrester hook | X | YY-A-00-90-YY-NNA-682A-A |
| Flight control system | X | YY-A-00-90-YY-NNA-682A-A |
| Propulsion system | X | YY-A-00-90-YY-NNA-682A-A |
| Secondary and emergency power system | | |
| Environmental system | | |
| Electrical system | X | YY-A-00-90-YY-NNA-682A-A |
| Hydraulic system | | |
| Fuel system | X | YY-A-00-90-YY-NNA-682A-A |
| Oxygen system | | |
| Escape system and canopy | | |
| Interphone and communications system | | |
| Defensive aids system | | |
| Miscellaneous utilities | X | YY-A-00-90-YY-NNA-682A-A |

| Zone 21 - Left main landing gear compartment | | |
|---|---|---|
| **System** | **Applicable** | **Data module** |
| … | | |

Data modules must be coded:

YY-Y-00-90-00-NNA-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-NNAAA-682A-A (37 characters)

2.2.4.3 Identification of engine assemblies and/or modules
A data module must be provided consisting of a three-quarter front view illustration showing the engine zones. This illustration gives the assembly/module number, its designation and the data module code where the damage assessment data of the given hardware is provided (refer to Chap 3.9.5.2.11.4).

Data modules must be coded:

YY-Y-72-NN-00-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y72-NN-0000-00AAA-682A-A (37 characters)

ICN-S3627-S1000D0358-001-01

*Fig 3 Identification of engine zones - Example*

2.2.4.4 Identification of components

Illustrations must show all the components identified by an item number according to their location on the product frame or the engine. A location view indicates, as required, the area of the product frame or the engine subject to the illustration.

A related table must provide for each component (example only):

- Name
- Data module code providing the damage assessment data
- The presence, if any, of a power supply to the component
- The system to which it is related

The last two items are used to support and confirm the recognition of the component itself.

*Table 4 Identification of components - Example*

| Item No. | Name | Data module applicable to the main system | Related systems |
|---|---|---|---|
| 1 | AB Fuel pump | YY-A-73-13-01-00A-684A-A | O |
| 2 | Oil cooler | YY-A-79-24-01-00A-684A-A | F |
| 3 | AB overload SV | YY-A-73-13-03-00A-684A-A | E |
| 4 | AB Fuel filter | YY-A-73-13-02-00A-684A-A | D |
| 5 | Secondary oil filter | YY-A-79-22-02-00A-684A-A | |
| 6 | Emergency regulation electrical actuator | YY-A-73-12-04-00A-684A-A | E |
| 7 | Oil pressure switch | YY-A-79-23-01-00A-684A-A | E |
| 8 | Main oil filter | YY-A-79-22-01-00A-684A-A | |
| 9 | Tacho-generator | YY-A-74-11-01-00A-684A-A | |
| 10 | Accessory support | YY-A-79-21-01-00A-684A-A | A D |
| 11 | HP oil pump | YY-A-79-21-02-00A-684A-A | |
| 12 | Oil distributor | YY-A-79-21-03-00A-684A-A | |
| 13 | N stop corrector | YY-A-75-31-01-00A-684A-A | |
| 14 | 6 bar starting SV | YY-A-73-21-04-00A-684A-A | E |
| 15 | 80 bar by-pass SV | YY-A-73-21-07-00A-684A-A | E |
| 16 | Main pressuring and dump valve | YY-A-73-11-05-00A-684A-A | D |
| 17 | Overboard drain valve | YY-A-73-12-06-00A-684A-A | D |
| 18 | HV Ignition box | YY-A-74-11-01-00A-684A-A | |
| 19 | AB Ignition SV | YY-A-73-13-02-00A-684A-A | E |
| 20 | Oil de-aerator | YY-A-79-21-11-00A-684A-A | |
| 21 | Main fuel pump | YY-A-73-11-01-00A-684A-A | |
| 22 | Oil pressure filling adapter | YY-A-79-21-09-00A-684A-A | D |

| Item No. | Name | Data module applicable to the main system | Related systems |
|---|---|---|---|
| 23 | Drain valve (Combustion chamber) | YY-A-73-31-01-00A-684A-A | D |

Key to Table 4:

- E = Electric power
- F = Fuel
- O = Oil
- A = Air
- D = Drain

If a component occurs in more than one system (eg oil, fuel), the data module code of the damage assessment must be given in the table for one of them (eg fuel system). The relation with the other systems must be indicated with a key in the table.

Data modules for the product frame must be coded:

YY-Y-00-90-**YY**-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-**YY**00-00AAA-682A-A (37 characters)

Data modules for the engine must be coded:

YY-Y-**YY-YY-YY**-00A-682A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY**-00AAA-682A-B (37 characters)

where "**YY-YY-YY**" or "**YYY-YY-YYYY**" corresponds to the SNS used for the Product.

ICN-S3627-S1000D0359-001-01

*Fig 4 Identification of engine components - Example*

ICN-S3627-S1000D0360-001-01

*Fig 5 Identification of air vehicle system frame components - Example*

2.2.4.5 Identification of wiring harnesses
These data modules contain:

- the principle and standard procedures to identify harnesses
- information necessary to identify harnesses, their bundles and connectors

**Note**

If the principle and standard procedures described under this heading are available in an existing general BDR publication, BDR procedures must refer to the relevant data modules contained in the general BDR publication.

*2.2.4.5.1 Identification*

The number of illustrations required will be dependent on the given harness, eg:

- harness and its attachments mounted on the hardware (refer to Fig 6)
- description of the harness components (refer to Chap 3.9.5.2.9.3)
- schematic diagrams (harness, leads, etc)

Data modules must be coded:

YY-Y-**YY-YY-YY**-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY**-00AAA-682A-A (37 characters)

where "**YY-YY-YY**" or "**YYY-YY-YYYY**" corresponds to the SNS used for the Product.

*2.2.4.5.2 Identification principle*

As electrical circuits are complicated, it is recommended to provide, as an identification principle, the method of identifying the wiring from the detected damaged area such as the routing, splits, the components reached, etc.

Illustrations and/or diagrams must describe the identification principle.

Data modules must be coded:

YY-Y-**YY-YY-YY**-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY-YYYY**-00AAA-682A-A (37 characters)

where "**YY-YY-YY**" or "**YYY-YY-YYYY**" corresponds to the SNS used for the Product.

*2.2.4.5.3 Standard identification procedures*

These data modules provide the general procedures to be applied when identifying a damaged harness in order to

- prevent possible damage to the component it is connected to
- identify leads by means of continuity measurement

Data modules must be coded:

YY-Y-**YY-YY-YY**-00A-682A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY**-00AAA-682A-A (37 characters)

where "**YY-YY-YY**" or "**YYY-YY-YYYY**" corresponds to the SNS used for the Product.

ICN-S3627-S1000D0361-001-01

*Fig 6 Identification of harness items*

ICN-S3627-S1000D0362-001-01

*Fig 7 Identification of harness components*

ICN-S3627-S1000D0363-001-01

*Fig 8 Identification principle for damaged harnesses - Illustration*

ICN-S3627-S1000D0364-001-01

*Fig 9 Identification principle for damaged harnesses - Diagram*

**2.2.5 Damage assessment**

2.2.5.1 General

These data modules (information code 683) provide, for a damaged and identified item (zone, component, etc), the necessary data and information to establish:

- the effect of the item on the product frame or engine operation
- if the item can be left damaged without repair or isolation
- whether it can be repaired and/or isolated
- the relevant action that must be applied
- the consequence(s) of the actions on the product frame or engine utilization (mission, limitation, etc)

**Note**

If the project or the organization decides to create separate data modules for the last listed information, their data module code must follow the rule given in this paragraph, but the information code must be "684" (Utilization degradation).

2.2.5.2 Structural damage categories

For assessment purposes structural damages must be given in three categories (refer to Para 2.1.2).

- Category 1 items must be highlighted (in red if color is useable)
- Category 2 items must be highlighted (in yellow if color is useable)
- Category 3 items are not highlighted (normally shown only for reference)

2.2.5.3 Structural damage limits categories

For assessment purposes structural damage limits must be given for penetration, fragmentation and fire and overheat.

*2.2.5.3.1 Structural damage limits, penetration*

The limits for penetration damage must be given in terms of maximum permitted hole diameter and minimum undamaged edge distance.

Where possible, penetration damage limits are shown on an illustration of the structure as a number - in a circle - representing the maximum permitted hole diameter in mm. In cases where the limits for "as received" damage differ from those for "cleaned out" damage (refer to Para 2.1.2), the "as received" limit must be additionally shown as a number in inverted commas.

Where it is not possible to include the limits on the illustration or when the limits are complex, they must be included in a data list or given as notes.

*2.2.5.3.2 Structural damage limits, fragmentation*

The limits for fragmentation damage must be given in terms of maximum permitted diameter of the damage area, maximum diameter of any hole, maximum number of holes in the damaged area and minimum undamaged edge distance. Where the limits for "as received" damage differ from those for "cleaned out" damage, this must be stated.

*2.2.5.3.3 Structural damage limits, fire and overheat*

The limits for fire and overheat damage must be given in terms of critical temperature indication (level of temperature), conductivity, ultimate tensile strength and hardness.

2.2.5.4 Component function ability

The importance of a component regarding the product frame and engine operation must be given in three categories (refer to Para 2.1.2).

2.2.5.5 Damage assessment of structures

These data modules provide for each zone of the product frame or assembly/module of the engine a list of their significant structures.

This list must contain:

- the designation of the significant structure
- the data module code where its damage assessment data is given. Illustrations support this list as required

Data modules for the Product must be coded:

YY-Y-00-90-00-**NN**A-683A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-**NN**AAA-683A-A (37 characters)

Data modules for the engine must be coded:

YY-Y-72-**NN**-00-00A-683A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y72-**NN**-0000-00AAA-683A-A (37 characters)

Tables provide damage assessment data for each significant structure. They must contain:

- its name (M)
- its damage category (M) (refer to Para 2.2.5.2)
- damage limits (M) (refer to Para 2.2.5.3)
- the level of temperature (critical temperature) attained in utilization (O)
- the original material and its alternatives or substitute that can be used in repair and are contained in the BDR kit (O) (refer to Para 2.2.9)
- the data module code (information code 684) where repair ability and/or tolerated damages are provided. If a significant structure cannot be repaired and/or no damage is tolerated, "non repairable" and/or "no damage tolerated" must be recorded in the table

Data modules for significant structures must be coded:

YY-Y-**YY-YY-YY-YYA**-683A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-683A-A (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the structure used for the Product.

ICN-S3627-S1000D0365-001-01

*Fig 10 Damage assessment of significant structures of - Example*

2.2.5.6 Damage assessment of components and parts
These data modules provide the data and information necessary for:

- assessment of the damage to components and parts of each system (eg pipes)
- determination of the possible actions to be carried out on each of these items
- evaluation of the effect of these actions on the product frame or engine operation

**Note**

Wiring harnesses are covered in Para 2.2.5.7.

The necessary illustrations with the identification of the items (callout with the item number) must be provided for each system.

A related table for parts and containing the following information must be provided:

1 Description (for parts)

- Item number (M)
- Physical and maximum operational characteristics (O)

2 Name (of component)

- Name (M)

3 Repair ability

- Data module code of the procedure to repair the component. If a component is not repairable then state "Not repairable". (M)

4 Function category

- Category of the component (M) (refer to Para 2.2.5.4)

5 Isolation

- Data module code of the procedure to isolate the component. If isolation is not applicable then state "Not applicable". (M)

6 Special operation instruction

- Particular operation instruction due to repair and/or isolation of a component must be given. If no subsequent limitation occurs then state "No limitation". (M)

**Note**

This last information must not be included in "damage assessment" if the project or the organization decides to create it separately as "degradation data" (refer to Para 2.2.6).

*Table 5 Damage assessment - Example of table for piping*

| **Description** | | | | | | |
|---|---|---|---|---|---|---|
| **Pipe (1)** | **Dia (1)** | **Max pressure (1)** | **Repair ability (3)** | **Function category (4)** | **Isolation (5)** | **Special operating instructions (6)** |
| C1 | 6 mm | 2 bar | YY-A-73-13-18-00A-684A-B | Imperative (T.S. pump E drain) | Not applicable | No limitation |
| C2 | 6 mm | 2 bar | YY-A-73-13-15-00A-684A-A | Imperative (T.S. pump E supply) | Not applicable | No limitation |
| C3 | 6 mm | 2 bar | YY-A-73-13-16-00A-684A-B | Imperative (T.S. pump E supply) | Not applicable | No limitation |

| Description Pipe (1) | Dia (1) | Max pressure (1) | Repair ability (3) | Function category (4) | Isolation (5) | Special operating instructions (6) |
|---|---|---|---|---|---|---|
| C4 | 6 mm | 2 bar | YY-A-73-12-10-00A-684A-A | Imperative (T.S. pump E supply) | Not applicable | No limitation |
| C5 | 6 mm | 5 bar | YY-A-73-12-12-00A-684A-B | Performance (Hydr. valve opening SV return) | YY-A-73-12-12-00A-686A-A | Flight without AB |
| C6 | 6 mm | 50 bar | YY-A-73-12-15-00A-684A-A | Performance (Hydr. valve opening SV supply) | YY-A-73-12-15-00A-686A-B | Flight without AB |

*Table 6 Damage assessment - Example of table for components*

| Name (2) | Repair ability (3) | Function category (4) | Isolation (5) | Special operating instructions (6) |
|---|---|---|---|---|
| AB fuel pump | Not repairable | Performance | YY-A-73-13-01-00A-686A-A | Flight without AB |
| AB fuel control unit | Not repairable | Performance | YY-A-73-13-10-00A-686A-B | Flight without AB |
| Upstream manifolds | Not repairable | Performance | YY-A-73-13-12-00A-686A-A | Flight without AB |
| Burner rings | Not repairable | Performance | YY-A-73-13-13-00A-686A-B | Flight without AB |
| Hydraulic accumulator | Not repairable | Performance | YY-A-73-12-08-00A-686A-A | Slow power lever movements |
| Main pressuring and dump valve | Not repairable | Imperative | Not applicable | Flight prohibited |
| Two -flow injector | Not repairable | Imperative | Not applicable | Flight prohibited |

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-683A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-683A-Z (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the component or part used for the Product.

ICN-S3627-S1000D0366-001-01

*Fig 11 Damage assessment of systems - Example*

2.2.5.7 Damage assessment of wiring harnesses

Tables must be used in accordance with the definition given in Para 2.2.5.6 except for the column "Description" which contains:

- the description of the harness (M)

followed by:

- the "from/to" for each bundle of the harness (eg from over speed control SV to 103D connector) (M)

*Table 7 Damage assessment - Example of table for harnesses*

| Description (2) | Repair ability (3) | Function category (4) | Isolation (5) | Special operating instructions (6) |
|---|---|---|---|---|
| Wiring harness (103 Δ boundary connector) | | | | |
| Connections: | | | | |
| Over speed control SV → 103 Δ connector | YY-A-73-13-33-00A-684A-A | Performance | YY-A-73-13-33-00A-686A-A | Limited performance |
| T4 control override SV → 103 Δ connector | YY-A-73-12-13-00A-684A-B | Performance | YY-A-73-12-13-00A-686A-B | De-energizing the T4 control override SV involves de-energizing the auxiliary pressure reducer.<br>Limited performance (flight with raw T4)<br>Avoid operation at rpm between 7200 and 7800 |
| Fuel chopper SV → 103 Δ connector | YY-A-75-31-07-00A-864A-A | Imperative | Not applicable | Flight prohibited |
| Nozzle opening SV → 103 Δ connector | YY-A-79-21-05-00A-684A-B | Imperative (emergency regulation) | Not applicable | If you switch to emergency regulation, monitor T4 temperature.<br>Gun firing can result in compressor stall or engine rich flameout. To be used in "relight in flight" configuration. |
| Engine control amplifier → 103 Δ connector ("N" regulation) | YY-A-73-12-09-00A-684A-A | Performance and imperative | Not applicable | Flight prohibited |

| Description (2) | Repair ability (3) | Function category (4) | Isolation (5) | Special operating instructions (6) |
|---|---|---|---|---|
| Pulse probe → 103 Δ connector (with or without R1 extension cable) | YY-A-74-12-11-00A-684A-B | Imperative | Not applicable (Replace with F wiring harness) | No limitation |

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-683A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-683A-Z (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the harness used for the Product.

**2.2.6 Utilization degradation**

The damage assessment (refer to Para 2.2.5) includes the utilization degradation. However if the project or the organization decides to isolate them, they must be tabulated (information code 684). For each system or component (if data differ between them) the table provides the consequences on the utilization (eg mission, operating limitations) of the product frame or the engine with the non-repaired damage or following the action done on damaged hardware.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-684A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-684A-Z (37 characters)

**2.2.7 Repair and isolation procedures**

Repair (information code 685) and isolation (information code 686) procedures use the hardware making up the BDR kit (refer to Para 2.2.9).

The procedures must be broken down as given in the following paragraphs.

2.2.7.1 Standard procedures

Standard procedures provide the methods not specific to the product frame or the engine (eg repair of pipes, wires, normal isolation).

Data modules for repair must be coded:

YY-Y-YY-YY-YY-YYA-685A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-685A-Z (37 characters)

Data modules for isolation must be coded:

YY-Y-YY-YY-YY-YYA-686A-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-686A-Z (37 characters)

**Note**

If the content described under this heading is available in an existing general BDR publication, BDR standard procedures must refer to the relevant data modules contained in the general BDR publication.

2.2.7.2 Repair of structures

These data modules provide the procedures specific to product frame or engine structures, otherwise refer to standard procedures (refer to Para 2.2.7.1).

Tolerances, if any, must be given in the procedure.

Illustrations must be used wherever possible to describe the procedures. Text is used only to complete the understanding of the illustrations.

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-685A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-685A-A (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the structure of the product frame or the assembly/module of the engine.

2.2.7.3 Repair of components and parts

These data modules provide the procedures specific to the systems (including electrical), otherwise refer to standard procedures (refer to Para 2.2.7.1).

The procedures must be described step by step. Illustrations support the procedures as required.

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-685A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-685A-A (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the hardware used for the Product.

2.2.7.4 Isolation of systems and components

These data modules provide step-by-step procedures to isolate damaged portions of a system or of one of its damaged components.

Illustrations and/or diagrams support the procedures as required.

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-686A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-686A-A (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the hardware used for the Product.

### 2.2.8 Function tests

Function tests (information code 687) procedures must be given to ensure that repaired systems can fulfill the requirements of the mission. These procedures must be designed to take only a minimum of time. If available, full use must be made of on-board test facilities.

If the isolation or repair involves limitations in operating instructions of the product frame or the engine It must be noted in the procedure to inform the crew/operator of the limitations.

Data modules must be coded:

YY-Y-**YY-YY-YY-YYA**-687A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**YYY-YY-YYYY-YYAAA**-687A-A (37 characters)

where "**YY-YY-YY-YYA**" or "**YYY-YY-YYYY-YYAAA**" corresponds to the coding of the hardware used for the Product.

### 2.2.9 Battle damage repair kit

A list of the hardware contained in the BDR kit (for the definition, refer to Para 2.1.2) must be provided. Items as shown below are subdivided into:

- support equipment and tools
- materials
- expendables
- consumables

The relevant data to be given for each kind of hardware must be defined by the project or the organization.

Data modules must be coded:

YY-Y-00-90-00-00A-688A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-90-0000-00AAA-688A-A (37 characters)

## 2.3 Generated information

### 2.3.1 General

Generated information is based on and must be prepared from source data stored in the BDARP data modules. The source data can be used to generate this information within a page-oriented BDARP as well as within an interactive BDARP.

Source data are:

- structure items
- system components
- system parts
- harness data
- material data

These source data include all pertinent information that is used for assessment and degradation.

Generated information within an interactive BDARP is described in Para 2.4. Examples of generated information for a page-oriented BDARP such as zone-oriented and/or system-oriented breakdown, mission related breakdown etc are given below.

Specific projects can have reduced or expanded requirements with regard to the given content of the lists. Generated data are not part of the data exchange. Therefore no data module code is allocated.

### 2.3.2 Structure item list

A structure item list must be produced for the material frame or engine based on each assigned zone, in numerical order, providing the following information:

- Name
- Part number
- Zone
- Applicability
- Damage category
- Damage Limit
- Material

### 2.3.3 System part list ordered by zone

A system part list must be produced for the product frame or the engine based on each effected zone, in system numbering order, providing the following information:

- Pipe description
- Pipe identification
- Pipe diameter
- Maximum working temperature
- System breakdown code or Functional item code
- Part number
- Zone
- Applicability
- Degradation information
- Material

### 2.3.4 System part list ordered by system

A system part list must be produced for the product frame or the engine based on each effected system, providing the information as shown in Para 2.3.3.

### 2.3.5 System component list ordered by zone

A system component list must be produced for the product frame or the engine based on each effected zone, in system numbering order, providing the following information:

- Name
- Reference designator
- System breakdown code
- Part number
- Zone
- Applicability
- Degradation information

### 2.3.6 System component list ordered by system

A system component list must be produced for the product frame or the engine based on each affected system, providing the information as shown in Para 2.3.5.

## 2.4 Interactive BDARP functionalities

The following paragraphs describe the possible functionalities for an interactive BDARP.

### 2.4.1 Assessment protocol function

2.4.1.1 General

During an assessment of the product frame or the engine, important information will be recorded to allow quick decision for further actions required regarding the damaged hardware.

2.4.1.2 Assessment protocol information

The assessment protocol provides information depending on a performed assessment as follows:

- collects all damages for each affected zone
- lists damages (for structure items), which need no repair
- lists damages (for structure items), which cannot be repaired, replacement only
- lists damages (for structure items), which must be repaired, including reference to the required procedure
- lists system part and component information for each affected system

Another list provides degradation information ordered by component function ability and associated mission. Isolation information, special operation instruction and reference to the required function tests must be given.

### 2.4.2 Direct entry

2.4.2.1 System parts and components

The direct entry functionality allows direct access to information about the damaged hardware. If the assessor knows the unique identifier of a damaged hardware, for example the reference designator of a system component, it is not necessary to navigate to the damaged hardware via the normal information access. This is because there is identification of the zone using the zone illustrations, identification of the required system from the associated table to get reference to the system component illustration, identification on the illustration of the damaged component and the associated table and at least get reference to the degradation information.

2.4.2.2 Harnesses

Direct entry of a harness number will show all available information including degradation information to that harness. If the project documentation contains an interactive wiring publication and more information is required eg wiring information on the damaged harness, the interactive BDARP can be linked to the interactive wiring publication to provide further detailed information.

### 2.4.3 Context sensitive data presentation

Context sensitive extract of basic information and additional details must be displayed for all generated information and other interactive functionalities.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Separation of Product frame and engine BDAR information.** The project or the organization must decide whether the BDARP is to be separated in product frame and engine BDAR information or not (refer to Para 2.2.2).

**Separate data modules for utilization degradation.** The project or the organization must decide whether degradation information is to be prepared in separate data modules or included in the damage assessment data modules (refer to Para 2.2.5 and Para 2.2.6).

**Interactive BDARP.** The project or the organization must decide whether there is an interactive BDARP or not and which functionalities are required (refer to Para 2.4).

# Chapter 5.2.1.15

## *Common information sets - Illustrated tool and support equipment information*

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## *References*

*Table 1 References*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Illustrated Tool and Equipment (ITE) Information.

## 1.2 Scope

It covers the rules for the preparation of information for the identification and use of Support Equipments (SE) and special tools, in the following just called equipment, to:

- maintain and operate on the ground, the air vehicle, land or sea system engine, airborne equipment and nominated assemblies in accordance with the agreed maintenance plan
- carryout general functions on the Product, eg tow, moor, park

**Note**

The ITE information set normally contains the equipment for on-air vehicle, land or sea system maintenance but its use can be extended to other levels of maintenance if required by the project.

# 2 Illustrated tool and support equipment information

## 2.1 General requirements

The ITE information set must contain the following types of data modules:

- Introduction
- Alphanumeric index and lists
- Equipment information

## 2.2 Introduction

The introduction data modules contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They are also to contain any necessary information of a general nature which is not detailed in any of the specific data modules.

An explanation of the presentation of each of the following must be given:

- the alphanumeric index
- how each equipment entry is presented

Where applicable, references can be made to the appropriate equipment information set.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.3 Alphanumeric index and lists

The index and the lists can be divided in separate data modules for each chapter/system.

Data module must be coded:

YY-A-SS-00-00-00A-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YSS-00-0000-00AAA-XXXA-A (37 characters)

Where:

- "SS" identifies the system of the first or major use of the equipment. When only one data module is used "SS" is to be "00".
- "XXX", the information code:
  - 014 - Alphanumeric index
  - 061 - Special SE and tools
  - 062 - Standard SE and tools
  - 063 - Government supplied SE and tools
  - 064 - Locally made SE and tools

### 2.3.1 Alphanumeric index

The alphanumeric index data module must list all the equipment included in the ITE data modules. The table consists of the following columns (refer to Table 2):

1 Part No.: The part No. of the equipment must be that given in the IPD. The arrangement must start with the letters A thru Z followed by the numerals 0 thru 9.

2 NSCM: Identifies the supplier or design authority by its North Atlantic Treaty Organisation (NATO) supply code for manufacturer.

3 Name: The name of the equipment as given in the IPD. The identifying noun or keyword must always to be first, followed by the necessary adjectives, eg Tool, spring compression.

4 Used in: The data module code of the procedure where each equipment is required.

### 2.3.2 SE and tools lists

As a complement to the alphanumeric index one or more of the following SE and tools lists data module can be included:

- Special SE and tools
- Standard SE and tools
- Government supplied SE and tools
- Locally made SE and tools

The lists are presented with the same table as for the alphanumerical index (refer to Table 2). The examples in Table 2 use 17 character data module coding.

*Table 2 Alphanumeric index - Example of data module E1-A-72-00-00-00A-014A-A*

| Part No. (1) | NSCM (2) | Name (3) | Used in procedure/Data module code (4) |
|---|---|---|---|
| HU24857 | K0680 | Clamp | E1-A-72-32-40-00A-510A-A<br>E1-A-72-32-40-00A-730A-A |
| HU24939 | K0680 | Segments | E1-A-72-41-00-00A-500A-A<br>E1-A-72-41-00-00A-700A-A |
| HU24947 | K0680 | Gauge, slip | E1-A-72-00-50-00A-520A-A<br>E1-A-72-00-50-00A-720A-A<br>E1-A-72-00-41-00A-920A-A<br>E1-A-72-00-50-00A-600A-A |
| HU25092 | K0680 | Clamp | E1-A-72-41-20-00A-520A-A |
| HU25281 | K0680 | Cutter, hydraulic | E1-A-72-32-30-00A-920A-A |
| HU25306 | K0680 | Handwheel | E1-A-72-32-30-00A-920A-A |
| HU25322 | K0680 | Cutter | E1-A-72-32-30-00A-920A-A |

| Part No. (1) | NSCM (2) | Name (3) | Used in procedure/Data module code (4) |
|---|---|---|---|
| HU25445 | K0680 | Rig, flow | E1-A-72-32-10-00A-640A-A |

## 2.4 Equipment information

### 2.4.1 General

For each equipment, a separate data module is to be allocated.

Data module must be coded:

YY-A-AA-YY-YY-YYA-066A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YAA-YY-YYYY-YYAAA-066A-A (37 characters)

### 2.4.2 Presentation of the equipment entries

Equipment information data modules must give the following data:

- A title: The identifying noun or keyword must always be first, followed by the necessary adjectives. The same wording as given in the description column of the alphanumerical index must be used.
- Application: A brief description of the equipment to enable the user to readily understand what it is used for. Related tools or equipment needed to do the task must also be given.
- Dimensions: For large equipment, their dimensions must be given to assist the user to handle the equipment.
- Mass: For heavy equipment, the mass must be given to assist the user to handle the equipment.
- Parts list: A standard tabular presentation must be used to give parts information on the equipment. Equipment, which the user can repair or replace parts on, must have a parts breakdown given in this table. Equipment which the user cannot repair or replace parts on must only have data on the SE or special tool itself.
- For complex equipment (if the parts list exceeds one page) a reference can be made to the detailed parts data module. Refer to Chap 5.2.1.9 Equipment Maintenance Information and Chap 5.2.1.5 IPD information.
- An illustration: The table must be followed by the necessary illustrations showing the equipment and, wherever possible, its location if in use.

The parts list table must consist of the following columns (refer to Fig 1, Fig 2 and Fig 3):

1 Fig ref: The figure number followed by the item number of the part on the illustration. The numbers separated by a dash. Eg "1-3" is Fig 1 and Item No. 3.

2 Part number: The part number of the equipment and, if applicable, the part number of the parts which can be repaired or replaced.

3 Name: The number of the equipment and its parts.

4 Units per assy: The number of units required for the next higher assembly.

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## Tool, fuel tank water drain

***Support equipment and tool data***

### Table of contents

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3 Mass....1
4 Parts list....1

### 1 Application

To drain water from the air vehicle fuel tanks through the drain valves.

### 2 Dimensions

Not applicable.

### 3 Mass

Not applicable.

### 4 Parts list

*Table 1 Tool, fuel tank water drain*

| Fig ref | Part number | Name | Units per assy |
|---|---|---|---|
| 1-1 | 037132P401 | Tool, fuel tank water drain | 1 |

ICN-F9-A-EB2810-D-P1632-00039-A-01-1

*Fig 1 Tool, fuel tank water drain*

Effectivity: All | **F9-A-EB-28-1000-16A-066A-A**

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-S1000D-A-050201-D-F6117-00003-A-001-01

*Fig 1 Simple equipment ITE data module - Example*

Utopia Ministry of Defence | Unclassified | F9-M1234-IETM0-00-P

# Adapter assembly, engine hoist

## *Support equipment and tool data*

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4 Parts list....1

## 1 Application

Used to remove the engine from the air vehicle and to keep it in horizontal and vertical plane..

## 2 Dimensions

1895 mm x 890 mm x 1105 mm.

## 3 Mass

65 kg.

## 4 Parts list

*Table 1 Adapter assembly, engine hoist*

| Fig ref | Part number | Name | Units per assy |
|---|---|---|---|
| 1-1 | 037132P401 | Adapter assembly, engine hoist | - |
| 1-2 | 037132P403 | • Arch assembly | 1 |
| 1-3 | 037132P405 | • Link assembly | 1 |
| 1-4 | SP113N8 | • Pin, headed, 13 mm diam | 1 |
| 1-5 | SP112N | • Washer, plain | 1 |
| 1-6 | SG90G8 | • Pin, split 3 mm diam, 25 mm long | 1 |
| 1-7 | P90E5 | • Pin, split 1 mm diam, 127 mm long | 2 |
| 1-8 | SP113E8 | • Pin, headed 6 mm diam | 2 |
| 1-9 | SP112E | • Washer, plain | 2 |
| 1-10 | 037132P409 | • Rod assembly, retaining | 1 |
| 1-11 | 037132P429 | •• Fork end, LH thread | 1 |
| 1-12 | 037132P423 | •• Fork end, RH thread | 1 |
| 1-13 | A102QP | •• Nut, lock 16 mm diam | 1 |
| 1-14 | 037132P431 | •• Nut, adjusting | 1 |
| 1-15 | 037132P427 | Ring, adapter | 1 |

Effectivity: All | F9-A-FB-71-00-02A-066A-A

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ICN-S1000D-A-050201-D-F6117-00004-A-001-01

*Fig 2 Equipment ITE data module with illustrated parts list - Example page 1*

**Utopia Ministry of Defence** **Unclassified** **F9-M1234-IETM0-00-P**

ICN-F9-A-EF7100-C-G1394-00214-A-02-1

*Fig 1 Adapter assembly, engine hoist*

Effectivity: All **F9-A-FB-71-00-02A-066A-A**

**End of data module**

**Unclassified** **2006-10-02 Page 2**

ICN-S1000D-A-050202-D-F6117-00005-A-001-01

*Fig 3 Equipment ITE data module with illustrated parts list - Example page 2*

# Chapter 5.2.1.16

## *Common information sets - Service bulletins*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Service Bulletin (SB) information.

## 1.2 Scope

it covers the rules for the preparation of service bulletin information to apply a modification, a special and/or temporary inspection to an in-service Product or part of the Product. The SB information must contain the following topics:

- Introduction
- Numerical index
- Cross-reference index
- Service bulletin

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Service bulletins

## 2.1 General

The complete set of service bulletin data modules provides a single source to notify the customers of the following types of recommendations:

- Modifications to the Product or part of the Product, including embedded software, which affect performance, improve reliability, increase safety of operation, provide improved economy or facilitate maintenance or operation.
- Substitution of one part with another superseding part when it is not completely interchangeable both functionally and physically or when change is considered sufficiently urgent or critical that special scheduling of accomplishment will be required.
- Special inspection/check to determine if the Product or part of the Product is in safe operating condition.
  - One-time inspection/check to detect a flaw or manufacturing error.
  - Special inspection/check required to be performed until a corrective action (modification) can be taken. The modification information must be issued as a revision of the service bulletin which transmits the inspection instructions.
  - Special checks of an urgent nature, such as pressure check, functional checks, etc., required to detect an incipient failure.
- Replacement of one part with another part or addition of an alternate part even though these parts are completely interchangeable both functionally and physically.
- Substitution of one embedded software program by another which change component function and the part number of the programmed memory device, requiring a record of accomplishment.
- Conversion from one model to another.
- Changes affecting the interchangeability or mixing of parts.
- At the direction of the manufacturer, a service bulletin will be used to transmit other types of information considered to be important enough for a record of accomplishment to appear in the service bulletin file (eg approved oils).

## 2.2 Technical content

### 2.2.1 General requirements

The service bulletin information set is made up of individual service bulletins.

A SB normally consists of a package of four data modules with the following information:

- Service bulletin data
- Planning information
- Accomplishment instructions
- Material information

A SB can however consist of the Introduction data module detailing such information as compliance category, planning information, accomplishment instructions, material information or

referring to other data modules dealing with accomplishment instructions. This Introduction data module can be a work sheet or contain a procedure list.

### 2.2.2 Data module coding

To assist in the codification of data modules, the rules which follow can be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-YY-YY-YY-NNW-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-NNWWW-XXXA-Z (37 characters)

Where:

- "YY-YY-YY" or "YYY-YY-YYYY", the SNS, is the one already used, for the same assembly/part in the CSDB.
- "NN", the disassembly code, is a sequential number starting from "01". Must be used to differentiate the various service bulletins which can be applied on the same assembly/part or "NN" in the disassembly code, is the one already used for the same subassembly/item of assembly/part to which maintenance information applies, starting from "00" for the complete assembly/equipment as specified in Chap 3.8.
- "W" or "WWW", the disassembly code variant, identifies in alphabetic order, starting from A, the revision of a given SB. B = first revision or "W" in the disassembly code variant, is the one already used in the CSDB to designate alternative items of assembly/subassembly/equipment differing in design to which maintenance information applies.
- "XXX", the information code must be:
  - 931 - Service bulletin data
  - 932 - Planning information
  - 933 - Accomplishment instructions
  - 934 - Material information
  - or "XXX" in the information code must be 930 - Service bulletins, when the SB consists of one data module.

Example of data module code for a SB:

YY-A-72-54-00-01D-931A-C

This data module code identifies the third revision of the first SB (01D) applicable to the low turbine shaft of an engine (72-54-00).

YY-A-72-54-00-15A-930C-C

This data module code identifies the third variant of the SB applicable to the low turbine shaft blade of an engine (72-54-00-15).

**Note**
The second SB applicable to this low turbine shaft must be identified:
YY-A-72-54-00-02A-931A-C.
The second SB applicable to this low turbine shaft blade must be identified:
YY-A-72-54-00-15A-930A-C

The content of data module YY-A-72-54-00-01D-931A-C refers to three connecting data modules:

- YY-A-72-54-00-01B-932A-C
  This data module code identifies the first revision (01B) of the planning information (932A)

- YY-A-72-54-00-01A-933A-C
  This data module code identifies the initial issue (01A) of the accomplishment instruction (933A)
- YY-A-72-54-00-01C-934A-C
  This data module code identifies the second revision (01C) of the material information (934A)

The content of data module YY-A-72-54-00-15A-930C-C can refer to data module addressed with information codes specified in Chap 8.4.

### 2.2.3 Service Bulletin Types

There are two types of service bulletin applicable, Standard and Alert. Only Alert service bulletins are to be treated differently.

#### 2.2.3.1 Alert service bulletins

The following must be applied to alert service bulletins

- the Alert SB must be differentiated from a standard service bulletin.
- revisions to an Alert service bulleting must be easily identified
- if an Alert release is done on a Standard service bulletin this must be easily identified.
- The program can decide on how best this is to be achieved.

### 2.2.4 Compliance categories

Compliance category specifies the service bulletin priority for business planning. The following nine categories can be used as such or adapted for the project:

#### 2.2.4.1 Category 1

Do before subsequent operation or before XX hours, YY cycles, or a specific date or interval. Compliance is mandatory for air vehicles, generally as a support of airworthiness authorities' action.

#### 2.2.4.2 Category 2

Do as soon as possible without effect on revenue service or before XX hours, YY cycles, or a specific end date or specified interval.

#### 2.2.4.3 Category 3

Do at next shop visit of the Product or part of the Product.

#### 2.2.4.4 Category 4

Do when (area) is next exposed.

#### 2.2.4.5 Category 5

Do as soon as the affected part is removed from the Product.

#### 2.2.4.6 Category 6

Do when the part is next repaired.

#### 2.2.4.7 Category 7

Do at customer convenience/option.

#### 2.2.4.8 Category 8

Spare parts information only.

#### 2.2.4.9 Category 9

Information only.

**Note**

Compliance category must be given in the data modules' identification and status section under "Remarks". Refer to Chap 3.9.5.1.

### 2.2.5 Introduction

This data module, introduction, must give:

- the purpose and scope of the SB publication
- the organization of the SB publication
- abbreviations and terms

Data modules must be coded:

YY-Y-YY-YY-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNAAA-018A-A (37 characters)

where "NN" in the disassembly code is a sequential number starting from "00" if more than one data module is needed.

### 2.2.6 Numeric index

This data module must give a numerical index of all effective service bulletins.

*Table 2 Numeric index*

| Service bulletin DMC | Title | Date |
|---|---|---|
| YY-A-72-21-00-05A-930A-C | Engine - Fan frame<br>Replacement of oil supply tube | 1994-12-21 |
| … | | |
| … | | |
| YY-A-72-21-00-06A-930A-A | Engine - Fan frame<br>Deletion of safety Wire | 1995-02-10 |
| … | | |

Data modules must be coded:

YY-Y-YY-YY-00-00A-013A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-00AAA-013A-A (37 characters).

### 2.2.7 Cross-reference index

This data module must give a cross-reference index of all effective service bulletins.

*Table 3 Cross-reference index*

| Title | Service bulletin DMC | Date |
|---|---|---|
| Engine - Fan frame<br>Replacement of oil supply tube | YY-A-72-21-00-05A-930A-C | 1994-12-21 |
| Engine - Fan frame<br>Deletion of safety Wire | YY-A-72-21-00-06A-930A-A | 1995-02-10 |

| Title | Service bulletin DMC | Date |
|---|---|---|
| … | | |

Data modules must be coded:

YY-Y-YY-YY-00-00A-013B-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-00AAA-013B-A (37 characters).

**2.2.8 Service bulletin**

2.2.8.1 Service bulletin data

This data module can provide, as content, the code and the title of the three data modules related to the SB or only the code of all data modules related to the SB, whenever this data module contains a work sheet or a procedure list.

**Note**

The applicability and the compliance category, given in the planning information data modules, must also be given in this data module.

2.2.8.2 Planning information

These data modules must contain the information required to permit the operator to determine if theSB should be applied to its component and to plan its accomplishment.

The information must be presented under the following headings:

*2.2.8.2.1 Applicability*

Specifies the component to which the service bulletin is applicable. Lists model, part numbers and serial numbers, or otherwise clearly identified component affected, when not specified in the status section of the data modules.

As applicable, paragraphs must be included beneath the applicability to state the production introduction by Product or component serial number.

*2.2.8.2.2 Reason*

Provides sufficient facts to assist the operator in determining the applicability to, or effect on, his operation. This information must be prepared in quantitative terms to permit the operator's evaluation as follows:

- Objective - State immediate effect the new part will have
- Problem and effect - State problem with present part, what has happened and/or what might happen if the problem is not resolved
- Solution - State how the new part or procedure will alleviate the problem

*2.2.8.2.3 Description*

Provides a brief but complete statement outlining what the service bulletin does.

*2.2.8.2.4 Compliance*

This is the compliance recommendation to the operator for incorporation of the service bulletin. Compliance categories are defined Para 2.2.4.

*2.2.8.2.5 Approval (commercial application)*

If civil authority approval is required and this approval must be stated.

*2.2.8.2.6 Manpower*

Provides and estimate of man hours required to accomplish the intent of the service bulletin.

*2.2.8.2.7* *Material*
Furnishes the operator with necessary information needed for planning and procurement. In routine cases, a reference to a "Material information" data module (refer to Para 2.2.8.4), will be sufficient. In cases where material concessions must be granted, the information must be included in this paragraph.

*2.2.8.2.8* *Tooling*
All tooling consideration associated with the change will be addressed. In cases where the change does not impact tooling "No additional special tooling is required" must be stated.

*2.2.8.2.9* *Weight and balance*
The total increase or decrease in weight will be provided if the limits stated by national or international authorities are equaled or exceeded for the Product.

The associated centre of gravity or momentum for the modification must be stated. For an engine, this statement must be given in terms of engine manufacturer's stationing system.

If the weight is not affected, the statement "Not affected" will be used.

*2.2.8.2.10* *Data modules affected*
Data modules which have been or will be revised as a result of the service bulletin will be referenced.

*2.2.8.2.11* *Previous modifications*
These will be listed when they affect a part that has been previously modified or replaced. Normally, only the service bulletin which introduced the last change of part number affected by the modification will be listed, if this part has not yet been introduced in the logistic system, such as IPD.

2.2.8.3 Accomplishment instructions
These data modules must contain all the necessary instructions to accomplish the work required by the modification or change.

The procedure will be provided step by step, in chronological sequence. Refer to Chap 3.9.5.2.3.

Applicable data modules must be referenced.

Use of illustrations to support the procedure is recommended. The illustrations will show Before and After part conditions.

If parts re-identification is required, the marking location and method to be used (in reference to standard practice data module) will be included in the instructions.

2.2.8.4 Material information
These data modules provide the information regarding material necessary to perform the modification or change, the configuration evolution, the interchangeability conditions and the parts disposition, when such information is not given in Para 2.2.8.2.7. It must be presented under the following headings:

*2.2.8.4.1* *Material requirements*
Provides the user with all information regarding material required to apply the modification or part change, material availability, spare parts provisioning data and, in same cases, instruction for return of parts for rework when such instruction is not given in Para 2.2.8.2.7. In this case, the rework facility address will be provided. Consumable products will be also defined.

*2.2.8.4.2* *List of components*
Provides configuration differences in a tabular format. As a minimum, the table will contain the following data:

– New part number

- Name
- Quantity (new)
- Old part number
- Quantity (old)
- Operation (replace, rework, re-identify)
- Change codes. These codes give the interchangeability of the new part with the old one. Change codes are numerical. They can be derived from spare part information according to the relevant specification (eg S2000M).
- Support codes. Alphabetical codes used to determine parts availability. Examples of codes:
  - A = Old parts will no longer be supplied
  - B = Old parts will be supplied until inventory is depleted
  - C = Old parts will be supplied until 1996-03-31
  - D = Old parts will be supplied for the Product not modified by this service bulletin
  - E = Old parts will be supplied, and can be used for other locations

*2.2.8.4.3 Interchangeability*

Provides explanations concerning all aspects of assembly and piece part interchangeability. Physical and functional interchangeability must be considered.

If applicable the, possibility of combining pre-modified and post-modified piece part or assemblies must be included in this paragraph.

A summary of technical and/or operational effects, limitations, that can occur, must also be included.

*2.2.8.4.4 Parts disposition*

Provides address to those parts which remain after compliance with the service bulletin. Any parts replaced and not used, deleted parts, parts to be returned for rework by some other source, parts to be discarded, etc, will have the disposition stated in this paragraph. The shipping address will be indicated for parts which are required to be returned.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Agreement on the treatment of alert SBs.** The project or the organization must decide on the treatment of alert SBs. Refer to Para 2.2.3.1.

**Agreement on compliance categories.** The project or the organization must decide on the compliance categories to be used. Refer to Para 2.2.4

# Chapter 5.2.1.17

## *Common information sets - Material data*

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*Table 1 References*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Material Data (MD) information.

## 1.2 Scope

It covers the rules for the preparation of material data information which will enable skilled personnel to order, store and use materials/Products. The MD information must contain the following topics:

- Introduction
- Material data sheets
- List of suppliers
- Numerical index
- Alphabetical index
- List of hazardous material

The material data information provides a single source of information for all Products needed for maintenance. Any information set can refer to the material data information set. The procedures described in these publications will refer to a Product per its data module code.

## 1.3 Standard and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Material data

## 2.1 General

The complete set of MD data modules is specified in Para 2.2.

## 2.2 Technical content

### 2.2.1 General requirements

The material data information set is made up of individual data sheets for all material or Products. Each data sheet is the subject of the data module.

### 2.2.2 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They are also to contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-50-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

### 2.2.3 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-A-00-50-SS-NNA-XXXA-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-SS00-NNAAA-XXXA-C (37 characters)

Where:

- "SS", the subject code must be used as follows:
  - 00 - Products/material used for complete air vehicle, land or sea system
  - 20 - Products/material used for the complete system without engine
  - 70 - Products/material used for engine

"20" and "70" are optional

- "NN", a sequential number starting from "01".
- "XXX" in the information code must be "077" for any consumables except dangerous ones which will be coded "074".

Examples:

| | |
|---|---|
| Hydrochloric acid 36% | YY-A-00-50-00-01A-074A-C |
| Sulphuric acid, pure | YY-A-00-50-00-14A-074A-C |
| Alumina 60 mesh | YY-A-00-50-70-01A-077A-C |
| Accelerator BZ | YY-A-00-50-20-25A-077A-C |

### 2.2.4 Material data sheet

All Products are identified by a separate data module.

These data modules must give technical data on the Products. They are also to present sufficient information on each Product such as alternatives or substitutes.

The data modules must furthermore give the purchasing agent necessary information to obtain the material/Product with the minimum of difficulties. They are also to assist the stock clerk in storage of the Product.

Listed below are the requirements for the eleven entries of a material data sheet.

**Note**

If an entry is not fulfilled, "None" must be stated.

1 Material identification name: It is the common name that best identifies the material/Product. This is usually the brand name or generic name.

2 Identifier Number (IN): It is assigned for the material/Product by the project. It is used to referencing in procedures. Once assigned, the IN is not to be used for any other Product or material. If a Product or a material becomes unavailable for procurement, the IN must be cancelled and never used again for another Product or material.

3 Description: It provides any other information on the material/Product to aid their identification. Its function, such as cleaning agent, lubricating coating, etc., and the form or state of Product such as paste, liquid, gas, etc, is also to be stated.

4 Trade name: It consists of the usual name of a material/Product given by the manufacturer.

5 Supplier trade name code: All data sheets must have at least one supplier listed. It is preferred to have several. Suppliers are identified by their trade name code to simplify the list in the data sheet.

6 Specification references: It lists any known international or national specifications which can define the material/Product, or to which the Product is usually manufactured, eg North Atlantic Treaty Organization (NATO) stock number, USA spec, UK spec, etc.

7 Storage information: Storage conditions of the material/Product are provided, such as temperature limits, shelf life limitation, etc. If normal storage is acceptable the information section will include the following statement: "Standard".

8 Packaging information: This information is provided to assist both the purchasing agent and the stock clerk. Package sizes, shape etc. should be indicated. Packaging data will be that used by the supplier listed in the data sheet at time of issue of the sheet.

9 Transportation information: This information is provided to assist both the purchasing agent and the stock clerk. Data must include color codes when they exist and helpful information relative to any restrictions or problems related to transporting the material/Product from supplier to the user. It is also to carry the classifications according to risk such as "harmful", "inflammable", "combustible", "poisonous" and the flash points of inflammable substances. Hazardous classes must be given in accordance with regulations such as International Air Transport Association (IATA) regulations.

10 Specification requirements/General characteristics: It provides the appropriate data to aid the procurement and/or identification of the material/Product. The data can be general, or in some cases, data shown can relate to both specification requirements and general characteristics.

11 Disposal information: It provides the information required to ensure the proper procedures are identified to dispose of the hazardous waste, and environmental pollutants in an environmentally acceptable manner.

Data modules are coded as given in Para 2.2.2.

Examples of a data sheets with data relative to a chemical Product and an abrasive Product are given in Fig 1 and Fig 2.

### 2.2.5 List of suppliers

This data module must give a list of suppliers. The list can be deduced from the data modules previously defined. For each supplier, in alphabetic order, this list must give the information described in Table 2, as available.

*Table 2 List of suppliers*

| Trade code address | Supplier code | Identifier number | Material identification name |
|---|---|---|---|
| Turco | XXXXX | IN 1001 | Nitric acid |
| Turco France<br>35 imp. Industrie F91200 Athis-Mons | | IN 1027 | Descaler |
| … | | | |

Data modules must be coded:

YY-Y-00-50-00-00A-019A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-0000-00AAA-019A-A (37 characters)

### 2.2.6 Numeric index

This data module must give a numeric index of all identifier numbers. This index can be deduced from the data modules previously defined. For each identifier number, in alphanumeric order, this list must give the information described in Table 3.

*Table 3 Numeric index*

| Identifier number | Material identification name |
|---|---|
| IN 2034 | Alodine |
| IN 2333 | Accelerator BZ |
| … | |

Data modules must be coded:

YY-Y-00-50-00-00A-013A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-0000-00AAA-013A-A (37 characters)

### 2.2.7 Alphabetic index

This data module must give an alphabetic index of all Material identification names. This index can be deduced from the data modules previously defined. For each material/Product, in alphabetic order, this list must give the information described in Table 4.

*Table 4 Alphabetic index*

| Material identification name | Identifier code |
|---|---|
| Accelerator BZ | IN 2333 |
| Alodine | IN 2034 |
| … | |

Data modules must be coded:

YY-Y-00-50-00-00A-014B-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-0000-00AAA-014B-A (37 characters)

### 2.2.8 List of hazardous material

Hazardous materials will be listed in a separate data module "List of hazardous materials" per potential hazard class given by IATA regulations. Refer to Table 5.

*Table 5 Hazard classes*

| Class | Potential hazard |
|---|---|
| 1 | Explosive |
| 2 | Compressed gases |
| 3 | Flammable liquids |

Data modules must be coded:

YY-Y-00-50-00-00A-016A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-50-0000-00AAA-016A-A (37 characters)

Utopia Ministry of Defence CLASSIFICATION E1-A/MDP-00

(1) **Sulphuric acid, pure**

(2) ***IN 1064***

(3) **1 Description**
Sulphuric acid, pure. $H_2SO_4$

(4) **2 Trade name**
None

(5) **3 Supplier trade name code**
K1, P7, S16

(6) **4 Specification references**
None

(7) **5 Storage information**
Keep the container well closed. When concentrated acid is stocked in container of ferrous metal, precautions must be taken to ensure that no humidity is absorbed from the air to form a highly corrosive layer. Water increases its corrosive properties.

(8) **6 Packaging information**
None

(9) **7 Transportation information**

**WARNING**

**Corrosive product. Very dangerous.**

(10) **8 Specification requirements/General characteristics**
Containing a minimum of 95 % $H_2SO_4$

Impurity tolerances:

| | |
|---|---|
| Arsenic and arsenious acid | 0.002 % |
| Nitric acid | 0.01 % |
| Fe | 0.010 % |
| Fixed residues | 0.08 % |

Color: White

Relative density: 1,8394 66° Baumé

(11) **9 Disposal information**
None

E1-A-00-50-00-14A-074A-C

**End of data module**

CLASSIFICATION 1995-03-01 Page 1

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*Fig 1 Data sheet - Example, chemical Product*

Utopia Ministry of Defence CLASSIFICATION E1-A/MDP-00

**Corundum, white 300 micrometers**

***IN 2403***

**1 Description**
Abrasive aluminium oxide grit (CA46)

**2 Trade name**
None

**3 Supplier trade name code**
P13, E4

**4 Specification references**
None

**5 Storage information**
Store in sealed container.

**6 Packaging information**
50 kg paper bag (Europe)

**7 Transportation information**
Not listed. No known hazard

**8 Specification requirements/General characteristics**
Composition

| | |
|---|---|
| $AL_2O_3$ | >99.0% |
| $SIO_2$ | <0.1 % |

Color: White

Test sieve ISO: 565 micrometers

| Sieve designation | % Retained |
|---|---|
| 600 | 100 % pass through |
| 425 | 30 % max. retained |
| 300 | 65 % min. retained |
| 250 | 3 % max. pass through |

**9 Disposal information**
None

E1-A-00-50-00-05A-077A-C

End of data module

CLASSIFICATION 1995-03-01 Page 1

ICN-AE-A-050201-A-D0216-00034-A-01-1

*Fig 2 Data sheet - Example, abrasive Product*

# Chapter 5.2.1.18

## *Common information sets - Common information and data*

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*Table 1 References*

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|---|---|
| None | |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding of data modules for Common Information and Data (CID) information.

## 1.2 Scope

It covers the rules for the preparation of consolidated lists of Common information and data. The CID information contains one or more of the following:

- List of abbreviations - List of abbreviations (LOA) - information code 005
- List of terms - List of terms (LOT) - information code 006

- List of symbols - List of symbols (LOS) - information code 007
- List of applicable specifications and documentation - List of applicable specifications and documentation (LOASD) - information code 00V (alt information code 017)

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Common information and data

## 2.1 Technical content

### 2.1.1 General requirements

The CID consists of the compiled lists given in Para 1.2. The abbreviations, terms, symbols and applicable specifications and documentation are derived from the introduction data modules prepared for each information set. If the project does not prepare individual LOA, LOT, LOS and LOASD for each information set, the lists in the CID have to be prepared from scratch.

### 2.1.2 List of abbreviations

Non-standard abbreviations used in the information set are listed in a list of abbreviations. The list must be presented as an informal table with the abbreviations in alphabetic order together with the full wording. Refer to Fig 1.

Data modules must be coded:

YY-A-00-00-00-00A-005A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-005A-A (37 characters)

### 2.1.3 List of terms

Non-standard terms used in the information set are listed in a list of terms. The list must be presented as an informal table with the terms in alphabetic order together with the amplification of their meaning. Refer to Fig 2.

Data modules must be coded:

YY-A-00-00-00-00A-006A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-006A-A (37 characters)

### 2.1.4 List of symbols

Non-standard symbols used in the information set are presented in a list of symbols. The list must be presented as an informal table with the symbol together with the explanation of their meaning. Refer to Fig 3.

Data modules must be coded:

YY-A-00-00-00-00A-007A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-007A-A (37 characters)

### 2.1.5 List of applicable specifications and documentation

Specifications and documents which are necessary to read or follow when using the information set are presented in a list of applicable specifications and documentation. The list must be presented as an informal table. Refer to Fig 4.

Data modules must be coded:

YY-A-00-00-00-00A-00VA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-00VA-A (37 characters)

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## List of abbreviations

| | |
|---|---|
| HP | High pressure |
| HPS1 | Hydraulic pressure system 1 |
| HPS2 | Hydraulic pressure system 2, Emergency system |
| LLW | Low level, warning |
| LPW | Low pressure, warning |
| PI1 | Pressure indicator HPS1 |

Effectivity: All | TA-A-00-00-00-00A-005A-A

End of data module

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*Fig 1 LOA - Example*

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## List of terms

| | |
|---|---|
| Bare engine | An engine which is fully completed internally, but on which no external parts or components have been installed. |
| Engine | An engine which is equipped with external parts and components supplied by the engine manufacturer. |
| Maximum conversion assembly | Two or more components, fittings and/or packings, or any externally mounted accessories which, for practical reasons, shall be assembled prior to being installed on the power plant. |
| Sequential grouping | Any coherent package of logically sequenced information which describes a complete action. The action may consist of the completion of either a maximum convenience assembly or the installation of an accessory or system. |

Effectivity: All | TA-A-00-00-00-00A-006A-A

**End of data module**

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*Fig 2 LOT - Example*

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## List of symbols

| | |
|---|---|
| $a_1$ | Distance 1 in m |
| $a_2$ | Distance 2 in m |
| $d_t$ | Diameter in mm |
| $n_1$ | Pump speed HPS1 in rpm |
| $n_2$ | Pump speed HPS2 in rpm |
| $n_d$ | Pump speed, difference $n_2$ - $n_1$ |
| | Warning. Laser beam |
| | Warning. Magnetic field |
| | No access for persons with pacemakers |

Effectivity: All | **TA-A-00-00-00-00A-007A-A**

**End of data module**

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ICN-AE-A-050201-G-S3627-00422-A-02-1

*Fig 3 LOS - Example*

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## List of applicable specifications and documentation

| | |
|---|---|
| ISO 7010:2003(E) | Graphical symbols - Safety colours and safety signs - Safety signs used in workplaces and public areas |
| ST/SG/AC.10/C.4/2001/30/Add.1 | Graphical symbols, safety identification, signs, shapes, symbols and colours, comprehensibility. Transmitted by the International Standardization Organization (ISO). Addendum 1 |
| ISO 3864-1:2002(E) | Graphical symbols - Safety colours and safety signs - Part 1:Design principles for safety signs in workplaces and public areas |
| DEF-STAN 00-60 Part 0 | INTEGRATED LOGISTIC SUPPORT PART 0: APPLICATION OF INTEGRATED LOGISTIC SUPPORT (ILS) |

Effectivity: All | TA-A-00-00-00-00A-00SA-A

End of data module

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ICN-AE-A-050201-G-S3627-00423-A-02-1

*Fig 4 List of applicable specifications and documentation (LOASD) – Example*

# Chapter 5.2.1.19

## *Common information sets - Training*

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| Chap 4.9.5 | Publication and SCORM content package management - SCORM content package module |

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Training Information.

## 1.2 Scope

It chapter covers planning and the content of training information set for training information. The information set described in the chapter is intended as a generic information set and it is acknowledged that different projects will have different requirements.

Data modules produced using this information set must cover the requirements for the preparation of information applicable to training, which will enable personnel to be trained on the product to a suitable level, as specified by the project. This chapter uses the following as a general example of training content. Note that these can be single or multiple elements. Refer to Fig 1.

- course
- introduction
- module (optional aggregation)
- lesson
- topic
- test

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*Fig 1 Training information set content*

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions are given for training information in data modules:

- Planning: Definition of information needed to for lesson planning.
- Course: Related series of lessons
- Lesson: Instructional aggregate consisting of multiple topics with one Terminal Learning objective
- Topic: Smallest instructional unit associated with one Enabling Learning Objective
- Terminal Learning Objective (TLO): A TLO is a primary, measurable objective that defines the knowledge or skill a learner must master to successfully complete a lesson
- Test: Knowledge check through testing. Method of test can be a scenario, practice etc and will be dependent on the project
- Enabling Learning Objective (ELO): An ELO is a subordinate objective that supports the achievement of a TLO. An ELO defines the skills a learner must master to successfully complete a topic.

# 2 Training

## 2.1 Planning information

Planning information describes learning needs and goals, instructional design models, task analyses, learning taxonomies, and other information necessary to the lesson planning process.

This is an essential part of the process of defining training information. Refer to Chap 3.9.7.

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

## 2.2 Training information

Training data modules contain only information that is specific to training. Any procedures that are already written, or planned to be written, as maintenance data modules are to be presented as a link from the training data modules. Refer to Chap 3.9.5.1 and Chap 3.9.5.2.1.2.

### 2.2.1 Introduction

The introduction data modules contain an explanation of the purpose, scope, structure, special format and use of the technical content of the information set.

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

### 2.2.2 Course

The method of course delivery is to be agreed within a project. This can be met several ways utilizing SCORM to create a compliant package or using a SCORM content package.

The SCORM content package coding methodology utilized will depend on the course delivery mechanism. Refer to Chap 4.9.5.

### 2.2.3 Module

A course module is an optional aggregate consisting of multiple lessons and multiple Terminal Learning objectives. A SCORM content package is used to describe the course module.

The course module data module(s) specify:

- course module introduction
- course module objective

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

### 2.2.4 Lesson

A module lesson is an instructional aggregate consisting of multiple topics with one TLO. A TLO is a primary, measurable objective that defines the knowledge or skill a learner must master to successfully complete a lesson. The format and construct of the lessons will be agreed within the project. A SCORM content package can be used to describe the lesson. Refer to Chap 4.9.5. Lesson data modules specify:

- lesson introduction
- lesson objective

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

**Note**

The above data module coding is to be used for those data modules that specifically contain training information only. Maintenance data modules that are being repurposed for training must be coded in the normal way for maintenance data modules and are not changed for use in training.

### 2.2.5 Topic

The lesson topic is the smallest instructional unit associated with one ELO, which is a subordinate objective that supports the achievement of a TLO. A SCORM content package can be used to describe the lesson. Refer to Chap 4.9.5.

The format and construct of the topics will be agreed within the project. The topic data module(s) specify:

- topic introduction
- topic objective
- topic content that is not contained in maintenance data modules
- maintenance data modules

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

**Note**

The above data module coding is to be used for those data modules that specifically contain training information only. Maintenance data modules that are being repurposed for training must be coded in the normal way for maintenance data modules and are not changed for use in training.

### 2.2.6 Test and sequencing

Testing and sequencing uses the process data module. Details on the specific use of this data module type, the state table and logic engine will be given in a future issue of the specification. Refer to Chap 4.11.

#### 2.2.6.1 Test

This aspect will cover knowledge checks, practice sessions, assessment and feedback through testing. The method of testing can be scenario based, practice based, etc and will be as agreed within the project. The format and construct of the tests will be agreed within the project. The test data modules specify:

- knowledge check
- practice sessions
- assessment
- feedback

Note that within some projects that this information can be interactive and integrated into a higher level LMS. In these cases the project will decide on the integration and feedback mechanisms.

Data modules must be coded:

YY-Y-YY-YY-YY-YYY-YYYY-Y-YYYA (21 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYYYY-YYYY-Y-YYYA (41 characters)

Where "XX-XX-XX" and "XXX-XX-XXXX" is the SNS of the Product (eg tire)

**Note**

The above data module coding is to be used for those data modules that specifically contain training information only. Maintenance data modules that are being repurposed for training must be coded in the normal way for maintenance data modules and are not changed for use in training.

#### 2.2.6.2 Sequencing

The sequencing through data modules is achieved using the process data module.

#### 2.2.6.3 Example constructs

Fig 2 shows an example topic construct that utilizes training and maintenance data. The example shows the possible flow of information, question points and the possible feedback/return paths. These are identified in four types:

- Sequencing, using the process data module
- traversal to a maintenance data module after training content has been delivered via a training data module
- return to the practice session data module after test; this would be invoked by establishing pass/forwarding criteria within the process data module

– feedback to the user

The decision boxes in Fig 2 represent the element <dmIf> within the process data module.

– Where a training data module is defined this can be one or more occurrences and will have the item location code in its data module code set to a value of "T", for those projects that either have legacy training data modules or have no requirement to be SCORM conformant. If there is a requirement to be SCORM conformant the data modules will need to use the learn code and/or learn event code. Refer to Chap 4.3.9 and Chap 4.3.10.

Where maintenance data modules are used, these can be one or more occurrences and will have their item location code in their data module codes set to the permissible values of "A", "B", "C" or "D" and will not be changed to integrate them into a training event.

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*Fig 2 Example Topic construct*

Fig 3 shows an example course construct that utilizes the SCORM content package to "build" the course.

ICN- AE-A-05020119-0-83007-00003-A-01-1

*Fig 3 Example Course Construct*

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Planning scope and depth**. There must be agreement between customer and contractor on the planning scope and depth. Refer to Para 2.1.

**Training information scope and depth**. There must be agreement between the customer and contractor on the training information scope and depth. Refer to Para 2.2.

# Chapter 5.2.1.20

## *Common information sets - List of applicable publications*

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| Chap 4.3 | Information management - Data module code |
| Chap 4.9.1 | Publication and SCORM content package management - Publication module |
| Chap 5.3.1.2 | Common requirements - Technical content |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding of the List of Applicable Publications (LOAP) information.

## 1.2 Scope

It covers the rules for the preparation of information for listing the applicable publications and other documents including individual data modules (not included in any of the technical

publications) to enable the users to select the publications they require for planning and to maintain, operate and support the Product.

The LOAP is a publication listing all technical publications and documents included in the technical publication package for a Product, a project or a part thereof. It is commonly used as a customized contractual document and during the delivery phase of the initial publication package. The LOAP is also frequently used during the in-service phase by the end-users as well as administrators to have a configured overview of the publications and documents contracted for.

**Note**

During the in-service phase the LOAP can be a consolidated LOAP including publications and documents produced and delivered by the contractor and other organizations.

The delivery consists of one publication module including front matter data modules and one or more publication list data modules.

A LOAP can be used as a contractual listing of technical publications and other documents to be delivered for a project.

**Note**

SCO package modules and learning data modules must not be listed in the LOAP.

# 2 List of applicable publications

The standards and definitions given in this chapter are applicable with no exceptions.

## 2.1 General

The LOAP must contain front matter as required and one or more publication list data modules (refer to Para 2.3) listing the references to all applicable publication modules, data modules, legacy technical publications or documents for the Product, the project or a part thereof as specified by the customer.

The information in the publication list data modules can be grouped, eg by operational, maintenance, equipment, support equipment, training equipment publications. The listing must be in alphanumeric sequence of the publication code, or equivalent, which is the entry to all lists. The listing can include not yet published publications.

## 2.2 Introduction

The introduction data module must provide information as specified in Chap 5.3.1.2. It must be coded:

YY-Y-00-40-00-NNY-018Y-Y (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-40-0000-NNYYY-018Y-Y (37 characters)

where "NN" in the disassembly code is a sequential number starting from "01" if more than one data module is needed.

## 2.3 Publication list data modules

The referenced publications and documents are listed in one ore more publication list data modules. The markup for descriptive data modules is used and the list data modules include one or more lists presented as tables. Refer to Table 2. The content of each entry is given in Para 2.3.2.

### 2.3.1 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules for publication lists must be coded:

YY-Y-00-40-00-NNA-014A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-40-0000-NNAAA-014A-A (37 characters)

where "NN" in the disassembly code is a sequential number starting from "01" if more than one data module is needed.

### 2.3.2 Populating the publication lists data modules

Each entry in the publication list must include:

– **Publication code** - The publication module code given in Chap 4.9.1 or any other relevant publication or document code or number.

  It is recommended to markup the entry as a <pmRef>, <externalPubRef> or <dmRef>.

  **Note**

  In case of individual data modules, the data module code is used as entry in the table. Refer to example in Table 3.

– **Title** - The title of the publication or document. For equipment publications the manufacturer's part No. or reference No. can, by project decision, be given as additional information.

– **Issue identifier** - Either or both:
  - Issue number - The issue number of the publication or document.
  - Issue date - The issue date of the publication or document.

– **Security classification** - The security classification/confidentiality of the complete publication as given in Chap 3.9.5.1.

  **Note**

  If the publication is distributed on eg a CD-ROM, the classification must correspond to the highest classified information on the entire CD-ROM.

– **Publisher** - The company name or the CAGE code of the responsible company for the complete publication or document.

– **Media information** - Gives information on which type of media the publication or document is available and its identifier (code) if different from the publication or document code.

Each entry can also include:

– **Language** - The language in which the publication or document is written.

The table header in the examples given below must be used.

Table 2 shows the publication list filled in with aircrew publications as an example. Data module code eg: 1B-A-00-40-00-01A-014A-A.

Table 3 shows the publication list filled in with maintenance publications as an example. Data module code eg: 1B-A-00-40-00-02A-014A-A.

Table 4 shows the publication list filled in with engine publications as an example. Data module code eg: 1B-A-00-40-00-03A-014A-A.

Table 5 shows the publication list filled in with component and support equipment publications as an example. Data module code eg: 1B-A-00-40-00-05A-014A-A.

*Table 2 Aircrew publications. Example*

| Publication code | Title | Issue date<br>Issue No. | Publisher<br>Security classification | Media information |
|---|---|---|---|---|
| 1B-D9460-00001-00 | Aircrew manual, Batch 1 | 2003-09-04 | C0419<br>Restricted | CD-ROM |
| 1B-D9460-00002-00 | Flight crew checklist | 2003-09-04 | C0419<br>Restricted | Paper |

*Table 3 Maintenance publications. Example*

| Publication code | Title<br>(Language) | Issue date<br>Issue No. | Publisher<br>Security classification | Media information |
|---|---|---|---|---|
| 1B-D9460-00105-00 | Air vehicle maintenance planning (English) | 2003-09-04 | C0419<br>Restricted | CD-ROM<br>1B-D9460-00100-00-CD[1] |
| 1B-D9460-00128-00 | Air vehicle maintenance (English) | 2003-09-04 | C0419<br>Restricted | CD-ROM<br>1B-D9460-00100-00-CD[1] |
| 1B-D9460-01001-00 | IPD - Air vehicle (English) | 2003-09-04 | C0419<br>Unclassified | CD-ROM<br>1B-D9460-00100-00-CD[2] |
| 1B-D9460-01001-00 | IPD - Air vehicle (English) | 2003-09-04 | C0419<br>Unclassified | Paper<br>1B-D9460-01001-00-P[2] |
| F2-A-12-00-00-00A-200A-A | Servicing - No-step areas | 2002-10-04 | C0419<br>Unclassified | Paper[3] |

1 These publications are included in an air vehicle publication.
2 This IPD is published in a CD and a paper version.
3 This document is a data module. The only reference is the data module code.

*Table 4 Engine publications. Example*

| Publication code | Title | Issue date<br>Issue No. | Publisher<br>Security classification | Media information |
|---|---|---|---|---|
| 1B-D9460-00504-00 | Engine manual | 2003-09-04<br>002 | D3309<br>Restricted | CD-ROM<br>1B-D3309-0004 |
| 1B-D9460-00508-00 | IPD - Engine | 2003-09-04<br>011 | D3309<br>Unclassified | CD-ROM<br>1B-D3309-0008 |

*Table 5 Component and support equipment publications. Example*

| Publication code | Title | Issue date<br>Issue No. | Publisher<br>Security classification | Media information |
|---|---|---|---|---|
| 1B-D9460-02009-00 | Component maintenance - Battery BATT-0045-A0073[1] | 2003-09-04 | C0419<br>Restricted | CD-ROM<br>1B-D9460-02000-00-CD[2] |

| Publication code | Title | Issue date<br>Issue No. | Publisher<br>Security classification | Media information |
|---|---|---|---|---|
| 1B-D9460-05017-00 | Aerospace ground equipment - Tire removal rig / 9567-223000-001<br>(English) | 2003-09-04 | C0419<br>Restricted | CD-ROM |
| GAF T.O. 14Q1-1RUS2-1-3 | Anti-G-Hose / ACME-004-BA34X02 | 1951-05-24 | K0999<br>Unclassified | Paper<br>L7001214741 |

1 The manufacturer's part No. or reference No. can be added by project decision.
2 This publication is included in a Engine component publication distributed on a CD.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**One consolidated publication list data module or several separate publication list data modules.** The project or organization must decide whether to deliver the publications and documents listed in one data module (with one or more lists presented as tables) or as separate data modules, eg by operational publications or maintenance publications.

**Include unpublished publications and documents**. The project or organization must decide whether or not to include publications and documents that are not published.

**Note**

When used as a contractual document all publications and documents, published or not, must be included.

**Include the manufacturer's part No. or reference No**. The project or organization must decide whether or not to include and present the manufacturer's part No. or reference No.

**Markup of publication entry as a link**. The project or organization must decide whether or not to markup of the publication entry as a link.

**Use of language**. The project or organization must decide whether or not to include and present language.

# 4 Example

The following example gives a publication list data module for maintenance publications (content of Table 3):

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<colspec colnum="3" colname="C3" colwidth="0.63*"/>
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</entry>
<entry>
<para>Title</para>
```

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<para>Issue date</para>
</entry>
<entry rowsep="1">
<para>Publisher</para>
</entry>
<entry>
<para>Media information</para>
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</row>
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<para>Security classification</para>
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<entry>
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</entry>
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infoCodeVariant="A" itemLocationCode="A"/>
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</dmRef>
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<entry>
<para>C0419</para>
</entry>
<entry>
<para>Paper</para>
</entry>
</row>
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<para>Unclassified</para>
</entry>
</row>
</tbody>
</tgroup>
</table>
</description>
</content>
```

# Chapter 5.2.1.21

## *Common information sets - Maintenance checklists and inspections*

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# 1 General

## 1.1 Scope

This chapter covers the rules for the preparation of information applicable to Maintenance Checklists and Inspection which will enable skilled personnel to perform required checks and services of the Product. It contains information about the necessary requirement for preventive checks and maintenance. The information contains the following topics:

- Preventive maintenance checks and services
- Checking unpacked equipment conditions
- Preventive maintenance inspections
- Special inspections

The data and information are based on technical analyses using the objectives of an efficient maintenance program.

## 1.2 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Maintenance Checklists and Inspection information.

## 1.3 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

- Preventive Maintenance Checks and Services (PMCS): Periodic inspection and maintenance at scheduled intervals to ensure that the equipment and its components remain mission capable and in good operating condition. In aircraft, checks are required of mandatory safety-of-flight items. Lubrication is part of (PMCS).

# 2 Maintenance checklists and inspections

## 2.1 Introduction

The introduction data modules can contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They can also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

A list of terms can be included which defines conditions (eg "excessive"), damage (eg "crack") and other relevant terms (eg inspection types).

Data modules must be coded:

YY-Y-05-00-00-NNA-018A018Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-00-0000-NNAAA-018Y-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

## 2.2 Data module coding

To assist in the codification of data modules the rules which follow can be used in addition to those given in Chap 4.3.

### 2.2.1 Preventive Maintenance Checks and Services (PMCS)

Data modules must be coded:

YY-Y-05-10-SS-NNA-200A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-10-SS00-NNAAA-200A-A (37 characters)

Where:

- "SS", the system to which data and information are applicable. Refer to Chap 8.2. "00" is used if data and information are applicable to the system as a whole.
- "NN", the subsystem if it is necessary to split the system into several subsystems (if not, use "00"). Refer to Chap 8.2.

The information code variant is used to distinguish between the different information sets.

Example:

- Data and information about PMCS for parts of the landing gear system (32) must be coded: 1Y-A-05-10-32-00A-000A-A

### 2.2.2 Checking unpacked equipment conditions

Data modules must be coded:

YY-Y-05-20-SS-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-20-SS00-NNAAA-000A-A (37 characters)

Where:

- "SS" is the system to which data and information are applicable. Refer to Chap 8.2. "00" is used if data and information are applicable to the system as a whole.
- "NN" is the subsystem if it is necessary to split the system into several subsystems (if not, use "00"). Refer to Chap 8.2.

Example:

- Data and information about Checking unpacked equipment conditions of the landing gear system (32) are coded: 1Y-A-05-20-32-00A-000A-A

### 2.2.3 Preventive maintenance inspections

Data modules must be coded:

YY-Y-05-SS-00-NNA-310A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-SS-0000-NNAAA-310A-A (37 characters)

Where:

- "SS" gives the inspection type:
  - "40": Scheduled check (eg Preflight inspection).
  - "50": Unscheduled check (eg Inspection after hard landing)
  - "60": Acceptance and functional check flight
- "NN" is a sequential number to identify a specific check.

The information code variant is used to distinguish between the different information sets.

Example:

- The definition of a check after hard landing could be coded: 1F-A-05-50-00-18A-000A-A

### 2.2.4 Special inspections

Data modules must be coded:

YY-Y-05-SS-00-NNA-310A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y05-SS-0000-NNAAA-310A-A (37 characters)

Where:

- "SS" gives the inspection type:
  - "40": Scheduled check (eg Preflight inspection).
  - "50": Unscheduled check (eg Inspection after hard landing)
  - "60": Acceptance and functional check flight
- "NN" is a sequential number to identify a specific check.

The information code variant is used to distinguish between the different information sets.

Example:

- The definition of a check after hard landing could be coded: 1F-A-05-50-00-18A-000A-A

## 2.3 Preventive Maintenance Checks and Services (PMCS)

The PMCS data module will be prepared and based upon the principles of Reliability Centered Maintenance (RCM) logic and will include PMCS information, periodic lubrication instruction and applicable scheduled corrosion inspections.

- Each line entry is built up from the items defined below.
- Each item is filled up as necessary in accordance with the description given.
- Only one value is given for each item. If items are subject to various values, as many line entries as values are provided.

### 2.3.1 Item Number

Item numbers will be assigned to the PMCS procedures. The PMCS procedures will be arranged in a logical sequence requiring minimum time and motion on the part of the person(s) performing them and will be arranged so that there will be minimum interference between persons performing the checks simultaneously on the same end item.

### 2.3.2 Intervals

The designated interval (ie "before", "during", "after", "weekly", etc) when each check is to be performed will be included. Procedures done first or most frequently (ie "before" checks and services) will appear prior to "during" and "after" checks and services. When more advantageous to the user, intervals will be subgrouped by crewmember(s). The "core" PMCS intervals which can be used are as follows:

- Before
- During
- After
- Daily
- Weekly
- Monthly
- Quarterly
- Semiannually
- Annually
- Periodic
- Intermediate (Aviation only)
- Manhour/day (Aviation only)
- Phased (Aviation only)
- Other

### 2.3.3 Duration or man-hours

When specified by the acquiring activity, duration or man-hours (MAN-HOUR) that are required to complete all prescribed lubrication services must be included. Man-hours must be stated to the nearest 10th of an hour.

### 2.3.4 Equipment

Information identifying the item or system to be checked will be identified in as few words as possible to clearly identify the item. Usually the common name (eg, bumper, gas can and mounting bracket, front axle) will be enough.

### 2.3.5 PMCS Procedure

The procedure by which each check is to be performed, as well as any information required to accomplish each check or service, including lubrication, appropriate tolerances, adjustment limits, and instrument gage readings will be provided. Illustrations will be prepared to identify the location or the process of the task being performed and must be integrated with the procedures. Whenever replacement or repair is recommended, the maintenance task will be included or the applicable maintenance data module can be referenced. Any periodic/scheduled lubrication procedures required for the equipment will be included in the PMCS procedures.

### 2.3.6 Equipment not ready or available

A brief statement of the condition (EQUIPMENT NOT READY/AVAILABLE IF:)(eg, malfunction, shortage) that would cause the equipment to be less than fully ready to perform its assigned mission will be provided. If the procedure contains detail steps the statement will be placed opposite the applicable task.

## 2.4 Checking unpacked equipment conditions

Instructions can be prepared for a condition check of the shipment (including that of pallets, containers, boxes, and legibility of markings). The information lists each item of a component by location that requires inspection. The information can be contained in tabular format.

- Each line entry is built up from the items defined below.
- Each item is filled up as necessary in accordance with the description given.
- Only one value is given for each item. If items are subject to various values, as many line entries as values are provided (except items where several values are allowed).

### 2.4.1 Location

The location includes a short description describing the location of the item being inspected.

**2.4.2 Equipment item**
Information identifying the item that requires inspection stated in as few words as possible. Usually the common name (eg, bumper, gas can and mounting bracket, front axle) will be enough.

**2.4.3 Equipment item**
Information identifying the item that requires inspection stated in as few words as possible. Usually the common name (eg, bumper, gas can and mounting bracket, front axle) will be enough.

**2.4.4 Action**
For each item listed, an inspection action is provided and, when needed, a reference can be made to an associated data module. Each component item can require multiple actions and subordinate actions to describe the inspection requirements. Each first level action can provide a separate reference to a data module for further details on an inspection or an action to be taken.

**2.4.5 Remarks**
Any additional remarks can be included in the remarks section.

## 2.5 Preventive maintenance services inspections

A data module can be developed for each specific inspection interval (ie daily, intermediate, periodic, 10 hour/14 day, 30 hr/42day, etc), as applicable to the aircraft. Inspection checklists will be divided by areas of the aircraft (ie nose, fuselage, tail, etc). All items requiring inspection will be listed in the logical sequence of inspection that would require a minimum of time and motion on the part of the individual performing the inspection. The checklist data can be contained in a table.

Each data module contains the following information:

**2.5.1 Sequence number**
Each inspection will be assigned a sequence number.

**2.5.2 Work area**
If applicable, each inspection can be assigned a work area.

**2.5.3 Procedures**
All procedures required to perform each of the required inspections will be captured. When an inspection item is not to be performed during each inspection, the interval/frequency will be stated within in the procedure (ie perform only every 2nd inspection).

**2.5.4 Task duration**
The time required perform the inspection task will be captured.

## 2.6 Special inspections

Items that qualify for special inspections (eg hard landings, sudden stoppage, over speed) will be included. These inspections will be grouped under specific aircraft areas. A line drawing of the aircraft or accessory showing sequence for inspection by area will be included. The area identified will include all surfaces, materials, components, and equipment pertaining to that specific location. The following inspection data entries will be included, as applicable, and can be presented in tabular format.

**2.6.1 Zone**
Zone will include area name and number.

**2.6.2 Item number**

Inspection number will be captured.

**2.6.3 Interval**

The designated interval when inspections are to be performed is captured for the purpose of creating columns to identify when each inspection should be performed.

**2.6.4 Equipment item**

Information identifying the item that requires inspection stated in as few words as possible.

**2.6.5 Inspection procedure**

All procedures required to perform each of the required inspections will be captured. When an inspection item is not to be performed during each inspection, the interval/frequency will be stated within in the procedure (ie perform only every 2nd inspection).

# Chapter 5.2.2

## *Information sets - Air specific information sets*

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| Chap 5.2.2.5 | Air specific information sets - Power plant build-up information |
| Chap 5.2.2.6 | Air specific information sets - Engine standard practices |
| Chap 5.2.2.7 | Air specific information sets - Aircrew information |

## 1 General

This chapter provides the references for the preparation and coding of air specific Information sets.

## 2 Air specific information sets

Guidance is given in the following chapters:

- Use of generic information, refer to Chap 5.2.2.1
- Structure repair information, refer to Chap 5.2.2.2
- Cross servicing information, refer to Chap 5.2.2.3
- Engine maintenance information, refer to Chap 5.2.2.4
- Power plant build-up information, refer to Chap 5.2.2.5
- Engine standard practices information, refer to Chap 5.2.2.6

– Aircrew information, refer to Chap 5.2.2.7

# 3 Business rules decisions

For all the chapters above, business rules decisions include, but are not limited to, the following:

**Data module coding strategy.** The project or the organization must decide the definition of the data module coding strategy to be applied.

**Project specific information sets**. The project or the organization must decide on the project specific information sets.

# Chapter 5.2.2.1

## *Air specific information sets - Use of generic information sets*

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## 1 General

The generic information sets specified in Chap 5.2.1 are also applicable to air vehicles. Specific rules for these air vehicles are stated in the corresponding locations in the Chap 5.2.2.2 thru Chap 5.2.2.7.

# Chapter 5.2.2.2

## *Air specific information sets - Structure repair information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Air vehicle Structure Repair (ASR) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to air vehicle structure repair which will enable skilled personnel to assess and repair damage. Battle Damage Assessment and Repair (BDAR) information is covered in Chap 5.2.1.14.

In accordance with the SNS (refer to Chap 8.2.2), the breakdown of the ASR information must be as follows:

- System 51 Standard practices - Structures
- System 52 Doors
- System 53 Fuselage
- System 54 Nacelles/pylons
- System 55 Stabilizers
- System 56 Windows and canopies
- System 57 Wings

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

# 2 Structure repair information

## 2.1 General

Repairs due to corrosion damage are included where necessary. Identification, classification and removal of corrosion are part of the Corrosion Control (CC) information set. Refer to Chap 5.2.1.3.4.

Instructions for one time (ferry) flight repairs, temporary repairs and critical area repairs include information on flight restrictions to be imposed (if applicable) until such time as permanent repairs have been completed.

Illustrations, diagrams and related tables must be included in the information with such additions as can be required to illustrate detailed repair of the air vehicle.

The ASR information set includes an overview illustration of each major structure group. Index numbers identify all items in the group which can be repaired, or where a repair is done by replacement. A complementary table also lists the items and gives such information as Fig No., Index No., Description, Material specification and gauge (thickness), and cross references to where repair limits and repair schemes can be found.

Standard repair illustrations must be provided. Such illustrations show the materials and dimensions of repair items, the types, sizes, pitch and edge distances of fasteners etc. Further illustrations must be included of specific repairs.

Illustrations must be included for the major structural components (wing, stabilizer, etc) which will provide contour data and dimensions necessary for the construction of locally made templates, support fixtures, and repair jigs for use in repairing the principal components. Where applicable, contour data must be included the list of contour and master dimension drawings.

Illustrations of structural repair kits (and explanation of the use of each kit) must be provided, when applicable.

## 2.2 Technical content

### 2.2.1 Introduction

If required, the introduction data modules contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-000-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

**2.2.2 Standard practices - Structures**

For system 51, this information covers, but is not limited to, the following contents:

2.2.2.1 General description of air vehicle structure

Using information code 041, these data modules describe the air vehicle, such as:

- type of construction
- special materials used
- classification of damage
- types of repair
- major structural group breakdown

2.2.2.2 Aerodynamic smoothness requirements

Using information code 361, these data modules give information on aerodynamic smoothness requirements for the air vehicle and permissible contour variations, gaps and mismatch data.

2.2.2.3 Clean-up of dents, cracks and scratches

Using information code 649, these data modules give information on negligible and/or minor dents, cracks, scratches and the description of the surface treatment after their repair.

2.2.2.4 Airframe sealing

Using information code 259, these data modules give information on all areas requiring sealing, type of seal required in each area, sealing procedures to be used, etc. General fuel tank sealing must be described separately.

2.2.2.5 Pressure check

Using information code 362, these data modules give information on special pressure testing of sealed compartments wherever such testing will be required after repair to check for leakage or structural integrity.

**Note**

General pressure testing will be included within the maintenance information set. Refer to Chap 5.2.1.3.

2.2.2.6 Materials

Using information code 072, these data modules give the following information:

- Description of materials including extrusions, formed sections, sheet, sealants, adhesives and special materials used in air vehicle repair. Where possible, permissible alternatives will be given.
- Materials to be covered such as:
  - Metallic: Steel, aluminum alloys, titanium alloys, nickel-based alloys, copper, lithium etc.
  - Non-metallic: Protective coating materials, sealants and related products, fiber reinforced materials, miscellaneous materials etc as far as they are not contained in the list of consumable materials.
- Material identification and conversion table.

Alternatives for metallic and non-metallic materials should be given. These must be presented in tabular form with table headings as shown in Table 1. An example of a Note belonging to the table is also given.

*Table 2 Extruded rubber standard sections - Example*

| Original design material | | Alternative material | | Other usable material | |
|---|---|---|---|---|---|
| **Specification** | **User nation** | **Specification** | **User nation** | **Specification** | **User nation** |
| XXXXX | FRG | XXXXX | UK | YYYYY | US |
| | | XXXXX | IT | TTTTT | UK |
| | | XXXXX | SP | ZZZZZ | IT |
| | | | | WWWWW | SP |
| | | | | VVVVV | FRG |
| | | | | TTTTT | NL |

**Note**

Commercial semi finished produce designation: Sealing profile, DTD 5583 Grade 50.

Delivery state: Dimensions see Fig 1, Detail A.

Method of retention: Integral buttons.

2.2.2.7 Fasteners

These data modules describe all fastener types, materials and sizes and give procedures for fastener installation and removal including hole preparation. For replacement of fasteners, alternative fastener types and sizes must be given.

Installation and removal of Heli-coil wire thread inserts must be described.

2.2.2.8 Support of air vehicle for repair

Using IC 670, these data modules give information on support of adjacent air vehicle structure during repair to prevent structure deformation.

2.2.2.9 Alignment/symmetry check procedures

Using IC 272, these data modules give information on measuring of the air vehicle structure after special events and repair of primary structure.

2.2.2.10 Control surface rebalancing

Using IC 271 (if applicable), these data modules give information on requirements and procedures for balancing of control surfaces.

2.2.2.11 Standard repairs

Using IC 663, these data modules give information on typical repairs which are those considered applicable to more than one major structure group (System 52 thru 57) ie skin patches, extrusion repairs, honeycomb type structures, formed structure repairs, special material repairs, metal-to-metal bonding, repair of fittings and replacement of bushings and bearings and other standard repairs as welding, heat treatments, forming etc. This information must also include precautions necessary to prevent damage by drilling into hidden structures and building in assembly stresses.

**2.2.3 Major structural components of the air vehicle**

2.2.3.1 General

The systems 52 thru 57 contain the information of the major structural components. Each major structural component must be broken down to system/subsystem level and the information then divided into:

- Identification
- Damage evaluation
- Repair information.

The major structural components are the following:

- Doors, as system 52
- Fuselage, as system 53
- Nacelles/pylons, as system 54
- Stabilizers, as system 55
- Windows and canopies, as system 56
- Wings, as system 57

2.2.3.2 Identification

Using IC 041, these data modules identify the materials used in the manufacture of the major assemblies. Illustrations and text concerning the air vehicle structure must use concise description, material and significant drawing numbers. Where applicable, material information must clearly define the final heat treatment condition.

For typical structure component identification a tabular form must be used. Table 2 gives an example.

*Table 3 Structure component identification - Example*

| **Item (1)** | **Description (2)** | **Material specification (3)** | **Thickness (mm) (4)** | **Repair limits/remarks (5)** |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 2A | | | | |
| 3 | | | | |

Table description:

1 Item

All required items, shown on the appropriate illustration, should be listed in this column, in sequential order, beginning with Item No. 1. For the addition of new items, numbers 1A, 1B, 1C, etc, can be used.

2 Description

This column must contain the exact description of structural components shown in the appropriate illustrations.

3 Material specification

All information concerning the type of materials (metallic and non-metallic) and, if available, the appropriate production method (machined, chemically etched, welded etc) should be given here.

4 Thickness (mm)

Information concerning the maximum thickness of structural components, made from sheet material, must appear in this column.

5 Repair Limits/Remarks

This column must give the repair limits by reference to that part of information where the repair limits are given. If the item cannot be repaired but must be replaced, then the word "Replace" must be inserted.

For existing specific or general repairs refer to the corresponding information.

For recommendation to replace the item refer to the information that tells you how to replace it.

2.2.3.3 Damage evaluation
Using IC 661, these data modules give the following information:

*2.2.3.3.1 Negligible damage*
Damage or distortion that can be permitted to exist as it is, or can be corrected by simple repair methods such as blending a scratch, removing a dent, stop drilling a crack etc, without placing restrictions on flight.

*2.2.3.3.2 Negligible damage limits*
The negligible damage limits must be defined. If necessary, graphs or suitable illustrations can be used.

*2.2.3.3.3 Repairable damage*
Damage which exceeds negligible limits but is not great enough to require repair by replacement is classified repairable. Repairable damage is further classified into standard repair schemes and specific repair schemes.

2.2.3.4 Inspection criteria
Using IC 284, these data modules give the criteria for the following inspections:

- Preliminary external and internal inspection for skin buckles, deformation, etc
- Detailed visual inspection for obvious damage areas, including information about critical points and access. Inspection methods and techniques, such as:
  - fire or heat damage (inspection using testers and discoloration of paintwork)
  - corrosion damage
  - pressure testing for strength or leaks
  - delaminated structure
- For inspections after hazardous incidents (eg excessive g, heavy landings, lightning strikes, emergency stop with the arrestor hook) and for inspections for corrosion, cross references must be made to the air vehicle maintenance and the corrosion control information sets or associated data modules.
- Identification of those areas requiring the design authority to produce a repair scheme.
- Identification of the non-destructive inspection method to be used to determine the extent of damage, and reference to the applicable non-destructive inspection information.

2.2.3.5 Classification of structure
These data modules give the classification of structural items. Structural items must be classified into primary and secondary structure. Specific repair information (refer to Para 3.2.3.6.3).

2.2.3.6 Repairs
*2.2.3.6.1 General*
Sufficient information must be given to enable the operator to carry out permissible repairs. One-time flight repairs (fly-in repairs), temporary repairs and specific repairs must be shown for each major part or component, when applicable.

*2.2.3.6.2 Standard repairs and application*
Refer to Para 2.2.2.11.

*2.2.3.6.3* *Specific repairs*
Using IC 664, these data modules give complete repair procedures and show compliance with all relevant design requirements.

Illustrations of the members or components showing where the various types of repairs must be employed must be given. The areas where each type must be used must be indicated by shading or other appropriate means. When a combination of two or more repairs will weaken or over-stiffen the member above the safe limit, the combination must be indicated and a caution must be given to prohibit such a combination. All specific repairs must be identified by drawing numbers.

Contour data and dimensions necessary for the construction of templates and repair jigs for use in repairing the principal components must be provided at the end of each section.

Where a repair procedure involves more than one structural element, the repair must be contained under the subject with the lowest assigned subject number.

Wherever possible, standard parts must be specified for use in repair or replacement. References in the information to these parts must be made by the applicable part number.

*2.2.3.6.4* *Temporary repairs*
Using IC 662, these data modules give complete repair procedures for a repair which fully restores the load carrying capacity of the structure, but is not necessarily aerodynamically smooth, nor able to satisfy fatigue considerations or interchangeability requirements. The temporary repair should be replaced with a permanent repair at the earliest opportunity.

*2.2.3.6.5* *Fly-in repairs*
Using IC 665, these data modules give complete repair procedures for a repair which restores a structural member to its load bearing capacity sufficiently so that the air vehicle can be flown to either a maintenance depot or the manufacturer for permanent repairs to be carried out.

*2.2.3.6.6* *Procedures for replaceable structure assemblies*
These data modules contain replacement procedures, with complementary illustrations if necessary, for those structural component assemblies, subassemblies or items required to be replaced within the agreed repair policy and where a procedure is deemed necessary. Some of these replacement procedures can be covered in the Air vehicle Maintenance information set or associated data modules.

*2.2.3.6.7* *Inspection and testing after repairs*
These data modules give the procedures for the inspections and tests (eg pressure tests), if required after repair, (if appropriate by cross reference to the corresponding air vehicle maintenance information set or associated data modules).

# Chapter 5.2.2.3

## *Air specific information sets - Cross servicing information*

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# 1 General

## 1.1 Purpose

This chapter contains the detailed specification for preparation and coding, where appropriate, of data modules to prepare an Air vehicle Cross Servicing Guide (ACSG).

## 1.2 Scope

This detailed specification covers the requirements for the preparation of information applicable for air vehicle cross-servicing which will enable personnel, who can be unfamiliar with the specific Product, to safely service the air vehicle.

The detailed specification incorporates all the North Atlantic Treaty Organisation (NATO) Standardization Agreement (STANAG) Number 3430 at Edition 7. Separate reference to the STANAG is therefore not necessary.

Air vehicle cross-servicing can be divided into two categories as follows:

- **Stage A cross-servicing:** The servicing of an air vehicle on airfields/ships. The servicing includes refueling, replenishment of fluids and gasses, drag chutes if applicable, starting facilities and ground handling.
- **Stage B cross-servicing:** The servicing of an air vehicle on airfields/ships which enables the air vehicles to be flown on an operational mission. The servicing includes all Stage A services plus the loading of weapons and/or film/video tapes and the replenishment of chaff or flares. This includes the processing and interpretation of any exposed film/video tapes from the previous mission.

The air vehicle cross servicing guide must contain sufficient detailed information to permit the airfield/ship personnel to follow the correct procedure to cross-service the air vehicle without having to make reference to other national manuals. Detachable or reproducible checklists suitable for flight line use must be included whenever deemed appropriate.

## 1.3 Topics covered in a cross-servicing guide

The air vehicle cross servicing guide must contain the following topics:

- Leading particulars
- Air vehicle handling, launching and recovery
- Replenishment, servicing points, engine starting and cooling
- Inspection and servicing procedures
- Main systems
- Armament
- Locally-manufactured items
- Glossary

When a topic does not apply, the data module number and title must be included followed by the words "Not applicable".

### 1.3.1 Minimum services required for air vehicle cross-servicing

1.3.1.1 Stage A

The following services must be provided by those airfields/ships which have been assigned Stage A operational air vehicle cross-servicing requirements:

- Appropriate, fully maintained, documentation, including.
- Fuel, oil and lubricants in such quantities to ensure an adequate supply for servicing of air vehicles to enable them to return to their assigned base.
- Adaptors to permit the use of available equipment in servicing specified types of air vehicle.
- Facilities for replenishing gaseous and liquid oxygen.
- Engine starting facilities.
- Shelters to protect air vehicles being cross-serviced. When there are insufficient shelters, the priority for aircraft protection will be determined by the local operational commander.
- Facilities for towing and maneuvering air vehicles, including placing in shelters.
- Trained ground crews to perform specified cross-servicing activities, including the recovery, drying, repacking and re-installation of drag chutes.
- External power to enable navigation system stabilization.

**Note**

Safety pins will be carried in air vehicles on all flights for all items which require pinning after flight. Items which are not normally carried on air vehicles must be pre-positioned by the home nation or locally manufactured by the host airfield/ship.

1.3.1.2 Stage B

The following services must be provided by those-airfield/ships which have been assigned Stage B operational air vehicle cross-servicing requirements:

- All services required for Stage A cross-servicing including sufficient quantities of replenishment materials to meet projected operational air vehicle cross-servicing requirements.
- Appropriate, fully maintained, air vehicle weapons loading schedules.
- Special arming tools, instructions, and equipment, necessary to prepare specified types of air vehicles for operational use as necessary.
- Fitting instructions and supplies of jettisonable fuel tanks for specified air vehicles.
- Ground handling equipment necessary for bomb loading, rocket installation etc.
- Operational stores (ammunition, bombs, rockets, mines, torpedoes, sonabouys, underwater sound charges, magnetic tape, chaff, flares, film, video tapes etc) of types and quantities needed to meet the operational air vehicle cross-servicing requirements.
- Sufficient trained weapon loading teams to meet projected operational air vehicle cross-servicing requirements.
- Facilities for film processing and interpretation.
- Personnel trained in processing and interpretation, and in the uploading and downloading of the appropriate reconnaissance vehicles.

### 1.3.2 Responsibilities of air vehicle captains

Air vehicle captains must:

- ensure that all cross-servicing actions have been completed by checking the signatures of the responsible crew chief in the appropriate documents, by visual inspection and by preflight pilot's check
- brief the ground crew on duties and signals expected/desired in pre-departure activities.
- sign the appropriate acceptance documents on the completion of the air vehicle cross-servicing
- sign the appropriate fogy for services not provided free of charge, if applicable

## 1.4 Standard and definitions

The standards and definitions given in this specification are applicable with no exceptions.

# 2 Cross Servicing Information

## 2.1 General

### 2.1.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

### 2.1.2 List of abbreviations

This data module must give a list of all the abbreviation followed by the word, word combination, expression or phrase abbreviated.

Data module must be coded:

YY-Y-00-00-00-00A-005A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-005A-A (37 characters)

### 2.1.3 List of technical terms

This data module must give a list, in alphabetical order, of the technical terms used in the ACSG both lists must be presented in. Data modules must be coded:

Data module must be coded:

YY-Y-00-00-00-00A-006A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-006A-A (37 characters)

### 2.1.4 List of symbols

This data module must give a list of all symbols (IC 007), and their meanings, used in the ACSG. If a recognized international standard for symbols (eg IEC Publication 117) is used, this should be stated and only those symbols used which are not to the agreed standards listed.

Data module must be coded:

YY-Y-00-00-00-00A-007A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-007A-A (37 characters)

**2.1.5 List of warnings**

This data module must give a list of all standard warnings applicable to the ACSG as a whole (eg those warnings associated with dangerous electrical voltages or with hazardous materials such as asbestos, beryllium, polytetrafluoroethylene). Warning applicable to particular maintenance procedural information (eg to release nitrogen pressure before disconnecting a pipe) must be included within the procedure, immediately before the operation/step where the danger exists. For further information on warnings, refer to Chap 3.9.3.

Data module must be coded:

YY-Y-00-00-00-00A-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-012A-A (37 characters)

**2.1.6 List of applicable specifications and documentation**

This data module must give a complete list of all specifications and documentation (eg NATO Standards) which have been cross-referred to in the ACSG.

Data module must be coded:

YY-Y-00-00-00-00A-017A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-017A-A (37 characters)

## 2.2 Technical content

**2.2.1 Leading particulars**

Where possible cross references should be made to existing descriptive data modules. (Refer to Chap 5.2.1.2).

2.2.1.1 General description and operation of the air vehicle

These data modules must include a brief description of the air vehicle, its operation, and any relevant information enabling a distinction to be made between the different Marks or Models of the air vehicles covered by the ACSG.

Data modules must be coded:

YY-Y-00-00-00-NNA-040A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-040A-A (37 characters)

2.2.1.2 Safety charts

These data modules must include safety charts must be a tabular presentation, illustrated where necessary, to inform personnel of the avoidable hazards associated with the air vehicle, including all non apparent hazards such as inter-related functions of systems, seat and canopy ejection systems and other cartridge operated devices. The safety charts must not replace or duplicate specific cautions and warnings included wherever applicable throughout the ACSG. The column headings of the safety charts must be as follows:

1 Servicing

2 Operation

3 Precautions

4 Remarks

Data modules must be coded:

YY-Y-00-00-00-00A-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-012A-A (37 characters)

2.2.1.3 Danger areas
(STANAG 3109 and 3230)

This data module on danger areas must include such danger areas as:

- auxiliary power unit and engine running danger areas
- high power radio transmission
- microwave radiation hazards
- area swept by guns and weapons

Data modules must be coded:

YY-Y-00-00-00-00A-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-012A-A (37 characters)

2.2.1.4 Walkways
These data modules must include illustrations showing the permitted walkways on the air vehicle.

Data modules must be coded:

YY-Y-12-00-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-00-0000-NNAAA-010A-A (37 characters)

2.2.1.5 Dimensions and weight data
These data modules must show a three view (top, front and side) line illustrations of the air vehicle, showing the principal overall dimensions, and a tabular presentation of the air vehicle dimension and weight.

Data modules must be coded:

YY-Y-YY**-YY**-YY-NNA-030A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY**-YY-0000-NNAAA-030A-A (37 characters)

Where "YY**-YY**" or "YYY**-YY**", is 06-10 and 08-40

2.2.1.6 Access and inspection openings diagrams
These data modules must give illustrations showing only those openings used in cross-servicing.

Data modules must be coded:

YY-Y-06-40-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y06-4000-0000-NNAAA-010A-A (37 characters)

2.2.1.7 Interior arrangements of compartments
These data modules must give illustrations showing the compartment arrangement as necessary for servicing, rescue and fire fighting.

Data modules must be coded:

YY-Y-06-30-40-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y06-30-0000-NNAAA-010A-A (37 characters)

2.2.1.8 Radio and radar equipment essential for flight
These data modules must give information on the radio and radar equipment which is essential for flight, presented in illustration and tabular form and covering:

- type of equipment
- location
- identification
- frequency and function
- power source
- circuit breaker or fuse amperage

Data modules must be coded:

YY-Y-YY**-YY**-YY-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY**-YY-0000-NNAAA-010A-A (37 characters)

Where "YY**-YY**" or "YYY**-YY**", is 23-00 and 34-00.

2.2.1.9 Armament installation
These data modules must give information on which is necessary to permit servicing of air vehicle which on arrival has armaments installed. Air vehicle safety requirements prohibit servicing of air vehicle having installed explosive armament except during controlled exercises, therefore brief instructional procedures and related safety precautions must be included when applicable. Full consideration must be given to the fact that standard handling equipment will, in most cases, not be available.

Data modules must be coded:

YY-Y-12-00-00-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-00-0000-NNAAA-012A-A (37 characters)

**2.2.2 Air vehicle handling, launching and recovery**

**Note**

Where possible cross references should be made to existing maintenance procedural data modules. (Refer to Chap 5.2.1.3).

2.2.2.1 List of handling equipment requirements

This data module must, in tabular form, list all the handling equipment and tools needed to do the instructions given in the ACSG. The list must be so designed as to permit the assembly of the equipment must be identified by an item number. The item number must be used in the text and the illustrations whenever equipment is referred to in text or on illustrations. Sufficient information must be given, including drawings of attachment points etc, for the items to be made by an NATO or PfP nation. The drawing must be contained in the topic "Locally-manufactured items" of the ACSG. Refer to Para 3.3.7. All equipment normally carried on the air vehicle must be included and so identified.

The data module must be coded:

YY-Y-00-00-00-00A-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-060A-A (37 characters)

2.2.2.2 Performance parameters for launching and recovery of air vehicles

- The maximum and minimum field take-off gross weights, distances and velocities must be given in the following format:
  - Field take-off distances to lift off: **ft/m at** and **lb/kg gross weight**
  - Field take-off velocity at lift off: **kt/km/h at** and **lb/kg gross weight**
- For carrier borne air vehicles, give the address of the appropriate national authority from which launch and arresting information can be obtained. Also give the recommended performance parameters, illustrated where necessary, for take-off and recovery on landing platforms of ocean-going vessels and escorts. Particular emphasis must be given to clearance areas required. These must be presented as shown in Fig 1.

| Dimension | ft | m |
|---|---|---|
| A | | |
| B | | |
| C | | |
| D | | |
| E | | |
| F | | |
| G | | |
| H | | |
| I | | |
| J | | |
| K | | |
| L | | |
| M | | |
| N | | |
| O | | |

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*Fig 1 Helicopter clearance requirements*

2.2.2.3 Handling safety chart
These data modules must give all warnings and cautions specifically related to air vehicle handing, crash removal, and approaching the air vehicle immediately after landing. The handling safety chart must be presented in tabular form.

Data modules must be coded:

YY-Y-YY**-YY**-YY-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY**-0000-NNAAA-012A-A (37 characters)

Where "YY**-YY**" or "YYY**-YY**", is 07-40 and 09-10.

2.2.2.4 Air vehicle overturn danger chart
These data modules must give information on the air vehicle overturn imminence with respect to gross weight, sea state and ship roll axis. The information must be presented in tabular form.

Data modules must be coded:

YY-Y-10-20-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-20-0000-NNAAA-010A-A (37 characters)

2.2.2.5 Methods of grounding
(STANAG 3632)

These data modules must give detailed procedures and requirements for grounding the air vehicle.

Data modules must be coded:

YY-Y-00-10-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-10-0000-NNAAA-010A-A (37 characters)

2.2.2.6 Towing and winching
(STANAG 3278, 3279)

These data modules must give procedures and equipment for both forward and, if permitted, backward towing and winching. Illustrations must be used where necessary. Details of sheltering the air vehicle in hardened shelters must be given. The maximum force to be applied during normal towing or winching must be specified to ensure that the correct shear pins can be fitted to the tow bar, when applicable.

Data modules must be coded:

YY-Y-09-10-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y09-10-0000-NNAAA-010A-A (37 characters)

2.2.2.7 Deck securing and picketing (mooring)
(STANAG 1095).

These data modules must give illustrations and if necessary data, of the approved method of deck securing and picketing (mooring).

Data modules must be coded:

YY-Y-10-20-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-20-0000-NNAAA-010A-A (37 characters)

2.2.2.8 Nose, wing, fin and rotor blade folding and unfolding
These data modules must give procedures for folding and unfolding the nose, wings, rudder, fin and rotor blades. Any special precautions necessary when external stores are installed must also be given.

Data modules must be coded:

YY-Y-10-00-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y10-00-0000-NNAAA-010A-A (37 characters)

2.2.2.9 Gust locking procedures
These data modules must give illustrations, incorporating if necessary procedures, for locking and unlocking movable surfaces.

Data modules must be coded:

YY-Y-00-30-00-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-30-0000-NNAAA-XXXA-A (37 characters)

Where "XXX", the information codes

- 520 - Remove procedures
- 720 - Install procedures

2.2.2.10 Safety devices and protective covers
These data modules must give illustrations, incorporating if necessary procedures, to remove and install safety devices and protective covers. Whenever possible, substitute methods for protective covers must be given.

Data modules must be coded:

YY-Y-00-30-00-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-30-0000-NNAAA-XXXA-A (37 characters)

Where "XXX", the information codes

- 520 - Remove procedures
- 720 - Install procedures

2.2.2.11 Emergency access and crew evacuation
(STANAG 3230)

These data modules must give illustrations showing the areas concerned, and the methods of gaining emergency access to those areas for crew evacuation. Details of the crew harness release must be included on the illustrations.

Data modules must be coded:

YY-Y-95-00-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y95-00-0000-NNAAA-010A-A (37 characters)

2.2.2.12 Fire fighting
(STANAG 3230)

These data modules must give illustrations showing information to help fighting fires. The illustrations must include the location of all combustible materials in tanks, reservoirs, lines etc. The information is intended to help NATO and PfP standard fire-fighting techniques, by giving all such data which is specific to the air vehicle.

Data modules must be coded:

YY-Y-00-00-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-NNAAA-010A-A (37 characters)

2.2.2.13 Slinging and hoisting
(STANAG 3237)

These data modules must give illustrations, procedures and data on:

- the method of slinging and hoisting the air vehicle
- the location of the centre of gravity
- the minimum hook height necessary to complete the lift
- the air vehicle attitude limits (angular displacement from level) that precludes the use of the sling
- all relevant safety precautions
- and pre hoisting procedures (eg removal of external stores, folding rotors or wings

Data modules must be coded:

YY-Y-07-30-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y07-30-0000-NNAAA-000A-A (37 characters)

2.2.2.14 Jacking
(STANAG 3098 and 3133)

These data modules must give illustrations, procedures and data on:

- the location, and if necessary the installation, of the jack pads
- the maximum jacking weight of the air vehicle
- the minimum capacity of the jack required at each jacking point
- the distance from the ground to the jack pad with the tires deflated and the landing gear shock struts fully compressed
- the distance from the ground to the jack pad with the landing gear shock struts fully extended and a 51 mm (2 in.) clearance beneath a correctly inflated tire

Data modules must be coded:

YY-Y-07-10-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y07-10-0000-NNAAA-000A-A (37 characters)

**2.2.3 Replenishment, servicing points, engine starting and cooling**

**Note**

Where possible cross references should be made to existing maintenance procedural data modules. Refer to Chap 5.2.1.3).

2.2.3.1 Servicing and drain points
(STANAG 3109)

These data modules must give illustrations identifying every point on the air vehicle requiring replenishment or drawing. NATO symbols and code numbers must be used as appropriate.

Data modules must be coded:

YY-Y-12-00-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-00-0000-NNAAA-000A-A (37 characters)

2.2.3.2 List of consumables
(STANAG 1135)

This data module must give a list of consumable materials with acceptable and emergency alternatives. The list must be presented in tabular form. The materials must be identified by the appropriate NATO stock numbers and also by appropriate important specifications.

The data module must be coded:

YY-Y-00-00-00-00A-070A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y00-00-0000-00AAA-070A-A (37 characters)

2.2.3.3 Types of replenishment connections for charging main vehicles
(STANAG 3105, 3207, 3209, 3210, 3212, 3294 and 3510)

These data modules must give details of the type of coupling or fitting. If the connection is not to a NATO standard, manufacturing drawings must be given. Alternatively, manufacturing drawings can be replaced by a list of foreign sources which will supply details of the connection. These sources must be available to all other NATO nations subscribing to STANAG 3430, Responsibilities for air vehicle cross-servicing.

Data modules must be coded:

YY-Y-12-10-00-NNA-060A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-10-0000-NNAAA-060A-A (37 characters)

2.2.3.4 Capacity of systems and methods of replenishment or charging
(STANAG 1135, 3053, 3054, 3416, 3499, 3545, 3547, 3568, 3595, 3603, 3624 and 3663)

These data modules must give all capacities and procedures for replenishment or charging. Sufficient data must be given to enable other nations to determine the servicing requirements.

Data modules must be coded:

YY-Y-12-10-00-NNA-200A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-10-0000-NNAAA-200A-A (37 characters)

2.2.3.5 Lubricating charts and symbols
These data modules must identify all items requiring pre flight or daily lubrication and give sufficient illustrations to enable identification of all such lubrication points. A chart must be given identifying the symbols used for the periodicity (eg pre flight, daily) and the method of application (eg by hand, brush, oil can, power gun, flexible extension).

Data modules must be coded:

YY-Y-12-20-00-NNA-240A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-20-0000-NNAAA-240A-A (37 characters)

2.2.3.6 External hydraulic power application
These data modules must give illustrations containing the procedure on how to apply external hydraulic power to the air vehicle hydraulic system. Requirements for normal and maximum pressure, normal and maximum flow rates, maximum fluid temperature, and minimum filtration, must also be given.

Data modules must be coded:

YY-Y-29-20-00-NNA-100A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y29-20-0000-NNAAA-100A-A (37 characters)

2.2.3.7 External electrical power application
(STANAG 3302, 3303 and 3457)

These data modules must give illustrations containing procedures, complete with the appropriate safety precautions, on how to apply external electrical power to the air vehicle electrical system. Requirements for voltage and frequency regulation, current type and magnitude, phase and power factor for both servicing and engine start, must also be given.

Data modules must be coded:

YY-Y-24-20-00-NNA-100A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y24-20-0000-NNAAA-100A-A (37 characters)

**2.2.3.8** External pneumatic power application
(STANAG 3054)

These data modules must give illustrations containing procedures on how to apply external pneumatic power to the air vehicle pneumatic systems. Requirements for nominal pressure, flow, temperature and engine start time must also be given.

Data modules must be coded:

YY-Y-36-00-00-NNA-100A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y36-00-0000-NNAAA-100A-A (37 characters)

2.2.3.9 Engine starting
(STANAG 3372)

These data modules must give illustrations and necessary data required by the ground crew to help the pilot start the air vehicle's engines.

Data modules must be coded:

YY-Y-71-00-00-NNA-100A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-NNAAA-100A-A (37 characters)

**2.2.3.10** External air conditioning requirements
(STANAG 3208, 3315 and 3569)

These data modules must give illustrations containing the procedure to supply conditioned air to compartments or garments. Requirements for mass flow, temperature, pressure, filtration, maximum permissible moisture content and dehumidification following cooling, must also be given.

Data modules must be coded:

YY-Y-21-00-00-NNA-100A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y21-00-0000-NNAAA-100A-A (37 characters)

2.2.3.11 Drag chutes
These data modules must give illustrations and procedures for packing and stowing the drag chutes.

Data modules must be coded:

YY-Y-32-80-00-NNA-700A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y32-80-0000-NNAAA-700A-A (37 characters)

**2.2.4 Inspection and servicing procedures**
Where possible cross references should be made to existing maintenance procedural and planning data modules. Refer to Chap 5.2.1.3 and Chap 5.2.1.6.

2.2.4.1 Access and inspection procedures
These data modules must give illustrations to show how access is obtained to enable inspection procedures to be done efficiently.

Data modules must be coded:

YY-Y-06-40-00-NNA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y06-40-0000-NNAAA-010A-A (37 characters)

2.2.4.2 Inspection

These data modules must give details of post-flight, pre-flight and turn-around inspections for an air vehicle staying up to 48 hours. Also given must be:

- all precautions necessary whilst doing the inspections
- required entries in the air vehicle's servicing forms
- inspections to be done immediately after landing (which are therefore only applicable to post-flight and turn-around inspections) such as checking the engine oil level within 15 minutes of engine shut down

The inspections must cover the air vehicle being service in, or out, of a hardened shelter.

For the presentations of post-flight, pre-flight and turn-around inspections, refer Chap 5.2.1.6.

Data modules must be coded:

YY-Y-12-20-00-NNA-281A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y12-20-0000-NNAAA-281A-A (37 characters)

**2.2.5 Main system**

(Refer to Chap 8.2.2 for the Chapter and Section numbers, Information Codes 282, 283, 284 and 300)

These data modules must give only the information concerning the main systems, and their control, which is essential for safety of flight and is necessary for doing minimum essential servicing not covered elsewhere in the ACSG. Applicable testing must be given following the recommended servicing.

Data modules must be coded:

YY-Y-YY**-YY**-YY-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY**-0000-NNAAA-XXXA-A (37 characters)

Where:

- **"YY-YY"** or **"YYY-YY"**, the codes are given in Chap 8.2.
- "XXX", the information codes
  - 282 - Unscheduled inspections
  - 283 - Special regular inspections
  - 284 - Special irregular inspections
  - 720 - Examinations, tests and checks

**2.2.6 Armament - Non-nuclear munitions**

These data modules must include unloading procedures for all non-nuclear munitions, including all relevant safety precautions, and any essential information on non-nuclear munitions relevant for cross-servicing.

Data modules must be coded:

YY-Y-14-40-00-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y14-40-0000-NNAAA-XXXA-A (37 characters)

Where "XXX", the information codes.

- 500 - Disconnect, remove and disassemble procedures
- 700 - Assemble, install and connect procedures

### 2.2.7 Locally-manufactured items

These data modules must contain a list and manufacturing drawings of all items which can have to be manufactured locally to enable servicing to be done. The drawings must contain sufficient information on the materials needed to enable suitable alternatives to be selected.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-064A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-064A-A (37 characters)

# Chapter 5.2.2.4

## *Air specific information sets - Engine maintenance information*

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## *References*

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| Chap 4.3 | Information management - Data module code |
| Chap 5.2.1.9 | Common information sets - Equipment information |
| Chap 5.2.1.17 | Common information sets - Material data |
| Chap 5.2.2.6 | Air specific information sets - Engine standard practices |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the detailed specification for preparation and coding, where appropriate, of data modules for Engine Shop Maintenance (ESM) information.

## 1.2 Scope

This detailed specification covers the requirement for the preparation of information applicable to engine shop maintenance which will enable skilled personnel to perform the maintenance of the basic engine and a limited maintenance on its components.

### 1.2.1 Engine shop maintenance information

The ESM information must contain the following topics:

1 Description of how are made and the functions, where appropriate, of basic engines, modules, assemblies and their components. Definitions are given in Para 1.3.2.

2 Technical data and information needed to gain access to and to maintain the previous hardware and a maximum number of parts that remain with the engine when it is removed from the air vehicle.

3 Fault isolation on the systems on-the-engine.

4 Data and information required to perform the maintenance of the components on the engine or off-the-engine. In this case, the maintenance must be limited, otherwise procedures to maintain the removed component must be provided as component maintenance information. Refer to Chap 5.2.1.9.

The maintenance of items such as brackets, standoff's connecting the components to the basic engine, module or assembly is part of the ESM information.

**Note**

This detailed specification is also applicable to airborne auxiliary power plants (SNS 49-00).

### 1.2.2 Engine base maintenance information

The Engine Base Maintenance (EBM) information provides the same kind of information as the ESM but the depth of the maintenance is limited.

### 1.2.3 Engine depot maintenance information

The Engine Depot Maintenance (EDM) information provides the information of the ESM described Para 1.2.1, Item 4 excluded.

**Note**

Because EBM and/or EDM are extractions of ESM, the rest of this detailed specification deals only with ESM unless otherwise mentioned.

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this specification are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate.

– **Basic engine**: Those units and items which are used:
  - to induce and convert fuel/air mixture into thrust/power
  - to transmit power to the propeller shaft, if any, and accessory drives
  - to supplement the function of other defined systems external to the engine
  - to control and direct the flow of internal lubrication

  The nacelle and the reverser are excluded.

– **Basic module or assembly**: Module or assembly which make up respectively a basic modular or non-modular engine. As regards this definition, a basic module or assembly has no installed components.

– **Lists of consumables and material:** These lists cover several data modules. They must contain for each item the following elements. Refer to Fig 2:
  - The code number of the item
  - Its supplier code
  - Its description

  Reference to the Material data information (refer to Chap 5.2.1.17) for dangerous items must be given under the heading "Remarks".

  **Note**

  If these lists cover only one data module, they are provided in its data module content. Refer to Chap 3.9.5.2.

– **Lists of special support equipment, tools and software:** These lists cover several data modules. They must contain for each item the following elements. Refer to Fig 3:
  - The code number of the item

- Its part number and its manufacturer code
- Its description

For special items locally made, the mention "locally made" must be indicated under the heading of the list "Remarks".

**Note**

If these lists cover only one data module, they are provided in its data module content. Refer to Chap 3.9.5.2.

– **Lists of standard support equipment and tools:** These lists cover several data modules. They must contain for each item the following elements. Refer to Fig 4:
  - The code number of the item
  - Its description
  - Its characteristics (so as the operator can select and use the equipment of its choice)

  They can be divided into nature of items, eg

  - tools
  - test and calibration equipment

  **Note**

  If these lists cover only one data module, they are provided in its data module content. Refer to Chap 3.9.5.2.

– **Major module:** Assembly of several modules managed as an entity (eg a core engine).
– **Major part:** Significant item, part, subassembly or assembly to which a disassembly code and variant are given.
– **Part Identifier (PI):** Code defined by the manufacturer identifying an item in a procedure and on the relevant figures (call-out). To have an easier reading of the procedures, it is recommended to give the parts identifier a group of numbers (eg rotables PI 300, expendables PI 600). If major parts are listed, their part identifiers must be the disassembly code and its variant.
– **Parts list:** List covering several data modules. It provides the user with information on items (eg parts, subassemblies, collections of associated parts) which are identified in the procedures. The parts list (refer to Fig 5) must indicate for each item:
  - The Part identifier
  - Its part number and its manufacturer code
  - Its name

  Additional information defined by the project or the organization can be provided as required under the heading of the parts list "Remarks" (eg modification number applicable to the item). Parts lists can be supported by illustrations as required. Each item is to be identified on the illustration by its part identifier.

  **Note**

  If these lists cover only one data module, they are provided in its data module content. Refer to Chap 3.9.5.2.

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| STEP | PROCEDURE |
|---|---|
| 100 | HOW TO PREPARE THE LP TURBINE-DISK BEFORE THE INSTALLATION OF THE STAGE 2 TURBINE BLADES (Fig. 1) (Fig. 2) |
| 101 | Install the plate (Ref. No. 2) on the module 6 blade installation-fixture (M0734). |
| 102 | Put the module 6 blade installation-fixture (M0734) around the stage 2 LP turbine-disk (08). This disk is on the disk support (M0742) in position on the multi-purpose workstand (M0085). |
| 103 | Adjust the plate (M0734) (Ref. No. 2) at 10 mm from the top edge of the stage 2 LP turbine-disk (08) with the adjustment posts and a depth gauge. |
| 104 | Find the recess No. 1 of the stage 2 LP turbine-disk (08). |
| | NOTE : The recess No. 1 is between the 2 spherical marks. |
| 110 | HOW TO INSTALL THE STAGE 2 TURBINE-BLADES (Fig. 3) |
| 111 | Get the stage 2 turbine-blade (06) No. 1 which is in its case in the module 6 blade storage crate (M0139). |
| 112 | Install the stage 2 turbine-blade (06) No. 1 in the recess No. 1 of the stage-2 LP turbine disk (08). The leading edge must be up. |
| | NOTE : Use degrip oil (P0636) to make the installation easier. |
| 113 | Install the 66 other stage 2 turbine blades (06) in the specified position sequence. Install a sealing plate (301) between 2 blades. |
| | NOTE : The installation occurs in the COUNTERCLOCKWISE DIRECTION WHEN YOU LOOK AT THE FRONT FACE of the stage 2 LP turbine-disk (08). |
| 114 | Operate the adjusting posts (Ref. No. 4) and regularly lower the plate (M0734) (Ref. No. 2). When the plate lowers, the 67 stage 2 turbine blades (06) also lower slowly (Fig. 1). |
| | NOTE : Push the sealing plates. |
| | NOTE : Lightly hit with a plastic mallet the blade roots one after the other to make sure they are in the correct position. |
| 115 | Continue with the installation of the stage 2 turbine-blades (06) until they are against the stage 2 turbine blade-retainer (07). |

Effectivity: All

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*Fig 1 Job instruction - Example*

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## Engine

### *Lists of consumables and material*

*Table 1 List of consumables and material*

| Code | Supplier code | Name | Remarks |
|---|---|---|---|
| P0167 | F3512 | SF3 Diluants | Refer to DSM |
| P0219 | FA268 | Hymolar AO32M | |

Effectivity: All | C2-A-72-00-00-00A-901A-A

**End of data module**

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*Fig 2 List of consumables and material - Example*

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## Engine

### *Lists of special SE, tools and software*

*Table 1 List of special SE, tools and software*

| Code | Manufacturer code | Part number | Name |
|---|---|---|---|
| M0351 | F0301 | 853-202-050-0 | Fitting guide and tooling bolts |
| M0307 | F0301 | 853-200-799-0 | Bearing protective bushing |
| M0364 | F0301 | 853-202-239-0 | Guide pin |

Effectivity: All | C2-A-72-00-00-00A-904A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

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*Fig 3 List of special support equipment, tools and software - Example*

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## Engine

### *Lists of standard SE and tools*

*Table 1 List of standard SE and tools*

| Code | Name | Characteristics |
|---|---|---|
| E0207 | AC motor | Power supply: 115 V, 400 Hz<br>No-load: 9500 rpm<br>Starting torque: 160 cm/dN min |
| E0227 | Stabilized DC power supply unit | DC output voltage adjustable from 0 to 32 V<br>Max output; 0,5 A<br>Stability with respect to supply voltage +/- 2 mV for supply variation of + 10 %.<br>Stability with respect to temperature +/- 1 mV/ºC from -10 to 60 ºC. |

Effectivity: All | C2-A-72-00-00-00A-904A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-AE-A-050202-G-S3627-00408-A-01-1

*Fig 4 List of standard support equipment and tools - Example*

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## Engine

### *Parts list*

*Table 1 Parts list*

| Part identifier | Manufacturer code | Part number | Name | Remarks |
|---|---|---|---|---|
| 01A | F0301 | 303-230-603-0 | Seal, Stage 1 turbine nozzle guide assy vane | |
| 02A | F0301 | 303-185-605-0 | Spool, outer air cooling | |
| 03A | F0301 | 303-175-605-0 | Ring, support, outer, front, Stage 1 turbine nozzle guide | |
| 04A | F0301 | 303-190-303-0 | Support assy, outer Stage 1 turbine nozzle guide | |
| 05A | F0301 | 303-175-103-0 | Support, inner, front Stage 1 turbine nozzle | |
| | | 303-176-106-0 | Support, inner, front Stage 1 turbine nozzle | M 364 |
| 06A | F0301 | 303-184-705-0 | Support assy, inner, rear Stage 1 turbine nozzle | |
| 07A | F0301 | 303-180-006-0 | Vane assy Stage 1 turbine nozzle | |
| 301A | F0111 | 22236TD050014 | Bolt, double, hexagon head | |
| 301B | F0111 | 22236TJ050014 | Bolt, double, hexagon head | M43/4 |
| 304A | F0111 | 22236TJ050018 | Bolt, double, hexagon head | |
| 305A | F0301 | 650-301-501-0 | Nut, double hexagon, self locking | |
| 306A | F0301 | 303-197-701-0 | Angle segment Stage 1 turbine nozzle guide vane assy | |
| 307A | F0111 | 33326TT040039 | Nut, captive | |
| 601A | F0301 | 303-197-901-0 | Strip, sealing, outer, vane | |
| 602A | F0301 | 303-197-801-0 | Strip, sealing, inner, vane | |

Effectivity: All | C2-A-72-00-00-00A-904A-A

**End of data module**

**Unclassified** | **2006-10-02 Page 1**

ICN-AE-A-050202-G-S3627-00409-A-01-1

*Fig 5 Parts list - Example*

Utopia Ministry of Defence

CLASSIFICATION

| DOCUMENT No | DESIGNATION OF OPERATIONS |
|---|---|
| C2-A-72-52-00-00A-010C-C | GENERAL DATA ON ASSEMBLY/ INSTALLATION |
| C2-A-72-52-22-00A-061F-C | LIST OF SPECIAL TOOLS - ASSEMBLY |
| C2-A-72-52-22-06A-712A-C | PROCEDURE TO REPLACE THE STAGE 2 BLADES * |
| C2-A-72-52-22-06A-712B-C | PROCEDURE TO PREPARE THE STAGE 2 BLADES |
| C2-A-72-52-22-06A-712C-C | PROCEDURE TO MEASURE THE STATIC MOMENT OF THE STAGE 2 BLADES |
| C2-A-72-52-22-06A-372A-C | VALUES OF SETTING AND STATIC MOMENT CONSTRAINTS FOR THE STAGE 2 BLADES |
| C2-A-72-52-22-07A-712D-C | PROCEDURE TO IDENTIFY THE POSITION OF THE STAGE 2 BLADES |
| C2-A-72-52-22-07A-720A-C | PROCEDURE TO INSTALL THE BLADE RETAINER ON THE STAGE 2 LP TURBINE DISK |
| C2-A-72-52-22-05A-710A-C | PROCEDURE TO ASSEMBLE THE BLADED STAGE 2 DISK |
| C2-A-72-52-22-05A-372A-C | BALANCE CONDITIONS FOR THE BLADED STAGE 2 DISK |
| C2-A-72-52-22-05A-372B-C | PROCEDURE TO BALANCE THE BLADED STAGE 2 DISK |
| C2-A-72-52-22-01A-712A-C | PROCEDURE TO PREPARE THE STAGE 2 TURBINE TIEBOLTS (1) |
| C2-A-72-52-22-00A-710A-C | PROCEDURE TO ASSEMBLE THE STAGE 2 DISK AND BLADES ASSY |
| C2-A-72-52-22-00A-711A-C | PROCEDURE TO TURN THE STAGE 2 DISK AND BLADES ASSY 180° AROUND ITS HORIZONTAL AXIS AND TO PUT IT IN THE CONTAINER PLATE |
| C2-A-72-52-22-00A-031C-C | INSPECTION FOLLOW-UP SHEET |
| | REFERENCED DOCUMENTS : |

Effectivity: All

CLASSIFICATION

ICN-AE-A-05020204-A-D0216-00045-A-01-1

*Fig 6 Work sheet - Example*

# 2 Engine maintenance information

## 2.1 General

The complete set of ESM data modules is specified in Para 2.2, Para 2.3 and Para 2.4.

The ESM information must contain the following topics:

- information for the engine depending on its design concept: modular or non-modular
- information for its systems

Descriptions of these topics are given in the following paragraphs.

### 2.1.1 Content for a modular engine

The ESM must provide as required the following information:

- for the engine
  - Description and operation of the engine as a whole
  - Procedures
    - to remove Quick Engine Change (QEC)
    - to breakdown an engine into major modules and/or modules
    - to build up a desired engine from major modules and/or modules
    - to install the QEC
    - to test the engine
- for major modules
  - Description and operation of the major modules
  - Procedures
    - to breakdown major modules into modules
    - to build up major modules from modules
    - to test major modules if required
    - to store them
- for modules
  - Description and operation of the modules
  - Procedures
    - to undress modules (removal of components, piping, harnesses, etc)
    - to disassemble basic modules into subassemblies and/or parts
    - to maintain disassembled basic modules
    - to build up and dress modules
    - to test modules if required
    - to store them

**Note**

Actions on modules or components installed on an engine are provided in the procedures of the relevant item.

### 2.1.2 Content for a non-modular engine

The ESM must provide as required the following information:

- for the engine
  - Description and operation of the engine as a whole
  - Procedures
    - to undress the engine (removal of QEC, components, piping, harnesses, etc)
    - to breakdown the basic engine into assemblies (ie compressors, combustion chamber)
    - to build up a desired basic engine from assemblies
    - to dress it
    - to test the engine
    - to store it

- for assemblies
  - Description and operation of the assemblies
  - Procedures
    - to disassemble assemblies into subassemblies and/or parts
    - to maintain disassembled assemblies
    - to build up assemblies
    - to store them

**Note**

Actions on assemblies or components installed on the engine are provided in the procedures of the relevant item.

### 2.1.3 Content for the systems

This heading is applicable to modular or non-modular engines.

The following information must be provided as required for the different systems:

- Description and operation of the systems and their components
- Procedures
  - for testing or fault isolating components on or off-the-engine
  - to maintain the systems and their components

The maintenance of components given here above must be limited otherwise they must be subject to Component Maintenance (CM) information sets (Chap 5.2.1.9).

The content of the topics dedicated to:

- engines (Para 2.1.1 and Para 2.1.2) must be provided in accordance with Para 2.2.
- components (Para 2.1.3) must be provided in accordance with the paragraph Technical content of Chap 5.2.1.9.

## 2.2 Technical content

### 2.2.1 General requirements

The technical content provides two categories of information:

- Technical data and descriptions (Para 2.3)
- Maintenance procedures (Para 2.4)

### 2.2.2 Data module coding

To assist in the codification of data modules, information codes are given and supplemented by additional specific requirements and/or explanations in subsequent paragraphs in addition to the rules given in Chap 4.3.

### 2.2.3 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-72-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y72-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different Information sets.

## 2.3 Technical data and descriptions

### 2.3.1 Technical data

These data modules must contain a brief outline of the nature of the item. It are also to provide all special or important physical, electrical/electronic, mechanical and operational characteristics and performances. These characteristics and performances must be supported by illustrations as required.

Critical values and special precautions must be provided.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-030A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-030A-B (37 characters)

### 2.3.2 Description of how it is made and its function

These data modules must contain description of how an item is made and its function when the item requires limited information.

The information must be given in accordance with Para 2.3.3 and Para 2.3.4.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-040A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-040A-B (37 characters)

### 2.3.3 Description of how it is made

These data modules must provide the user with the means of becoming familiar with the item and of locating the main assemblies, modules, components or parts complying with the maintenance concept applied in the procedures. It is also to include interrelationship between subsystems.

Attention must be drawn to manufacturing or adjustment procedures (eg rotation in one direction only).

Illustrations must support the description so as to simplify, shorten or make it easier to understand. They must describe the main elements and parts which have a particular importance.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-041A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-041A-B (37 characters)

### 2.3.4 Description of function

These data modules must provide the user with information and data to explain how the item functions.

Function is not to provide "how to operate an item".

Function must be described accurately and, whenever possible, illustrated with any of the following functional diagrams and/or lists enabling the user to understand and follow the fault isolation procedures:

- Block diagram used to simplify complex circuits to facilitate failure isolation. It allows understanding the function and operation of the system, subsystem, etc. It shows the arrangement of the system components and current/signal flow through the system. The test and measurement points as well as terminal points mentioned in the procedures must be represented.
- Schematic diagram which can replace block diagram for simple items or complete it for complex items when required. In the latter case, references must enable to cross-refer easily from the block diagram to the schematic diagram and vice versa.
- Wiring diagram provided to identify the terminal points, interconnections and components in order to easily detect any failure in the item.
- List of all wires shown on a wiring diagram for complex components. It must be arranged in termination order and give the following information: pin number (whether used or not), wire number, reference of the wiring diagram on which they appear, to-from routine and applicability. Unused and spare wires must be identified.
- Circuit diagram for visual identification of components on the item.

All input/output signals must be identified.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-042A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-042A-B (37 characters)

## 2.4 Maintenance

All the Work Sheets (WS) provided as required must only define the mandatory workflow to perform a work. Any other use of a WS in this annex is excluded (eg work management in the workshop).

### 2.4.1 Setting-up of parts lists

Parts lists (Para 1.3.2) are set up as required for maintenance procedures and are relative to a given SNS.

Depending on the complexity of the item, the project or the organization will define which level of detail is applicable to the SNS. An example of setting-up parts lists is given hereafter.

Example:

Parts lists decided for the engine as Model Identification (MI) code JE:

- for the engine as a whole JE-A-72-00-00-00A-075A-Z
- for the inlet casing module JE-A-72-21-00-00A-075A-Z
- for the LP compressor module JE-A-72-31-00-00A-075A-Z
- etc

### 2.4.2 Setting-up of other lists

The other lists (Para 1.3.2) must be dedicated lists (Chap 4.3). They are set up for a given SNS, except for Repair (IC 600) for which procedures are related to individual parts. In this case, lists set up for IC 600 are applicable to the couple SNS-disassembly code and variant.

Example:

Dedicated list and its coding:

- List of special support equipment and tools to assemble the LP compressor JE-A-73-31-00-00A-704A-C where, in information code "704", the Primary Code "7" indicates '"Assemble" and "04" the list of special support equipment and tools (used when assembling).

**2.4.3 Servicing**

These data modules must contain:

- Job Instructions (JI) for the servicing itself
- as required, WS for the workflow of the instructions necessary to perform servicing such as drain of storage fluid (IC 228), filling oil (IC 212), bleeding (IC 231)

Clean and apply surface protection (IC 250) must provide the methods specific to the items; otherwise, the preferred method is by referencing to engine standard practices.

Paint and varnish removals must be included in cleaning. Cleaning procedures must take the repairs previously applied to the item into account such as bounded or brazed parts.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-2XXA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-2XXA-B (37 characters)

**2.4.4 Examinations, tests and checks**

2.4.4.1 Visual examinations

These data modules must provide the methods specific for examining items; otherwise, the preferred method is by referencing to engine standard practices.

Procedures must provide:

- JI for the examination itself such as boroscope examination
- as required, WS for the workflow of the instructions necessary to perform examinations such as removal of harnesses or pipes for access, equipment calibration, close-up actions

Based on the results of visual examinations, the following status must be given in the procedure:

- Acceptance for continued operation
- Complementary checks to be performed in accordance with referenced data module in the procedure
- Repairable in accordance with repair procedures referenced in the procedure
- No longer serviceable or repairable

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-31XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-31XA-B (37 characters)

2.4.4.2 Test preparation

These data modules must contain the procedures and data to be carried out on an item, its assemblies or components before installation/connection on and/or removal from a test bench or a test equipment.

The procedures must provide:

- JI for simple tests preparation

- as required, WS for the workflow of the instructions necessary to perform tests preparation such as removal of blanking, checks of connectors, checks of short circuits to avoid damage of the test bench, checks of connections (pneumatic, hydraulic, etc)

If there is more than one test, each individual test must have its own test preparation.

If insulation tests are required, they must precede the function tests.

When test assembly diagrams are required, they must indicate all the standard equipment needed (oscilloscope, flow-meter, power supply, etc) with their name or their code given in the list of standard equipment (refer to Para 1.3.2).

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-33XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-33XA-B (37 characters)

2.4.4.3 Function tests

These data modules contains tests to evaluate as required the operational efficiency and integrity of an engine, modules or components after maintenance actions.

Function tests must provide:

- JI describing the tests and providing acceptance limits
- as required, WS or charts (Fig 7 and Fig 8) for the workflow of the instructions necessary to perform function tests and to close up such as test preparation, calibrating, servicing

Special conditions applicable to the test must be specified and their characteristics given (eg climatic conditions, room temperature, relative humidity, max speed and direction of the wind).

To minimize the amount of engine running necessary to perform the tests after several maintenance actions (eg a module replacement, work on the oil system and adjustment of a fuel component), a matrix can be provided to select the sequence of JI so that the appropriate level of test is applied.

For items requiring a complex environment, the procedure must give at the applicable step the code of the standard equipment contained in the relevant list (Para 1.3.2).

The various power sources must be indicated with their characteristics and tolerances.

ICN-AE-A-05020204-A-D0216-00046-A-01-1

*Fig 7 Testing - Basic principle (Example)*

ICN-AE-A-05020204-A-D0216-00047-A-01-1

*Fig 8 Testing - Example (Sheet 1 of 2)*

ICN-AE-A-05020204-A-D0216-00048-A-01-1

*Fig 8Testing - Example (Sheet 2 of 2)*

2.4.4.4 Structure tests, checks

These data modules must contain the detailed procedures needed to determine the status of parts, ie repairable, to be scrapped, serviceable (see also visual examination Para 2.4.4.1).

The different levels of serviceability must be covered where acceptability standards depending on the maintenance process exist (eg blade checks in-situ or as disassembled part).

The procedures must provide:

- JI for structure tests or for checks such as dye penetrant test (IC 351), check of an actuator stroke length (IC 361)
- as required, WS for the workflow of the instructions necessary to be performed to check the item

Only procedures specific to the item must be described; otherwise, refer to engine standard practices.

Illustrations must be used to indicate critical stress zones, to locate and to identify defects. Defects can be coded and the procedure must refer to these codes whenever those defects are mentioned (Fig 9).

Any systematic or as-required measurements must be located on an illustration as simple as possible for easy reading. If dimensions, tolerances and clearances are coded on the illustration, their values must be given on a separate table (Fig 10).

Permissible in-service/service wear tolerances and clearances must be provided.

Based on the known results of the structure test or of the check, the following status of the item must be given in the procedure:

- Acceptance for continued operation
- Repairable in accordance with repair procedures which must be referenced in the JI
- No longer serviceable or repairable

Measurements, clearances and torques which are specific to assembly procedures must not be mentioned in check procedures but in the relevant content (eg ensuring assembly clearance by machining a spacer to length).

Data module for structure tests must be coded:

YY-Y-XX-YY-YY-YYA-35XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-35XA-B (37 characters)

Data module for checks must be coded:

YY-Y-XX-YY-YY-YYA-36XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-36XA-B (37 characters)

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*Fig 9 Illustration of defects - Example*

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**CLASSIFICATION**

| ITEM IDX | DIM REF. | CAT | MIN. ACC. | MAX. ACC. | CRITERIA | DECISIONS | REQTS |
|---|---|---|---|---|---|---|---|
| 06 | A | 1 | 350 | 350,14 | If not in the limits | Not permitted<br>Keep the part | |
| | B | 1 | 67,2 | 67,25 | If more than 67,25 | Not permitted<br>Refer to Work Instruction 72-51-00-10Y-361A | |
| | C | 1 | 448 | 448,07 | If not in the limits | Not permitted<br>Keep the part | |
| | D | 1 | 14,5 | 14,54 | If not in the limits | Not permitted<br>Keep the part | |

Effectivity: All

**CLASSIFICATION**

ICN-AE-A-05020204-A-D0216-00050-A-01-1

*Fig 10 Dimensions checks - Table and illustrations (Example)*

### 2.4.5 Failure isolation procedures

These data modules must contain the procedures required to detect presumed malfunctions in the item and to isolate the faulty component or part in order to proceed with its replacement or repair.

Failure isolation must make possible to detect the faulty item in order to

- remove it without systematic disassembly. However removals can result in the possible disassembly of peripheral parts
- make any adjustments in situ required by repair or replacement of an items
- carry out overall testing of subassemblies or items after repair

The content must be written essentially as a function of the following criteria:

- Clear specification of values and tolerances applicable to in-service item
- Rapid failure isolation in order to minimize the item turn-around time
- Limiting of repair work to the absolute minimum

The procedures must be provided in form of JI. They must be arranged in such a manner that they will progressively isolate and identify each assembly, subassembly or parts.

Whenever possible, failure isolation procedures must make maximum use of built-in self-test features and must require a minimum of test equipment and repair tools. If built-in test equipment (BITE) is installed, specific procedures of the BITE must be provided and precede the detailed performance test procedure.

JI is preferably to be presented by flow charts (Fig 11 and Fig 12) except where tabular forms, descriptive language or any combination of these three forms as well as computer language presentation is more appropriate.

A single combined testing and failure isolation is not permissible.

Procedures must be provided using a test point/location method of testing rather than tests used by the manufacturer for item specification approval. These methods must identify the minimum test points/locations and must indicate the range for input and output parameters such as flow rate, pressures, ratings, voltages, wave shapes, etc, needed to insure the proper functioning and integrity of the item. Time constants to be observed between the application of an input parameter and the measurement of its output, or between two steps of the procedures must be clearly indicated.

The choice of the procedure to be used is essentially governed by the design of the item.

Repairs to be done during the failure isolation process must refer to relevant data module or to engine standard practices, except if they are simple (eg fuse change). In this case, repair information must be given at the applicable step in the procedure.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-4XXA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-4XXA-B (37 characters)

ICN-AE-A-05020204-A-D0216-00051-A-01-1

*Fig 11 Failure isolation - Basic principle*

ICN-AE-A-05020204-A-D0216-00052-A-01-1

*Fig 12 Failure isolation - Example (Sheet 1 of 2)*

ICN-AE-A-05020204-A-D0216-00053-A-01-1

*Fig 12 Failure isolation - Example (Sheet 2 of 2)*

### 2.4.6 Disconnect, remove and disassemble procedures

These data modules must contain:

- JI for the disconnection, removal or disassembly itself of a given item. All measurement and/or values that must be documented prior to an individual action being performed must be provided in the applicable step in the JI. Matched set must be indicated.
- as required, WS for the workflow of the instructions necessary to gain access with the minimum of disturbance, to disconnect or remove other serviceable items and subsequently remove the given item. No unnecessary actions must be carried out such as opening of permanent joints, unsoldering of connections, etc.

Cleaning of items before any disassembling must be referenced.

Procedures can be supported by illustrations or sequence charts as required.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-5XXA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-5XXA-B (37 characters)

### 2.4.7 Repair and locally make procedures and data

These data modules must contain detailed repair processes and data required to restore a worn or damaged part to serviceable conditions.

The process applied to a part is not to change the interchangeability

- of the repaired part

thru

- of the assembly repaired with a repair size part

Each repair must be identified. This identifier is not to be changed or reused. A cross reference must be provided between the identifier and the data module code of the procedure to perform the repair.

If several repairs are applicable to the same part, a table can be provided to select the sequence of JI so that the instructions are not duplicated unnecessarily (Fig 13). This table must be subject of a data module.

The procedures must provide:

- JI for the repair itself of the item. It must include illustrations, drawings, machining specifications, dimensions, etc, as required for carrying out work correctly
- as required, WS for the workflow of the instructions necessary to perform the repair

Only procedures specific to the item must be provided; otherwise, refer to engine standard practices (Chap 5.2.2.6).

Repair parts must be listed in the parts list set up in accordance with Para 2.4.1. The procedure must refer to the Parts Identifiers (PI) whenever those parts are mentioned.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-6XXA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-6XXA-B (37 characters)

Where "6XX" are the information codes from 610 to 659.

Procedures must state where repaired parts must be marked.

"How to mark" on the repaired parts must be included in the procedure for simple marking; otherwise it must refer to engine standard practices or relevant data module.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-691A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-691A-B (37 characters)

If parts can be locally manufactured, procedures must provide all dimensional data, materials, processing and QA data.

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-670A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-670A-B (37 characters)

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CLASSIFICATION

| DOCUMENT No. | PROCESS APPLICABILITY CASE No. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
| C2-A-72-31-20-09Y-659A-C (1) | x | x | | | | | | | | | | | | | |
| C2-A-72-31-20-13Y-659A-C (1) | | x | | | | | | | | | | | | | |
| C2-A-72-31-20-20Y-258A-C (2) | | x | x | | | | | | | | | | | | |
| C2-A-72-31-20-20Y-351B-C (3) | x | | x | | | | | | | | | | | | |
| C2-A-72-31-20-20Y-257A-C (4) (5) | x | | x | | | | | | | | | | | | |
| C2-A-72-31-20-20Y-712A-C (6) | x | x | x | | | | | | | | | | | | |

**REFERENCED DOCUMENTS**

(1) C2-A-70-00-57-00A-170A-C

(2) C2-A-70-00-64-00A-130A-C

(3) C2-A-70-00-33-00A-160A-C

(4) C2-A-70-00-67-00A-020A-C

(5) C2-A-70-00-67-00A-260A-C

(6) C2-A-70-00-61-00A-120A-C

Effectivity: All

CLASSIFICATION

ICN-AE-A-05020204-A-D0216-00054-A-01-1

*Fig 13 Repair table - Example*

### 2.4.8 Assemble, install and connect procedures

These data modules must provide:

- JI for the assembly, installation or connection itself of the item
- as required, WS for the workflow of the instructions necessary to have the desired assembled, installed or connected item such as checks, assembling, storage fluid replacement, closing up areas opened to get access

Assembly fits and clearances, adjustments and torque values must be given in the applicable steps. Matched set must be detailed.

Procedures must be supported by illustrations or flow charts as required.

If the use of special tools is not self-explanatory, data modules must provide data and information for their utilization.

Only special locking procedures must be described. They must be provided at the applicable step.

However, if an item (eg a component) requires complex or numerous locking operations, a separate procedure could be given in accordance with Para 2.4.9 Locking procedures. In this case, reference to this relevant locking procedure must be made in the assembly procedure.

Calibration or tests which cannot be performed after final assembly or which are easier to perform during assembly must be given at the applicable step.

Steps which are not to be accomplished

- until after testing
- until after item installation on the engine, a module, etc must be clearly indicated. Instructions to put on a tag on the item specifying the incompletion of the tasks must be mentioned in the procedure

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-7XXA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-7XXA-B (37 characters)

### 2.4.9 Locking procedures

These data modules are applicable to items requiring complex or numerous locking operations.

JI must provide step-by-step instructions necessary to secure that each part is locked on the item.

Illustrations must be provided to allow the user to visually identify the parts to be locked. Each part must be listed. This list must enable the user to record that each locking operation has been correctly carried out (eg signature, stamp).

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-712A-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-712A-B (37 characters)

### 2.4.10 Storage procedures and data

These data modules must provide:

- JI for the storage and the removal of storage itself of an item,

- as required, WS for the workflow of the instructions necessary to perform the work.

The procedures must provide the detailed instructions:

- to apply preservation when packing an item and to remove this preservation when unpacking it such as wrapping, blanking, consumable spraying. Data and instructions relative to air pressurization, humidity, temperature control, etc, must be provided.

  Data modules for preservation packing applying must be coded:

  YY-Y-XX-YY-YY-YYA-81XA-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-81XA-B (37 characters)

  Data modules for preservation packing removing must be coded:

  YY-Y-XX-YY-YY-YYA-82XA-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-82XA-B (37 characters)

- to put in or remove from a container an item.

  Data modules for putting in from a container must be coded:

  YY-Y-XX-YY-YY-YYA-830A-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-830A-B (37 characters)

  Data modules for removing from a container must be coded:

  YY-Y-XX-YY-YY-YYA-840A-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-840A-B (37 characters)

- to extend the shelf lives

Data modules must be coded:

  YY-Y-XX-YY-YY-YYA-85XA-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-85XA-B (37 characters)

- to transport items installed in containers. Only special handling must be provided.

Data modules must be coded:

  YY-Y-XX-YY-YY-YYA-86XA-B (17 characters)

  thru

  YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-86XA-B (37 characters)

- to prepare an item removed from storage before introduction into service. These procedures must provide the required workflow of instructions necessary to prepare the item such as:
  - Build-up of the item from several other items removed from storage

- Replacement of storage fluids, filling, etc
- Tests applicable when preparing the item. These tests must be specific tests to prepare the item, otherwise they must be referred to the relevant test (eg function test Para 2.4.4.3)

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-87XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-87XA-B (37 characters)

– to decide, after the checks of the condition of storage of an item and its physical integrity when remove from storage:
  - if it is acceptable to be prepared before introduction into service
  - what maintenance actions must be taken depending on the condition of the container, of blanking, etc

  This information can be given in the form of textual description, table or flow charts (Refer to Fig 14).

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-88XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-88XA-B (37 characters)

**Note**

On-condition maintenance cannot be applied to an item subject to this type of maintenance if it is removed from a damaged container.

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*Fig 14 Removal from storage - Example of incoming checks*

### 2.4.11 Data of items in storage

Shelf lives and Inspection Intervals when in storage must be listed.

The list must contain:

- the description of the item
- its manufacturer code and part number
- the shelf life or Inspection Interval (value and unit)
- the data module code of the procedure to be performed when limits are reached

Data modules must be coded:

YY-Y-XX-YY-YY-YYA-89XA-B (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-YY-YYYY-YYAAA-89XA-B (37 characters)

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Additional information.** The project or the organization must decide if additional information should be provided under the heading of the parts list "Remarks" (eg modification number applicable to the item). Refer to Para 1.3.2.

# Chapter 5.2.2.5

## *Air specific information sets - Power plant build-up information*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Power Plant Build-up (PPB) information.

## 1.2 Scope

It covers the rules for the preparation of information applicable to power plant build-up which will enable skilled personnel to equip a bare engine delivered by the manufacturer for installation on the air vehicle by the addition or transfer of parts and components. The PPB information must contain the following:

- Description and indexes
- Accessory assembly
- Power plant build-up

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate.

- **Bare engine:** An engine which is fully completed internally, but on which no external parts or components have been installed.
- **Engine:** An engine which is equipped with external parts supplied by the engine manufacturer.
- **Sequential grouping:** Any coherent package of logical sequenced information which describes a complete action. The action can consist of the completion of either a maximum convenience assembly or the installation of an accessory or system.
- **Maximum convenience assembly:** Two or more components, fittings and/or packings, or any externally mounted accessories which, for practical reasons, must be assembled prior to being installed on the power plant.

# 2 Power plant build-up information

## 2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-71-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

### 2.1.1 General description of the power plant

The engine description data modules will provide the following information:

1 Bare engine configuration and engine configuration

2 Zoning and location of the various attachment points, captive nuts, flanges, etc

3 List of equipment items to be installed on the bare engine

4 List of equipment items to be installed on the bare engine at delivery

5 List of equipment items calling for a maintenance action (servicing, test, etc), once the engine has been built-up

Data modules must be coded:

YY-Y-71-00-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-NNAAA-000A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

### 2.1.2 Special tools, fixtures and equipment

Special tools and equipment required to carry out the power plant build-up must be listed giving information such as, (refer to Table 2).

- Name
- Part number
- Manufacturer code (NCAGE)
- Usage

Data modules must be coded:

YY-Y-71-00-00-00A-061A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-00AAA-061A-A (37 characters)

*Table 2 Table of special tools, fixtures and equipment - Example*

| Name | Part No. | NCAGE | Usage |
|---|---|---|---|
| Engine accessory hoist | 196k4005-501 | 51563 | Support CSD or generator |
| Nose cowl sling | 196k4009-1 | 51563 | Hoist nozzle cowl |
| Nozzle dolly | 196k4003-1 | 51563 | Support exhaust nozzle |
| Exhaust plug support | 196k4008-1 | 51563 | Support exhaust plug |
| Primary nozzle sling | 196k4004-1 | 51563 | Hoist primary nozzle |
| Crank wrench | 196k8009-1 | 51563 | Rotate fuel condition control |

### 2.1.3 Vendor codes

Vendor codes must be shown for applicable vendor parts in the text to facilitate identification of the vendor. This list must be arranged in numerical sequence and give for each vendor supplying parts for PPB the following information, (refer to Table 3).

- VendorNCAGE
- Name of vendor
- Address of vendor

Data modules must be coded:

YY-Y-71-00-00-00A-019A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-00AAA-019A-A (37 characters)

*Table 3 Table of vendor codes - Example*

| NCAGE | Vendor |
|---|---|
| C0202 | Pall Filtrationstechnik GmbH<br>Philipp-Reis-Strasse<br>66072 Dreieich-Sprendlingen, Germany |
| D2638 | Elektro-Metall Expost GmbH<br>Manchinger Strasse 1<br>68070 Ingolstadt, Germany |
| F0230 | ABG-Secma SA<br>BP 502 75725<br>Paris Cedex 15, France |
| 00153 | Edcliff Instruments, Inc<br>1711 South Mountain Avenue<br>Monrovia, CA 91016-4256 |
| 00357 | Van Dusan Aircraft Supplies<br>Teterboro Airport, 500 Industrial Ave<br>Teterboro, NJ 07608 |
| 00624 | Aeroquip Corporation<br>Jackson Plant, 300 S East Ave<br>Jackson, MI 49203 |
| 01673 | Airdrome Parts Company<br>3251 Airport Way KP, PO Box 1867<br>Long Beach, CA 90801 |
| … | |

### 2.1.4 Consumables

All consumables materials, such as lubricants, greases, etc, which are prescribed for use during emergency accessory assembly and build-up procedures must be listed by name, specification and application or use. Refer to Table 4.

Data modules must be coded:

YY-Y-71-00-00-00A-017A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-00AAA-017A-A (37 characters)

*Table 4 Table of consumables - Example*

| Name | Specification | Use |
|---|---|---|
| Alcohol, polyvinyl | S-122 | Release |
| Ethyl acetate | TT-E-751 | Clean surface prior to dissimilar metals protection |
| Grease, graphite | MIL-T-5544 | Lubrication of bolts |
| Hydraulic fluid | Aerospatiale Spec. 307.110 | Hydraulic system lubricant |
| Liquid shim | EA934NA | Drain mast shim |
| Lubricant, anti-seize | MIL-L-25681 | Bolts threads, high temperature |
| Lubricant, dry film | MIL-L-23398 | Pneumatic duct couplings |
| Lubricant, oil | MIL-L-7808<br>MIL-L-23699 | Engine oil system, general |
| Oil, lubricating molybdenum disulfide | DOD-L25681 | General purpose |
| Petrolatum | VVP-236 | Packing lubricant |
| … | | |

### 2.1.5 Standard practices

The standard practices must include standard torques and locking methods as well as assembly practices or processes which are new, unique or manufacturer specified for a particular application. It also include procedures to ensure serviceability of a new converted engine such as cleaning, inspection, repair and servicing. Refer to Fig 1.

Data modules must be coded:

YY-Y-71-00-00-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-NNAAA-XXXA-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

## 4.4 Torque, standard bolts

4.4. **Thread MJ**

Torque values for standard bolts thread MJ with self locking nuts Inconel material 1380 MPa synthetique oil (μ = 0,10).

*Table 13 Torque values. Standard bolts thread MJ*

| Thread MJ nominal size metric | Torque value Nm (1) |
|---|---|
| 5 x 0.80 | 5.5 |
| 6 x 1.00 | 9 |
| 7 x 1.00 | 17 |
| 8 x 1.00 | 24 |
| 10 x 1.25 | 50 |
| 12 x 1.25 | 80 |

(1) The tightening torque actually obtained depends on the calibration and handling of the spanner, within an estimated plus minus 5 tolerance.

4.4. **Thread M**

Torque values for standard bolts thread M with self locking nuts Iconel material 1030 MPa, graphite mineral petrolatum (μ = 0,08).

*Table 14 Torque values. Standard bolts thread M*

| Thread M nominal size metric | Torque value Nm (1) |
|---|---|
| 5 x 0.80 | 8 |
| 6 x 1.00 | 13 |
| 7 x 1.00 | 24 |
| 8 x 1.25 | 33 |
| 10 x 1.50 | 75 |
| 12 x 1.50 | 132 |

(1) The tightening torque actually obtained depends on the calibration and handling of the spanner, within an estimated plus minus 5 tolerance.



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*Fig 1 Standard practices - Example*

### 2.1.6 Numeric index

The numeric index data module must consist of a complete listing of all parts required in the accessory assembly and power plant build-up data modules. All parts used must be listed by part number in alphanumeric order. The index must facilitate identifying the location of given part or accessory when only the part number is known. Refer to Table 5.

Data modules must be coded:

YY-Y-71-00-00-00A-013A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-00AAA-013A-A (37 characters)

*Table 5 Numeric index - Example*

| Part number | Airline part No. | DMC | Fig ref | Units per assembly |
|---|---|---|---|---|
| VT-0306D | | E1-A-71-00-01-06A-000A-A | 5-3 | 1 |
| VT-0306D | | E1-A-71-00-02-12A-000A-A | 4-1 | Ref |
| VT-0306D | | E1-A-71-00-02-12A-000A-A | 6-9 | Ref |
| VTA01431 | | E1-A-71-00-01-06A-000A-A | 7-9 | 2 |
| VT01433 | | E1-A-71-00-01-00A-000A-A | 7 | 2 |
| VTA01433 | | E1-A-71-00-02-23A-000A-A | 5-6 | 2 |
| VTA01431 | | E1-A-71-00-02-16A-000A-A | 5-6A | 2 |
| VTF00090 | | E1-A-71-00-02-16A-000A-A | 5-24 | 1 |
| VTF00100 | | E1-A-71-00-02-16A-000A-A | 5-18 | 1 |
| VTF00110 | | E1-A-71-00-02-16A-000A-A | 5-11 | 1 |
| 11J22-200 | | E1-A-71-00-02-32A-000A-A | 3-4 | 1 |
| 12H65 | | E1-A-71-00-02-26A-000A-A | 3-10 | 21 |
| 12811-11 | | E1-A-71-00-02-07A-000A-A | 2-17 | 2CSD |

## 2.2 Procedure index

Accessories and installations must be listed in the procedure index data module in alphabetical order so that the location of the desired information in the accessory assembly and power plant build-up data modules can be readily determined by the user. All accessories and installations of the accessory assembly and power plant build-up data modules must be listed in alphabetic order by keyword. Refer to Table 6.

Data modules must be coded:

YY-Y-71-00-00-00A-014A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0000-00AAA-014A-A (37 characters)

*Table 6 Procedure index - Example*

| Sequential grouping | Assembly/Build-up procedure DMC | Fig |
|---|---|---|
| QAD kit installation - Constant speed drive | E1-A-71-00-01-19A-710A-A | 4 |
| Ring segment Installation - Outer V-groove, lower fixed | E1-A-71-00-02-10A-720A-A | 2 |
| Ring segment Installation - Outer V-groove, upper fixed | E1-A-71-00-02-10A-720A-A | 3 |
| Seal installation - Engine Flange, Lower Bifurcation | E1-A-71-00-02-10A-720A-A | 5 |
| Seal installation - Generator and constant speed drive | E1-A-71-00-02-22A-720A-A | 3 |
| Seal installation - Turbine Inlet and compressor bleed | E1-A-71-00-02-17A-720A-A | 4 |
| Seal support installation - Upper fan case, aft | E1-A-71-00-02-10A-720A-A | 8 |
| Sensor, compressor inlet total temperature | E1-A-71-00-01-08A-710A-A | 3 |
| Sensor, fuel temperature | E1-A-71-00-01-14A-710A-A | 7 |
| … | | |

## 2.3 Accessory assembly

The accessory assembly data modules must contain the following information:

- General requirements
- Procedural information

### 2.3.1 General requirements

These data modules must list all the accessories requiring build-up and assembly information which must be completed as a maximum convenience assembly prior to installation as part of power plant build-up. All externally mounted accessories, engine support type as well as aircraft-support type, which require completion as an assembly must be included in these data modules. The accessory assembly information must be numbered so that each sequential grouping is separated from the others by its figure number. Each sequential grouping must be detailed in its corresponding procedural data modules. When it is necessary to assemble together two or more components to facilitate power plant build-up, the resulting maximum convenience assembly must be completed in accordance with a sequential grouping which must be included in this section. This information is also to include any checking operations to be performed on the accessory assembly prior to its installation on engine. Refer to Table 7.

Data modules must be coded:

YY-Y-71-00-01-NNA-700A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0100-NNAAA-700A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

*Table 7 List of accessories requiring build-up - Example*

| Name | Fig | Units per assy | Assembly procedure DMC |
|---|---|---|---|
| CSD oil heat exchanger | 2 | 1 | E1-A-71-00-01-04A-710A-A |
| Oil pressure transmitter and bracket | 3 | 1 | E1-A-71-00-01-04A-710A-A |
| Oil differential pressure switch | 4 | 1 | E1-A-71-00-01-04A-710A-A |
| Fuel pressure transmitter | 5 | 1 | E1-A-71-00-01-12A-710A-A |
| Nose cowl | 6 | 1 | E1-A-71-00-01-11A-710A-A |
| Nose cowl (Starter system) | 7 | 1 | E1-A-71-00-01-11A-710A-A |
| Hydraulic pump | 8 | 1 | E1-A-71-00-01-17A-710A-A |

### 2.3.2 Procedural information

Procedural information must include the parts list with the applicable part numbers. Item numbers must be assigned in the sequence-of-build order, without gaps.

**Note**

Procedural information must be the necessary information in step-by-step format, to accomplish the maximum convenience assembly.

The parts required to perform each maximum convenience assembly must be listed with their item numbers, part numbers, name and units per assembly. Torque values and value tolerances, special tools and lubricants and other relevant information for the accomplishment of each step must be included in the applicable step. Vendor codes must be listed for vendor parts to facilitate identification of the vendor.

**Note**

Identification of each vendor code listed must be made in the Introduction data module.

The title of the procedural information must be identical to the title of the supporting illustration. The maximum convenience assembly must also be cross-referenced to Next Higher Assembly (NHA) which must be the power plant build-up sequential grouping where the installation of the maximum convenience assembly onto the power plant is accomplished. Refer to Fig 2.

The illustration must consist of a completed view of the maximum convenience assembly with views showing the exploded detail parts. The index numbers assigned to the exploded parts must correspond to the item numbers listed in the procedural information. Refer to Fig 3.

Data modules must be coded:

YY-Y-71-00-01-NNA-710A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0100-NNAAA-710A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

## 6 Oil pressure transmitter preassembly

6.1 Install union (10) and packing (15) lubricated with engine oil to top of transmitter (5).

6.2 Torque union to 15,3 to 16,9 Nm (135 to 150 lb in).

6.3 Install elbow (20) lubricated packing (15) and nut (25) in bottom of transmitter. Leave nut fingertight.

*Table 6 Oil pressure transmitter assembly*

| Fig ref | Part number | Name | Units per assy |
|---|---|---|---|
| 6-5 | VT-034C | Transmitter, pressure | 1 |
| 6-10 | AN815-4J | Union | 1 |
| 6-15 | M83248-1-904 | Packing (V81349) | 2 |
| 6-20 | AN833-4J | Elbow | 1 |
| 6-25 | AN924-4J | Nut | 1 |



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*Fig 2 Accessory assembly procedure (Sheet 1 of 2) - Example*

E1-A-710001-C-F3352-00764-A-03-1

*Fig 6 Oil pressure transmitter*



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*Fig 2 Accessory assembly procedure (Sheet 2 of 2) - Example*

## 2.4 Power plant build-up

The power plant build-up information must be divided into the following parts:

- Major installation
- Attachment fittings installation
- Power plant build-up

Complete assembly information, including illustrations and step-by-step procedures for the installation of each accessory and system in a logical sequence of assembly from the bare engine to the completed power plant, must be included.

### 2.4.1 Major installation

Illustrations must be included which will allow leaders, with index numbers, to point out the location of the different sequential groupings. Tables must be included which will list the sequential groupings in a logical sequence of power plant build-up. This major installation of sequential groupings must be arranged with all installation data first, followed by Tables. Index numbers on the illustrations must tie the depicted installation to the corresponding name entry. Refer to Fig 4and Fig 5.

**Note**

The index number must correspond with the applicable sequential grouping figure number.

Data modules must be coded:

YY-Y-71-00-02-NNA-720A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0200-NNAAA-720A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

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*Table 2 Mid fan major installations*

| Fig ref | Name | Units per assy |
|---|---|---|
| 1-1 | Engine - JT9D-59A | 1 |
| 1-2 | Bracket install - LH upper fan case, flanges | 1 |
| 1-3 | Bracket install - LH mid fan case, flanges A, B1 and C | 1 |
| 1-4 | Bracket install - LH mid fan case, flanges V and W | 1 |
| 1-5 | Bracket install - LH lower fan case, flanges A and B1 | 1 |
| 1-6 | Bracket install - LH lower fan case , flanges B1, C, V and W | 1 |
| 1-7 | Bracket install - RH upper fan case, flanges B1, C and V | 1 |
| 1-8 | Bracket install - RH mid fan case, flanges A and B1 | 1 |
| 1-9 | ... | |
| 1-10 | ... | |
| 1-11 | ... | |
| ... | ... | |
| ... | ... | |
| ... | ... | |

...

...

Effectivity: All **E1-A-71-00-02-03A-720A-A**

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ICN-AE-A-050202-G-S3627-00412-A-01-1

*Fig 3 Major installation (Sheet 1 of 2) - Example*

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E1-A-710002-C-F3352-02312-A-03-1

*Fig 1 RH flanges G thru L*

Effectivity: All | **E1-A-71-00-02-17A-730A-A**

**Unclassified** | **2006-10-02 Page 3**

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*Fig 3 Major installation (Sheet 2 of 2) - Example*

### 2.4.2 Attachment fitting installation

Sequential groupings must be included as required to show each attachment fitting in its correct position on the engine flanges. All attachment fittings supplied by the engine and air vehicle manufacturers must be included. Each attachment fitting must be illustrated with a leader and index number. A locator drawing must be included at the top of each illustration to indicate the area being shown. All attach hardware required to secure each flange must be illustrated and indexed. There must be as many sequential groupings as necessary to show the illustration of each attachment fitting with its attachment hardware. The index numbers on the illustration of each bracket installation sequential grouping must be keyed to the corresponding parts list item numbers. The attachment fitting installed in accordance with each sequential grouping must be itemized in a logical sequence order. The parts list must consist of several columns showing the figure and item number, manufacturer's part number, open column for airline part numbers, flange location, hole location and installation configuration for each attachment fitting. Any special information must be included with the corresponding part numbers, with the procedure keyed to the parts list using the item numbers in parentheses. Refer to Fig 4.

Data modules must be coded:

YY-Y-71-00-02-NNA-730A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0200-NNAAA-730A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

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Attachment fitting location, see E1-A-71-00-02-00A-730A-A Introduction.

*Table 1 RH flanges G thru L*

| Fig ref | Part number | Name | Qty | On flange | Usage code | Hole location | Flange side | Angle faces |
|---|---|---|---|---|---|---|---|---|
| 1-1 | ASN0067-1 | Bracket assy | 1 | L | | Matched holes 4 o'clock | Aft | Aft |
| | NAS6103U10 | Screw | 1 | | | | | |
| | NAS1252-10H | Washer | 2 | | | | | |
| | MS21042L3 | Nut | 1 | | | | | |
| | NAS6103U16 | Screw | 1 | | | | | |
| 1-2 | ASN0017-503 | Support assy | 1 | K | | Matched holes 4 o'clock | Aft | Up |
| | NAS6103U10 | Screw | 2 | K-L | | | | |
| | NAS1252-10H | Washer | 3 | | | | | |
| | MS21042L3 | Nut | 2 | | | | | |
| | TA05KG1 | Clamp | 2 | | | | | |
| 1-2A | ASL0128-279 | Ground plate | 1 | L | | Matched holes 4:30 o'clock | Aft | |
| | NAS1306-10 | Bolt | 1 | | | | | |
| | AN960-616L | Washer | 2 | | | | | |
| | MS35338-46 | Washer | 1 | | | | | |
| | MS21042L6 | Nut | 3 | | | | | |
| 1-3 | ASL0088-2-B | Bracket | ... | | | | | |
| ... | ... | ... | | | | | | |
| ... | ... | | | | | | | |
| ... | | | | | | | | |

...

Effectivity: All **E1-A-71-00-02-11A-730A-A**

**Unclassified** **2006-10-02 Page 2**

ICN-AE-A-050202-G-S3627-00414-A-01-1

*Fig 4 Attachment fitting installation (Sheet 1 of 2) - Example*

E1-A-710002-C-F3352-01765-A-01-1

*Fig 1 Oil pressure transmitter*



ICN-AE-A-050202-G-S3627-00415-A-01-1

*Fig 4 Attachment fitting installation (Sheet 2 of 2) - Example*

### 2.4.3 Power plant build-up

Accessories and systems must be installed in a logical sequence of build order. A sequence grouping installation can consist of the installation of a single accessory or more than one accessory in an area being built-up, or, if the method of installation requires a complete system.

The illustrations must show the accessories, plumbing, components and associated hardware in the installed condition. For purposes of clarity, the affected parts must be illustrated in relief on the power plant by use of contrasting line weights. Detail views must be included as necessary to explode fittings, packing and other parts not exposed in the assembled view. Index numbers assigned to the exploded parts must correspond to the item numbers listed on the following parts list pages. A locator drawing must be included at the top of each illustration to indicate the particular area being shown. The procedural information for power plant build-up must be prepared in the same format and style used for the accessory build-up procedures. Installation of a maximum convenience assembly, completed in accordance with information contained in the accessory assembly data modules, must be called out in the power plant build-up data modules. These assemblies must be identified in the power plant build-up data modules by referencing the applicable figure number and, when existing, the installation part number, as listed in the accessory build-up data modules. Refer to Fig 5.

Data modules must be coded:

YY-Y-71-00-02-NNA-710A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y71-00-0200-NNAAA-710A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

## 6 Pneumatic pressure regulating valve installation

See Fig 11

1 Apply solid-film lubricant to inside of coupling (10).

2 Position coupling (10) between mating flanges of valve (5) and intermediate duct assembly.

3 Rotate coupling T-bolt to bottom of duct with nut outboard and torque valve marked on coupling.

4

**CAUTION**

**Make certain coupling T-bolts are positioned to clear thrust reverse.**

5 Connect plug DV224A to pneumatic regulating valve. Make certain one interfacial seal (15) is installed in receptacle.

6 Connect plug DV224B to valve. Make certain one interfacial seal (20) is installed in receptacle

*Table 1 Pressure regulating valve installation*

| Fig ref | Part number | Name | Units per assy |
|---|---|---|---|
| 11-5 | 3213754-1 | Valve pneumatic pressure regulating | 1 |
| 11-10 | 34H40-60 | Coupling | 1 |
| 11-15 | 095-1008-000 | Seal, Interfacial | 2 |
| 11-20 | 094-1020-000 | Seal, Interfacial | 1 |



ICN-AE-A-050202-G-S3627-00416-A-01-1

*Fig 5 Power plant build-up procedure (Sheet 1 of 2) - Example*

E1-A-710002-C-F3352-00372-A-02-1

*Fig 11 Pneumatic pressure regulating valve installation*



ICN-AE-A-050202-G-S3627-00417-A-01-1

*Fig 5 Power plant build-up procedure (Sheet 2 of 2) – Example*

# Chapter 5.2.2.6

## *Air specific information sets - Engine standard practices*

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1 References ....1


## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 4.3 | Information management - Data module code |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Engine Standard Practices (ESP) information.

## 1.2 Scope

It covers the requirements for the preparation of information applicable to engine standard practices which will enable skilled personnel to process standard procedures on engine parts. It also gives information concerning the preparation, check and regeneration of chemical solutions.

The standard practice must be referenced in the engine maintenance information, Service Bulletins, etc, to prevent the repetition of the detailed processes in these separate publications.

## 1.3 Standards and definitions

### 1.3.1 Standards

The standards given in this chapter are applicable with no exceptions.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 must be used as appropriate.

– **Standard practice:** A unique process used repetitively in the shop maintenance of air vehicle parts. It is a single detailed process of sequential operations to perform a specific task usually accomplished within a localized area of an engine shop.

  As a general rule, a standard practice is a complete process within itself and must not normally specify the required application of another standard practice or process, or of selected sections of another standard practice or process.

  The standard practice must only refer to material data information.

  A standard practice does not apply to only one part or group of parts. It is not a repair procedure.

  A process with a single application does not justify classification as standard practice. Such a process, however, can justify a standard practice classification when its application becomes more frequent.

– **Chemical solution:** A mixture of separate products. A data module is issued for each chemical solution. Content and numbering are defined Para 2.6.

# 2 Content

## 2.1 General

The complete set of ESP data modules is specified in Para 2.2 thru Para 2.7 Technical content and subsequent paragraphs.

## 2.2 Technical content

### 2.2.1 General requirements

The standard practice must provide a single source for all standard processes needed in the maintenance of an engine.

### 2.2.2 Data module coding

To assist in the codification of data modules, the rules which follow must be used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-70-SS-NN-ZZA-XXXA-C (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y70-SS-NN00-ZZAAA-XXXA-C (37 characters)

Where:

- "70" = standard practice
- "SS", the section code, gives the groups of standard practice.
  "00" identifies general information and chemical solutions. "10" the first group etc.
- "NN", in the subject code, is a sequential number, starting from "01", for chemical solutions and mixtures. For other groups "00" must be used.
- "ZZ", in the disassembly code, is a sequential number starting from "01". "00" is used for general information, if needed. "99" is always used for chemical solutions and mixtures.

### 2.2.3 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY–Y–70–00–00–NNA–018A–A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y16-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

## 2.3 General standard practices

Basic standard practices data module code are assigned. Refer to Para 2.7.

The general standard practice must not comply with the format of test or process standards and must not specify a detailed process.

The general standard practice must define the group and include any information pertinent to the entire group. It must not include any requirements pertinent to any specific process. It must contain general, descriptive, background information to assist the technician in processing a part.

## 2.4 Test standard practice

### 2.4.1 General

Each group of standard practices can have special test standard practices which must be classified at the beginning of the group.

The test standard practice must be used to evaluate process control and quality by indirect means. Samples are processed before or with the engine part, or in a like manner, and separately tested to evaluate the quality of the processed engine part.

The test standard practice need not comply with the format of process standards, but must specify the actual test methods and acceptability criteria. It must specify that the process applicable to the test part/specimen (Para 2.4.2) is identical to that applied on engine parts but generally must not describe the process applied.

### 2.4.2 Test standard practice content

The test standard practice includes two types of samples:

- Test part
- Test specimen

2.4.2.1 Test part

A test part is a reusable part to which a process is applied. Inspection results are usually compared to a reference measurement/value.

The test standard practice must define the test part, the process applied, the test method applied, and the acceptability limits.

The process, test method, and acceptability limits for the test part are usually identical to those applied to the engine part.

Each different test part must require a separate test standard practice.

2.4.2.2 Test specimen

A test specimen is a non-reusable part or sample to which a process is applied. The application and/or testing of the process usually require destruction of the specimen.

The test standard practice must define the test specimen, the process applied, the test method applied and the acceptability limits.

The process, test method, and acceptability limits for the test specimen are usually identical to those applied to the engine part.

Each different test specimen must require a separate test standard practice.

## 2.5 Process standard practice

### 2.5.1 Process standard practice content

The title of the process standard practice must identify the process in the least number of words required to distinguish one from another.

Example:

"Removal of tungsten carbide coating from titanium" is required if separate standard practices exist for removal of different coatings from different metals. Otherwise "Removal of coating" would be sufficient.

Each standard practice data module must contain the following headings:

- General
- Equipment
- Materials
- Procedure

2.5.1.1 General

This section must contain a description of the purpose of the standard practice, often only a repeat of the title when the title is very explicit. It must be a longer description, usually, when the title is brief and general.

Warnings, cautions or notes must occur in this paragraph only when they are of a general nature.

2.5.1.2 Equipment

This section must identify the general requirements or condition of equipment required for this practice. It must not usually specify the exact size, model, specification or brand name of equipment, but when a standard practice defines the procedure for specific equipment, the

specific equipment must be listed. When there are no equipment requirements, N/A must be entered.

2.5.1.3 Materials

This section must list all the chemical solutions and/or consumable products required for this practice. When there are no material requirements "N/A" must be entered.

When more than one material or group of materials is listed, each must be identified by a separate paragraph with identifier and title.

When materials are listed, they must be identified by the name and code used on the material data information and/or chemical solution description.

The standard practice process must make reference to the material data information where all products, product specifications, etc., are separately identified and controlled.

2.5.1.4 Procedure

This section must include the detailed sequential steps to accomplish the task.

When reference is made to the materials, they must be identified as in Para 2.5.1.3.

All procedure details must be included. Standard practice procedure must also include all necessary visual inspection to ensure its correct application.

## 2.6 Chemical solutions and mixtures information

### 2.6.1 Content

Information must be provided for preparation, use and regeneration of each chemical solution/mixture.

It must:

- provide the data necessary to make the initial solution
  - list of ingredients
  - initial mix quantity or concentration
  - temperature
- specify any test necessary for the solution during initial mixing and/or periodic intervals
- specify any regeneration action required

**Note**

If a single product requires regeneration and check action a chemical solution data module must be issued.

### 2.6.2 Chemical solution/mixture data module numbering

Chemical solution/mixture data modules must be numbered following the rules given in Para 2.2.2.

Example:

| | |
|---|---|
| Alkaline permanganate | YY-A-70-00-01-99A-081A-C |
| Acid stripping solution | YY-A-70-00-02-99A-081A-C |
| ... | ... |
| ... | ... |
| Inhibited phosphoric acid | YY-A-70-00-34-99A-081A-C |
| Alkaline cleaner for titanium | YY-A-70-00-76-99A-081A-C |
| etc | |

## 2.7 Standard practices numbering system application

The following tables give an example of a "complete" set of standard practice data modules.

**2.7.1 70-00-00 General**

| | |
|---|---|
| General information - How to use information | YY-A-70-00-00-00A-040A-C |
| Safety instructions | YY-A-70-00-00-01A-012A-C |
| Conversion factors (The United States (US) and Metric) | YY-A-70-00-00-02A-017A-C |
| Quality of gases | YY-A-70-00-00-03A-076A-C |
| Water types | YY-A-70-00-00-04A-076A-C |
| Tool requirements | YY-A-70-00-00-05A-061A-C |
| Ultraviolet light test | YY-A-70-00-00-06A-340A-C |
| Chemical solutions | YY-A-70-00-00-99A-081A-C |
| Chemical mixtures | YY-A-70-00-00-99A-082A-C |

**2.7.2 70-10-00 Marking and masking**

**Marking**

| | |
|---|---|
| General | YY-A-70-10-00-00A-691A-C |
| Time/cycle marking of parts | YY-A-70-10-00-01A-691A-C |
| Test of temporary marking products | YY-A-70-10-00-02A-369A-C |
| Electro-chemical etch marking | YY-A-70-10-00-03A-691A-C |
| Vibro-pen marking | YY-A-70-10-00-04A-691A-C |
| Metal stamp marking | YY-A-70-10-00-05A-691A-C |
| Temporary marking | YY-A-70-10-00-06A-691A-C |

**Masking**

| | |
|---|---|
| General | YY-A-70-10-00-11A-259A-C |
| Masking with wax | YY-A-70-10-00-12A-259A-C |
| Masking with varnish | YY-A-70-10-00-13A-259A-C |
| Masking with plastic | YY-A-70-10-00-14A-259A-C |
| Masking with rubber | YY-A-70-10-00-15A-259A-C |

**2.7.3 70-20-00 Cleaning and coating removal**

Chemical cleaning

| | |
|---|---|
| Solvent degreasing of all materials except titanium alloys | YY-A-70-20-00-01A-251A-C |
| Vapor degreasing | YY-A-70-20-00-02A-251A-C |
| Steam cleaning | YY-A-70-20-00-03A-251A-C |
| Light cleaning of titanium alloys | YY-A-70-20-00-04A-251A-C |
| Solvent degreasing of titanium alloys | YY-A-70-20-00-05A-251A-C |
| Electrolytic degreasing | YY-A-70-20-00-06A-251A-C |
| Cleaning internal lube oil tube | YY-A-70-20-00-07A-251A-C |
| Light oxide removal from titanium alloys | YY-A-70-20-00-08A-251A-C |
| Descaling ferrous alloys | YY-A-70-20-00-09A-251A-C |
| Descaling martensitic alloys | YY-A-70-20-00-10A-251A-C |
| Oxide removal from austenitic alloys | YY-A-70-20-00-11A-251A-C |
| Oxide removal from aluminum alloys | YY-A-70-20-00-12A-251A-C |
| Heavy oxide removal from austenitic alloys and heat-resistant alloys | YY-A-70-20-00-13A-251A-C |
| Heavy oxide removal from titanium alloys | YY-A-70-20-00-14A-251A-C |
| Carbon removal from all materials except aluminum and titanium | YY-A-70-20-00-15A-251A-C |
| Ultrasonic cleaning | YY-A-70-20-00-16A-251A-C |

**Abrasive blast cleaning**

| | |
|---|---|
| Dry abrasive blast cleaning with alumina-fine | YY-A-70-20-00-21A-252A-C |
| Dry abrasive blast cleaning with alumina-medium | YY-A-70-20-00-22A-252A-C |

| | |
|---|---|
| Dry abrasive blast cleaning with glass-fine | YY-A-70-20-00-23A-252A-C |
| Dry abrasive blast cleaning with glass-medium | YY-A-70-20-00-24A-252A-C |
| Dry abrasive blast cleaning with fruit stones | YY-A-70-20-00-25A-252A-C |
| Wet abrasive blast cleaning-very fine | YY-A-70-20-00-26A-252A-C |
| Wet abrasive blast cleaning-fine | YY-A-70-20-00-27A-252A-C |
| Wet abrasive blast cleaning-medium | YY-A-70-20-00-28A-252A-C |
| Wet abrasive blast cleaning-coarse | YY-A-70-20-00-29A-252A-C |
| **Removal of surface coatings** | |
| Removal of chromium plate from steels and austenitic alloys-Electrolytic process | YY-A-70-20-00-31A-653A-C |
| Removal of chromium plate from steels and austenitic alloys-Chemical process | YY-A-70-20-00-32A-653A-C |
| Removal of copper and silver plate from steels - Chemical process | YY-A-70-20-00-33A-653A-C |
| Removal of copper and silver plate from steels -Electrolytic process | YY-A-70-20-00-34A-653A-C |
| Removal of nickel plate from steels and austenitic alloys -Chemical process | YY-A-70-20-00-35A-653A-C |
| Removal of acid anodize treatments from aluminum alloys -Chemical process | YY-A-70-20-00-36A-653A-C |
| Removal of nickel/cadmium plating from low alloy, stainless and martensitic steels - Chemical process | YY-A-70-20-00-37A-653A-C |
| Removal of cadmium plating from low alloy steels -Chemical process | YY-A-70-20-00-38A-653A-C |
| Removal of phosphating (Granodizing treatment) -Chemical process | YY-A-70-20-00-39A-653A-C |
| Removal of chemical oxidation from aluminum alloys -Chemical process | YY-A-70-20-00-40A-653A-C |
| Removal of black oxide finish -Chemical process | YY-A-70-20-00-41A-653A-C |
| Removal of tungsten carbide thermal spray coating from titanium -Electrolytic method | YY-A-70-20-00-42A-653A-C |
| Removal of tungsten carbide thermal spray coating -Mechanical process | YY-A-70-20-00-43A-651A-C |
| Removal of cobalt, chromium, nickel, tungsten alloy thermal spray coating from nickel-base alloys -Mechanical process | YY-A-70-20-00-44A-651A-C |
| Removal of nickel-aluminum and Cu-Ni-In thermal spray coating except from low alloy steels -Chemical process | YY-A-70-20-00-45A-653A-C |
| Removal of aluminum thermal spray coating - Chemical process | YY-A-70-20-00-46A-653A-C |
| Removal of tungsten carbide thermal sprayed coatings from nickel or cobalt base alloys - Molten salt | YY-A-70-20-00-47A-653A-C |
| Removal of alumina-titanium (top coat) with Ni-Al (bond coat) thermal spray coatings except from low alloy steels | YY-A-70-20-00-48A-653A-C |
| Removal of plasma sprayed and tungsten carbide coating from titanium, steel, and stainless steel -Chemical process | YY-A-70-20-00-49A-653A-C |
| Removal of aluminum paint -Mechanical process | YY-A-70-20-00-50A-651A-C |
| Removal of aluminum paint -Chemical process | YY-A-70-20-00-51A-653A-C |

| | |
|---|---|
| Removal of epoxy silicone paint with aluminum pigment from all materials except titanium alloys -Chemical process | YY-A-70-20-00-52A-653A-C |
| Removal of polyurethane paint -Chemical process | YY-A-70-20-00-53A-653A-C |
| Removal of rubber masking | YY-A-70-20-00-54A-653A-C |
| Stripping silicone rubber from titanium and aluminum | YY-A-70-20-00-55A-653A-C |
| Removal of polyurethane paint with diphase products | YY-A-70-20-00-56A-653A-C |
| Removal of RTV 147-148 with hollow glass beads coating -Mechanical process | YY-A-70-20-00-57A-651A-C |
| Removal of RTV 147-148 with hollow glass beads coating -Chemical process | YY-A-70-20-00-58A-653A-C |

**2.7.4 70-30-00 Inspection**

**Hardness Measurement**

| | |
|---|---|
| General | YY-A-70-30-00-00A-356A-C |
| Brinell Hardness Testing | YY-A-70-30-00-01A-356A-C |
| Vickers Hardness Testing | YY-A-70-30-00-02A-356A-C |
| Rockwell Hardness Testing | YY-A-70-30-00-03A-356A-C |
| Portable Rockwell Hardness Testing | YY-A-70-30-00-04A-356A-C |

**Fluorescent penetrant inspection**

| | |
|---|---|
| General | YY-A-70-30-00-10A-351A-C |
| Test of fluorescent-penetrant process | YY-A-70-30-00-11A-390A-C |
| Test of fluorescent-penetrant | YY-A-70-30-00-12A-390A-C |
| Test of emulsifier or remover | YY-A-70-30-00-13A-390A-C |
| Fluorescent-penetrant inspection -Stationary water-washable | YY-A-70-30-00-14A-351A-C |
| Fluorescent-penetrant inspection -Stationary post-emulsifiable | YY-A-70-30-00-15A-351A-C |
| Fluorescent-penetrant inspection -Portable water-washable | YY-A-70-30-00-16A-351A-C |
| Fluorescent-penetrant inspection -Portable post-emulsifiable | YY-A-70-30-00-17A-351A-C |
| Fluorescent-penetrant inspection stationary - Electrostatic spraying process | YY-A-70-30-00-18A-351A-C |

**Magnetic particle inspection**

| | |
|---|---|
| General | YY-A-70-30-00-20A-352A-C |
| Magnetic particle inspection -Symbols | YY-A-70-30-00-21A-013A-C |
| Test of magnetic particle inspection process | YY-A-70-30-00-22A-280A-C |
| Magnetic particle inspection | YY-A-70-30-00-23A-352A-C |

**Radiographic inspection**

| | |
|---|---|
| General | YY-A-70-30-00-30A-354A-C |

**Ultrasonic inspection**

| | |
|---|---|
| General | YY-A-70-30-00-40A-355A-C |
| Immersion ultrasonic inspection of engine run titanium hardware | YY-A-70-30-00-41A-355A-C |

**Miscellaneous inspection**

| | |
|---|---|
| Capillary inspection of open face honeycomb structures | YY-A-70-30-00-51A-369A-C |

| | |
|---|---|
| Check of locking efficiency of swaged or riveted self-locking nuts and self-locking inserts | YY-A-70-30-00-52A-369A-C |
| Airflow measurement | YY-A-70-30-00-53A-363A-C |
| Special inspection for surface fretting or wear | YY-A-70-30-00-54A-310A-C |
| **Eddy current inspection** | |
| General | YY-A-70-30-00-60A-353A-C |
| Two (2) MHz eddy current inspection of bores | YY-A-70-30-00-61A-353A-C |
| Five (5) MHz manual eddy current inspection of titanium alloy rotating engine hardware | YY-A-70-30-00-62A-353A-C |

**2.7.5 70-40-00 Repair principles**

| | |
|---|---|
| Blending | YY-A-70-40-00-01A-650A-C |
| Hand blending | YY-A-70-40-00-02A-655A-C |
| Power blending | YY-A-70-40-00-03A-655A-C |
| **Insert installation** | |
| Replacement of swaged self-locking inserts | YY-A-70-40-00-11A-628A-C |
| Replacement of ring-locked fluid port inserts | YY-A-70-40-00-12A-628A-C |
| Replacement of key-locked insert in aluminum alloy | YY-A-70-40-00-13A-628A-C |
| Replacement and installation of thread inserts | YY-A-70-40-00-14A-628A-C |
| Replacement of ring-locked fluid fittings | YY-A-70-40-00-15A-628A-C |
| Replacement of ring-locked studs | YY-A-70-40-00-16A-628A-C |
| Replacement of key-locked studs in a aluminum alloy | YY-A-70-40-00-17A-628A-C |
| Replacement of crimped nuts | YY-A-70-40-00-18A-628A-C |
| **Riveting** | |
| Rivet symbols/specifications | YY-A-70-40-00-21A-013A-C |
| Formed rivet assemblies | YY-A-70-40-00-22A-624A-C |
| Huck bolt rivet assemblies | YY-A-70-40-00-23A-624A-C |
| Blind rivet assemblies | YY-A-70-40-00-24A-624A-C |
| Huck blind rivet assemblies | YY-A-70-40-00-25A-624A-C |
| Visu-lok blind bolt rivet assemblies | YY-A-70-40-00-26A-624A-C |
| Hi-lok bolt rivets assemblies | YY-A-70-40-00-27A-624A-C |
| **Machining** | |
| General | YY-A-70-40-00-30A-650A-C |
| Turning | YY-A-70-40-00-31A-658A-C |
| Milling | YY-A-70-40-00-32A-656A-C |
| Grinding | YY-A-70-40-00-33A-655A-C |
| Broaching | YY-A-70-40-00-34A-654A-C |
| Drilling | YY-A-70-40-00-35A-652A-C |
| Tapping | YY-A-70-40-00-36A-657A-C |
| Electrical discharge machining (EDM) | YY-A-70-40-00-37A-653A-C |
| Electro-chemical machining (ECM) | YY-A-70-40-00-38A-653A-C |
| Tribo-finishing | YY-A-70-40-00-39A-648A-C |
| **Fusion welding** | |
| General | YY-A-70-40-00-50A-627A-C |
| Test specimen inspection | YY-A-70-40-00-51A-390A-C |
| Parts inspection | YY-A-70-40-00-52A-390A-C |
| Gas shielded tungsten arc welding of steels, nickel and cobalt alloys | YY-A-70-40-00-53A-627A-C |

| | |
|---|---|
| Gas shielded tungsten arc welding of titanium alloys | YY-A-70-40-00-54A-627A-C |
| Gas shielded tungsten arc welding of aluminum alloys | YY-A-70-40-00-55A-627A-C |
| Shielded metal arc welding of steels, nickel and cobalt alloys | YY-A-70-40-00-56A-627A-C |
| Plasma arc welding | YY-A-70-40-00-57A-627A-C |
| Electron beam welding | YY-A-70-40-00-58A-627A-C |
| Automatic welding | YY-A-70-40-00-59A-627A-C |
| **Resistance welding** | |
| General | YY-A-70-40-00-70A-627A-C |
| Test specimen inspection | YY-A-70-40-00-71A-390A-C |
| Parts inspection | YY-A-70-40-00-72A-121A-C |
| Spot welding | YY-A-70-40-00-73A-627A-C |
| Beam welding | YY-A-70-40-00-74A-627A-C |
| **Brazing** | |
| General | YY-A-70-40-00-80A-623A-C |
| Inspection of brazing test specimens | YY-A-70-40-00-81A-390A-C |
| High temperature furnace brazing | YY-A-70-40-00-82A-623A-C |
| Oxy-acetylene torch brazing | YY-A-70-40-00-83A-623A-C |
| Induction brazing | YY-A-70-40-00-84A-623A-C |
| **Thermal spraying** | |
| General | YY-A-70-40-00-90A-612A-C |
| Stamping test | YY-A-70-40-00-91A-390A-C |
| Bend test | YY-A-70-40-00-92A-390A-C |
| Tensile bond test | YY-A-70-40-00-93A-390A-C |
| Metallographic examination | YY-A-70-40-00-94A-390A-C |
| Lap shear test | YY-A-70-40-00-95A-390A-C |
| Scratch hardness test | YY-A-70-40-00-96A-390A-C |
| Plasma and flame thermal spraying | YY-A-70-40-00-97A-612A-C |
| **Heat treatment** | |
| General | YY-A-70-40-00-98A-630A-C |
| Heat treatment furnace approval | YY-A-70-40-00-99A-030A-C |
| Localized heat treatment equipment approval | YY-A-70-40-00-A1A-030A-C |
| Furnace heat treatment | YY-A-70-40-00-A2A-638A-C |
| Localized heat treatment | YY-A-70-40-00-A3A-638A-C |

**2.7.6 70-50-00 Surface preparation**

| | |
|---|---|
| **Abrasive blast surface preparation** | |
| Dry abrasive blast -fine | YY-A-70-50-00-01A-649A-C |
| Dry abrasive blast -medium | YY-A-70-50-00-02A-649A-C |
| Dry abrasive blast -coarse | YY-A-70-50-00-03A-649A-C |
| Wet abrasive blast -fine | YY-A-70-50-00-04A-649A-C |
| Wet abrasive blast -medium | YY-A-70-50-00-05A-649A-C |
| **Surface conditioning** | |
| General | YY-A-70-50-00-10A-630A-C |
| Almen test of surface conditioning intensity | YY-A-70-50-00-11A-390A-C |
| Test for minimum shot size and deformed shot | YY-A-70-50-00-12A-390A-C |
| Test for broken glass beads | YY-A-70-50-00-13A-390A-C |
| Surface stressing by glass bead peening | YY-A-70-50-00-14A-635A-C |
| Surface stressing by steel shot peening | YY-A-70-50-00-15A-635A-C |

**Etching procedure for fluorescent-penetrant inspection**

| | |
|---|---|
| Local swab etching (all materials) | YY-A-70-50-00-21A-653A-C |
| Immersion (dip) etching for inconel | YY-A-70-50-00-22A-653A-C |
| Immersion (dip) etching for titanium | YY-A-70-50-00-23A-653A-C |
| Bonding test for fluorinated polymers | YY-A-70-50-00-24A-653A-C |
| Preparation of fluorinated polymers before blending | YY-A-70-50-00-25A-653A-C |

**2.7.7 70-60-00 Coating application**

**Electrolytic surface coating**

| | |
|---|---|
| General | YY-A-70-60-00-00A-640A-C |
| Nickel Plating on steel -testing | YY-A-70-60-00-01A-390A-C |
| Copper plating on stainless steel | YY-A-70-60-00-02A-647A-C |
| Nickel plating on steel -high stress, watts type | YY-A-70-60-00-03A-647A-C |
| Nickel plating on steel -low stress, sulfamate type | YY-A-70-60-00-04A-647A-C |
| Chromium plating on high stress stainless steels and austenitic alloys | YY-A-70-60-00-05A-647A-C |
| Chromium plating on low stress carbon steels | YY-A-70-60-00-06A-647A-C |
| Silver plating on steel | YY-A-70-60-00-07A-647A-C |
| Diffused Ni/Cd plating on steel | YY-A-70-60-00-08A-647A-C |
| Cadmium plating on steel | YY-A-70-60-00-09A-647A-C |
| Chromium plating on aluminum and aluminum alloys | YY-A-70-60-00-10A-647A-C |
| Selective contact copper plating | YY-A-70-60-00-11A-647A-C |
| Selective contact nickel plating | YY-A-70-60-00-12A-647A-C |
| Selective contact silver plating | YY-A-70-60-00-13A-647A-C |
| Diffused Ni/Cd selective contact plating | YY-A-70-60-00-14A-647A-C |
| Chromic acid anodizing | YY-A-70-60-00-15A-641A-C |
| Sulphuric acid anodizing | YY-A-70-60-00-16A-641A-C |
| Hard anodizing | YY-A-70-60-00-17A-641A-C |

**Chemical surface coating**

| | |
|---|---|
| General | YY-A-70-60-00-20A-640A-C |
| Manganese phosphate coating | YY-A-70-60-00-21A-644A-C |
| Oxide film coating of aluminum alloys | YY-A-70-60-00-22A-649A-C |
| Spot touch-up of oxide film coating on aluminum alloys for appearance and protection | YY-A-70-60-00-23A-649A-C |
| Spot touch-up of oxide film coating on aluminum alloys for protection | YY-A-70-60-00-24A-649A-C |
| Zinc phosphate coating | YY-A-70-60-00-25A-644A-C |
| Black oxide coating | YY-A-70-60-00-26A-641A-C |
| Spot touch-up of black oxide coating | YY-A-70-60-00-27A-641A-C |

**Application of dry film lubricants**

| | |
|---|---|
| General | YY-A-70-60-00-30A-243A-C |
| Application of molybdenum disulfide dispersed in modified epoxy resin binder | YY-A-70-60-00-31A-243A-C |
| Application of micrographite pigment dispersed in a thermoplastic binder | YY-A-70-60-00-32A-243A-C |
| Application of colloidal graphite dispersed in an epoxy binder | YY-A-70-60-00-33A-243A-C |
| Application of molybdenum disulfide dispersed | YY-A-70-60-00-34A-243A-C |

| | |
|---|---|
| in polyimide resin | |
| Application of molybdenum disulfide and other dry film lubricants dispersed in an inorganic binder and non-flammable solvent | YY-A-70-60-00-35A-243A-C |
| Application of PTFE lubricant varnish | YY-A-70-60-00-36A-243A-C |
| **Application of paints** | |
| Bend test of paint | YY-A-70-60-00-41A-390A-C |
| Application of aluminum pigment silicone paint | YY-A-70-60-00-42A-257A-C |
| Application of epoxy-silicone aluminum pigment paint with catalyzer | YY-A-70-60-00-43A-257A-C |
| Application of mineral base aluminum paint | YY-A-70-60-00-44A-257A-C |
| Application of anti-erosion paint | YY-A-70-60-00-45A-257A-C |
| Application of epoxy resin paint | YY-A-70-60-00-46A-257A-C |
| Application of primer for protection of inner surfaces | YY-A-70-60-00-47A-257A-C |
| Application of an epoxy polyimide paint | YY-A-70-60-00-48A-257A-C |
| Application of protective varnish | YY-A-70-60-00-49A-257A-C |
| Diffused aluminum-silicon paint | YY-A-70-60-00-50A-257A-C |
| Application of intumescent fire retardant paint | YY-A-70-60-00-51A-257A-C |
| **Application of adhesives** | |
| Shear test | YY-A-70-60-00-61A-390A-C |
| Application of a two part epoxy adhesive | YY-A-70-60-00-62A-621A-C |
| Application of a one part epoxy adhesive | YY-A-70-60-00-63A-621A-C |
| Application of a modified epoxy adhesive | YY-A-70-60-00-64A-621A-C |
| Bonding of silicone elastomer seals to metal surfaces | YY-A-70-60-00-65A-621A-C |
| Application of a two-part sealing elastomer | YY-A-70-60-00-66A-621A-C |
| Application of sealing adhesive | YY-A-70-60-00-67A-621A-C |
| Application of a modified epoxy adhesive film | YY-A-70-60-00-68A-621A-C |
| Application of a modified epoxy adhesive foam | YY-A-70-60-00-69A-621A-C |
| **Application of elastomer sealant** | |
| Application of polysulfide elastomer sealant | YY-A-70-60-00-71A-621A-C |
| Application of silicone elastomer adhesive/sealant | YY-A-70-60-00-72A-621A-C |
| Localized application of silicone abradable coating charged with hollow glass beads on non-metallic materials | YY-A-70-60-00-73A-621A-C |
| Application of polysulfide and toluene elastomer sealant | YY-A-70-60-00-74A-621A-C |
| Application of mineral charged epoxy coating | YY-A-70-60-00-75A-621A-C |
| Application of aluminum charged epoxy resin | YY-A-70-60-00-76A-621A-C |
| Application of epoxy abradable coating charged with hollow glass beads | YY-A-70-60-00-77A-621A-C |
| Application of phenolic microballoons charged epoxy coating | YY-A-70-60-00-78A-621A-C |

**2.7.8 70-70-00 Assembly**

| | |
|---|---|
| General | YY-A-70-70-00-00A-700A-C |
| Tightening methods | YY-A-70-70-00-01A-711A-C |
| Locking methods | YY-A-70-70-00-02A-712A-C |

# Chapter 5.2.2.7

## *Air specific information sets - Aircrew information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for Aircrew (ACRW) information.

## 1.2 Scope

It covers the rules for the preparation of information needed to provide aircrew with the necessary degree of understanding of the air vehicle and its systems and the procedures to operate the air vehicle, its systems and equipment to their full potential under normal and failure

modes. Unnecessary theory and superfluous engineering detail which are not of direct concern to the aircrew are excluded. Inclusion of information that is a duplication of procedures, techniques or any other material contained in other documents (air vehicle/equipment publications, regulations or official publications) should be avoided.

Performance information must be included.

## 1.3 Standards, definitions, writing style and references

### 1.3.1 Standards

The standards given in this chapter are applicable. The use of Simplified Technical English is a business rules decision.

### 1.3.2 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate:

- **Procedure:** A narrative description of a process that the aircrew must complete to place an air vehicle or system in a desired state.
- **Drill:** A list of actions to be carried out by the aircrew to complete a procedure.
- **Checklist:** A compilation of all drills related to the normal and emergency operation of the air vehicle.

### 1.3.3 Writing style

Where data modules for system description and operation are used in common for aircrew and maintainer information, they are written in the style, scope and depth appropriate to aircrew data modules.

### 1.3.4 References

References to any other documents are minimized. To avoid repetition of information, related subject matter should be adequately referenced so that the reader does not overlook important supplementary information. Such references in a data module to other modules are made by reference to the data module code and, according to the project rules, the title.

# 2 Aircrew Information

## 2.1 General

Description and operation (functioning) of the air vehicle is given in the relevant system (systems 21 and up). Where possible at the most general level of description, the same description and operation data modules should be used to present both aircrew and maintainer information. As description and operation data modules become more detailed and aircrew or maintainer orientated, different data modules should be used.

System 15 of the SNS is reserved for the remainder of the aircrew information, to the extent that it is not covered in the various system chapters in a manner appropriate to aircrew. It is specifically arranged for the preparation of Flight information, eg Flight manuals, Operating data manuals and Flight crew checklists.

System 05-60-XX of the SNS has been designated for the Acceptance/Functional check flight.

## 2.2 Technical content

### 2.2.1 Introduction

If required, the introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of the Information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-15-00-00-NNA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-00-0000-NNAAA-018A-A (37 characters)

Where "NN", in the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

**2.2.2 Description and operation of systems**

2.2.2.1 Data module coding

To assist in the codification of data modules, the rules which follow are used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-XX-Y0-00-00A-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YXX-Y0-0000-00AAA-043A-A (37 characters)

Where "XX-Y0": In general the bulk of aircrew information will be at system level, "XX-00", but can for complex systems be broken down to subsystem level, "XX-Y0".

2.2.2.2 General

Description and operation must include normal operation of systems and equipment, and if applicable, malfunction analysis information and alternate operation. To describe all systems adequately, theory of operation of direct concern to aircrew can be included. The information provided is relevant and sufficiently detailed to enable aircrew to convert to and subsequently operate the air vehicle safely and effectively without recourse to associated engineering documents. Some systems will require separate normal and emergency operation, malfunction analysis and alternate methods of operation to provide optimum utilization of malfunctioning equipment. Each major air vehicle is covered under a major heading. Where necessary, major systems are divided into subsystems and/or equipment. Each component control and indication of the major air vehicle is covered under separate subordinate headings. The name of the system is used as the primary heading and the name of each control or indication as the subordinate heading.

2.2.2.3 Description and operation

The description and operation of each air vehicle are covered in data modules as follows:

- An introductory paragraph must cover the concept of the system and explain the function of the system and how it affects or is affected by any other system. Information on the peculiarities and automatic features of the system are given regarding items such as source of power to operate the system (eg electric or hydraulic power source) and means by which the system accomplishes its functions. Specific controls can be mentioned but, in order to maintain the general nature of this introductory paragraph, must not be discussed. In some cases (especially automatic systems) it can be advisable to explain the internal mechanization of the system, including operational moding, so that the aircrew can fully appreciate what can be expected of the system. Where appropriate, software and its effects on the system are discussed.
- Each control contributing to the operation of the system is described and its location established. The description must include the function of the control and the end result produced when the control is selected to each of its possible options. The means by which the control accomplishes the end result is stated, eg mechanically or hydraulically. The specific action that a control actually accomplishes rather than simply stating the action it is supposed to accomplish is stated; eg, "The landing gear lever mechanically releases the up-locks and electrically positions the hydraulic selector valve" and not ’the landing gear lever operates the landing gear". Any effect that this control can have on any other system or which other systems can have on the control is stated. If operating the control requires any special technique or action, it is stated. If practical, a separate paragraph is devoted to

each control and the name of the control is employed as the paragraph heading. Descriptions of controls used in normal operation of a system are listed first, followed by descriptions of those controls used as back-up to the normal controls.

- All dedicated indications and warning devices, which are part of the system, are described. This description must include location, function, power source and interpretation of the indications. If an indication is very closely related to a single control, it is described in the paragraph covering the control. A control used to set, produce or adjust an indication is covered under the indication paragraph.
- Each multifunction control must be uniquely identified by location and number, eg (STICK) (ST), BUTTON No.1(1). The function of each control can be given in chart or tabular form. The description must include all functions available for use within the subject system, any indications associated with the operation of the control and any captions/legends or changes to associated indications which can be displayed to prompt selection/deselection of the control. A description is given of the end result produced when the control is operated, both to the subject system and, where applicable, any other system. A full description of multifunction controls is given in the relevant data module.
- Each multifunction display or readout contributing to the operation of the subject system is described. This description must include the various display formats available for use within the subject system, together with pertinent display symbology and the interpretation of relevant mnemonics, graphics, color, etc. Each display is described in its "normal" configuration and also in any other selectable or automatically entered formats (including any additional or changed symbology, either by selection or automatic moding). Fault and warning conditions, which are part of an integrated system, must also be included. A full description of multifunction displays and readouts is given in the relevant data module.
- Illustrations should be included to illustrate all indications and controls and whenever the illustration helps to describe the operation of the equipment. All types of illustration permitted by Chap 3.9.2 can be used.

### 2.2.3 Flight information

The flight information data modules are used to build up the flight manual and operating data manual.

#### 2.2.3.1 Data module coding

To assist in the codification of data modules, the following rules are used in addition to those given in Chap 4.3.

Data modules must be coded:

YY-Y-15-SZ-ZZ-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-SZ-ZZ00-NNAAA-XXXA-A (37 characters)

Where:

- "15" = Aircrew information
- "S0" gives the section codes, "00" for General, "10" for Operating limitations, etc
- "Z-ZZ" to be used for further break down by project or organization decision, except for section codes "4Z", emergency procedures, which are given in Para 2.2.3.6. Where no break down is needed or relevant, "0-00" is used.
- "NN", in the Disassembly code, is a sequential number starting from "00", if more than one data module is needed.
- "XXX" is the information codes related to the data modules given in Para 2.2.3.2 to Para 2.2.3.10.

#### 2.2.3.2 General

These data modules contain an Introduction, which gives a general overview of the salient features of the air vehicle (including leading particulars not covered elsewhere within System 15) and its intended use.

Data modules must be coded:

YY-Y-15-0Z-ZZ-NNA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-0Z-ZZ00-NNAAA-043A-A (37 characters)

2.2.3.3 Aircraft release/operating limitations
These data modules cover all limitations that must be observed throughout the cleared operating envelope.

Data modules must be coded:

YY-Y-15-1Z-ZZ-NNA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-1Z-ZZ00-NNAAA-043A-A (37 characters)

2.2.3.4 Flight characteristics
These data modules describe in narrative form the unique flight characteristics of the air vehicle throughout all phases of flight.

Comprehensive coverage of the handling of the air vehicle is provided throughout all phases of flight, including information such as asymmetric flight, conditions leading to departure, ground resonance and auto rotation characteristics. The recovery technique for all conditions that could be classified as out of control flight is emphasized. Detailed coverage of the technique to be employed in accomplishing operations such as taxiing, take-off, climb, instrument flight and landing are required under all configurations. All precautions to be observed during the various operations are covered.

Data modules must be coded:

YY-Y-15-2Z-ZZ-NNA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-2Z-ZZ00-NNAAA-043A-A (37 characters)

2.2.3.5 Normal procedures
*2.2.3.5.1 General*
These data modules must contain in narrative and/or checklist form all normal procedures required to accomplish a flight. Details and discussions of the operation of the system are covered in the appropriate system chapters. The handling of installed equipment is included, if this is not satisfactorily covered in the system chapters with regard to aircrew. Checking and proper positioning of installed equipment controls can be included if neglect of these operations would affect the safety or the efficiency of the flight. Function, operation or effect of controls is repeated here only as required for emphasis. The use of warnings, cautions and notes is kept to a minimum so that their importance is not degraded.

Data modules must be coded:

YY-Y-15-3Z-ZZ-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y35-1Z-ZZ00-NNAAA-XXXA-A (37 characters)

Where "XXX" is:

- 121 - Pre-operation procedures (crew)
- 131 - Normal operation procedures (crew)

– 151 - Post-operation procedures (crew)

Where no break down of the information code is needed or relevant, information code 131 is used.

Flight crew checklist information codes 125, 135 and 155, refer to Para 2.2.4.

*2.2.3.5.2* *Special procedures*
Procedures for air vehicles flown under special conditions, such as scramble or missions requiring intermediate operational stops, can be developed. Under these conditions, only certain items of the pre-flight, engine run-up and other applicable procedures need to be accomplished to assure a safe operation. Intermediate stops are defined as stops such as refueling, crew change or re-arming etc. A code can be developed to identify each item of a normal procedure that must be performed during the special operation, eg external power connected items not coded can be checked at the discretion of the aircrew, except when an air vehicle has been "cocked" for scramble.

*2.2.3.5.3* *Alert procedures*
The addition of alert procedures must have no effect on the normal procedures. The arrangement of the normal procedures must remain unchanged and reference can be made to the alert procedures in the normal procedures. Since aircrew on alert status use the alert procedures as a master checklist, the alert procedures must include all the steps of the procedures required to operate the air vehicle under the alert concept. The alert procedures must start by referring the aircrew to the preceding normal procedures by directing them to perform the interior and exterior inspections as set forth in the normal checklist. Once the member of aircrew is in the midst of the alert checklist he must not be referred back to the normal procedures until he has completed all alert checks, even if this means repetition of an identical phase contained in the normal procedures. As found necessary, each phase of alert operation must include an explanation of the purpose of that phase. Amplification of the alert procedural entries is avoided if such amplification is already provided in the normal procedures.

*2.2.3.5.4* *External inspection diagrams*
Diagrams covering the paths to be followed and the various checks to be made during the exterior inspection of the air vehicle are included as necessary. The paths must not pass through danger areas.

2.2.3.6 Emergency procedures
*2.2.3.6.1* *General*
These data modules must contain in narrative and/or checklist form the procedures to be followed to meet any emergency that could reasonably be expected. Emergency operation is covered only if it affects flight safety or the ability to complete the mission. Emergency systems and equipment are described in the various system chapters. Each emergency is listed and the symptoms which can be felt or observed, together with the indications provided by the warning system and other instrumentation, are described. If applicable, multifunction display readouts giving emergency information (actions to be taken, special information) are included in a comprehensive form, as illustrations showing the layout of the electronic displays and in listed form. The effects of the emergency on air vehicle operation and handling and/or the effects on individual system operation must also be described. Explanatory notes should be included to cover any points in the emergency situation or in the emergency procedure, the significance of which can not be immediately apparent to the aircrew. All precautions to be observed in coping with an emergency are discussed. Normally, combinations of emergencies are not covered because of the numerous possible combinations. Many emergencies will require some urgency in landing the aircraft. Emergency procedures requiring expedition in landing are written with full consideration of the expected time-to-failure after initial malfunction of the critical system.

Data modules must be coded:

YY-Y-15-4Z-ZZ-NNA-141A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-4Z-ZZ00-NNAAA-141A-A (37 characters)

Where "4Z" is:

- 41 - General
- 42 - Ground emergencies
- 43 - Take-off emergencies
- 44 - System related emergencies
- 45 - Single or multi-engine failures
- 46 - Approach/landing emergencies
- 47 - Avionic system failures
- 48 - Other emergencies or failures
- 49 - Multifunction display readouts giving emergency information

Where no break down is needed or relevant, 40 is used.

**Note**

In data module code example Coding Z-ZZ" is to be used for further break down by project or organization decision, except for section codes "4Z", emergency procedures, which are given in Para 2.2.3.6. Where no break down is needed or relevant, "0-00" is used.

Flight crew checklist information code 145, refer to Para 2.2.4.

*2.2.3.6.2 Helicopters*

On helicopters some equipment malfunctions require the air vehicle to "Land immediately", others historically lead to rapid deterioration of serviceability of a critical system which in turn requires the crew to "Land as soon as possible". Other equipment malfunctions result in a less rapid deterioration of flying qualities and a less urgent requirement to land. For those malfunctions the term "Land as soon as practicable" has been designated. Therefore, these three terms are defined in the first data module within this section (data module code: YY-A-15-41-00-01A-141A-A) and used throughout the section as general guidance where appropriate, to relate to the aircrew the degree of urgency in landing:

- "Land immediately" - An emergency will be declared and the air vehicle landed at once even if, for example, the outcome is ditching or landing in trees. The consequences of continued flight are likely to be more hazardous than those of landing at a site normally considered to be unsuitable.
- "Land as soon as possible" - An emergency will be declared and flight continued for no longer than necessary to accomplish a safe but unhurried landing at the nearest site.
- "Land as soon as practicable" - Emergency conditions are less urgent and the air vehicle is landed at the nearest aviation location or, if one is not reasonably close, at a safe landing site selected for subsequent convenience.

*2.2.3.6.3 Fixed-wing air vehicles*

On fixed-wing air vehicles some equipment malfunctions require the crew to "Land as soon as possible". Other equipment malfunctions result in a less rapid deterioration of flying qualities and a less urgent requirement to land. For those malfunctions the term "Land as soon as practicable" has been designated. Therefore, these two terms are defined in the first data module within this section (data module code: YY-A-15-41-00-01A-141A-A) and used throughout the section as general guidance to relate to the aircrew the degree of urgency in landing:

- "Land as soon as possible" - An emergency will be declared and the air vehicle landed at the nearest airfield with a runway suitable for a safe landing.
- "Land as soon as practicable" - Emergency conditions are less urgent and the air vehicle is landed at the nearest airfield where it can be landed safely and practical assistance for the air vehicle type can be expected.

*2.2.3.6.4 Arrangement of emergencies*

Emergencies must, if applicable, be arranged in the following sequence:

1 **Ground emergencies:** These are the emergencies, which might occur during the aircrew manning the air vehicle until the commencement of the take-off phase.

2 **Take-off emergencies:** These are the emergencies, which might occur during the phase from take-off on the ground until airborne with the climb configuration or emergency landing configuration established.

3 **System related emergencies:** These are emergencies, which can occur during any phase of operation; therefore they must not be associated with a particular phase of operation, unless otherwise stated.

4 **Single or multi-engine failures:** These failures must include all resulting emergencies. Procedures are given to cover all phases of flight including the landing portion. If feasible, references to other applicable drills should be avoided and preference be given to consolidated drills.

5 **Approach/landing emergencies:** These emergencies must include all system failures that require special procedures to accomplish the approach and landing.

6 **Avionic system failures:** These emergencies must contain information with regard to failures of the avionic system and provide procedures which can enable the crew to complete the mission successfully.

7 **Other emergencies or failures:** Any other emergency or failure appropriate to role or air vehicle type.

*2.2.3.6.5 Illustrations*

Illustrations can be added to explain emergency procedures.

*2.2.3.6.6 General emergency procedures*

In the general emergency procedures data modules (data module code: YY-A-15-41-00-01A-141A-A), a statement of the three basic rules are included. This statement should be similar to:

"In all emergencies, the overriding consideration must be to:

8 Maintain air vehicle control

9 Analyze the situation

10 Take proper action"

2.2.3.7 Special conditions

These data modules must provide information pertaining to the operation of air vehicles under special_conditions, eg adverse weather and climatic conditions. It is primarily narrative in nature. Presentations in the form of procedural items are used only to cover specific procedures that are characteristic of adverse weather operations.

Data modules must be coded:

YY-Y-15-5Z-ZZ-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-5Z-ZZ00-NNAAA-XXXA-A (37 characters)

Where "XXX" is:

- 043 - Description of function attributed to crew (functional breakdown)
- 131 - Normal operation procedures (crew)
- 141 - Emergency operation procedures (crew)

2.2.3.8 Performance data

*2.2.3.8.1 General*

These data modules must provide the data to be used by the operators for flight planning purposes and are the best available data. They must also allow performance studies and comparisons to be made.

Data modules must be coded:

YY-Y-15-6Z-ZZ-NNA-030A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-6Z-ZZ00-NNAAA-030A-A (37 characters)

*2.2.3.8.2 Fundamental elements*

The base from which the operating data are calculated must have taken into account the following fundamental elements:

- The performance datum of the air vehicle must be defined.
- The performance datum of the engines must be defined.
- The level of performance appropriate to service use must be specified.
- The criteria for scheduling the standard of performance must be specified.

*2.2.3.8.3 Performance datum of air vehicle*

This datum must cover all phases of flight, extremes of the flight envelope, ambient conditions, air vehicle and external stores configurations for which the air vehicle must be cleared or certificated.

*2.2.3.8.4 Performance datum of engines*

This datum must cover all phases of flight, extremes of the flight envelope and ambient conditions for which the air vehicle must be cleared or certificated.

*2.2.3.8.5 Variations from datum performance*

The assumptions made to account for the variations from the datum performance of both the air vehicle and engines during the service life of the air vehicle are defined. These assumptions are applied in the calculation of the performance data presented in any output.

*2.2.3.8.6 Standards of performance*

Several standards of performance may be appropriate dependent on the levels of risk determined by the operational role of the air vehicle. These criteria are applied, as appropriate, in the calculation of the performance data presented in the output for each standard of performance. Such standards are to be agreed as a project or an organization requirement.

*2.2.3.8.7 Phases of flight*

Performance data can be required at some of the conditions or phases of flight listed below. These data must cover all phases of flight, extremes of the flight envelope, ambient conditions, air vehicle and external stores configurations for which the air vehicle must be cleared or certificated. Data must be provided with all engines operating and with one or more engines inoperative, as required.

- Take-off from dry, wet or contaminated runway surfaces
- Initial climb-out and obstacle clearance
- Hovering inside and outside the ground effect
- Flyaway, vertical or run-on landings, or other options following an engine failure in hover/ low speed flight
- Vertical climb
- Translational climb
- Net flight path profiles
- Cruising flight for maximum range and endurance or any other appropriate speed
- Supersonic flight

- Maximum altitude
- Combat and/or maneuvering flight or boundaries
- Specific excess power boundaries
- Tactical low level and/or Terrain following operations
- Carrier/Ship-borne operations
- Descent
- Holding
- Approach and landing
- Overshoot and/or Baulked landing
- Ferry flight information
- Flight in abnormal configurations
- Effects of, or performance with, external stores and/or underslung loads carried
- Effects of, or performance with, sand, ice, foreign object, weapon countermeasure or other engine intake protection devices fitted
- Any other appropriate conditions required by individual projects

The above data can be required for:

- Normal operations
- Mission planning
- Operations from restricted sites or airfields and/or requiring steep climb-out or approach profiles
- Operations when higher than normal risks are accepted and authorized

*2.2.3.8.8* *Presentation*
Performance data can be presented in the most appropriate form, including reference to external software using basic aerodynamic algorithms.

2.2.3.9 Role operation/Weapon system techniques

*2.2.3.9.1* *Descriptions*
These data modules describe the armament/role system, controls and installed equipment and will be included only to the extent that they are not covered in the various system chapters in a manner appropriate to aircrew.

Data modules must be coded:

YY-Y-15-7Z-ZZ-NNA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-7Z-ZZ00-NNAAA-043A-A (37 characters)

*2.2.3.9.2* *Safety requirements*
These data modules specify all safety requirements relevant to the armament/role system fitted.

Data modules must be coded:

YY-Y-15-7Z-ZZ-NNA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-7Z-ZZ00-NNAAA-012A-A (37 characters)

*2.2.3.9.3* *Normal and reversionary procedures*
These data modules must contain in narrative and/or checklist form, as necessary, all normal and reversionary procedures relating to weapon delivery/role operation/equipment operation to be followed from the time the aircrew arrive at the air vehicle until they depart from the air vehicle and to an extent that it is not covered in the appropriate system chapters or in Normal procedures. Refer to Para 2.2.3.5.

Data modules must be coded:

YY-Y-15-7Z-ZZ-NNA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-7Z-ZZ00-NNAAA-XXXA-A (37 characters)

Where "XXX" is:

- 121 - Pre-operation procedures (crew)
- 131 - Normal operation procedures (crew)
- 151 - Post-operation procedures (crew)

Where no break down of the information code is needed or relevant, IC 131 are used.

*2.2.3.9.4* *Emergency procedures*
These data modules must contain in narrative and/or checklist form, as necessary, all emergency procedures relating to weapon delivery/role operation not covered in the appropriate system chapters or in Emergency procedures Refer to Para 2.2.3.6.

Data modules must be coded:

YY-Y-15-7Z-ZZ-NNA-141A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-7Z-ZZ00-NNAAA-141A-A (37 characters)

*2.2.3.9.5* *Weapons procedures and sample problems*
These data modules describe the weapons planning procedures and give in charts and in tabular form the data related to weapon delivery/role operations.

- **Scope:** The basis for the charts and tables and assumptions used with respect to temperature, pressure, atmospheric density etc, are discussed including appropriate reference line illustrations and definitions. The appropriate planning software program applicable to the air vehicle weapon aiming system is identified.
- **Description of charts and tables:** Sample problems for each type of delivery mode for each weapon will only be required if it is decided that it is necessary for the aircrew to be able to carry out manual calculations.

Data modules must be coded:

YY-Y-15-7Z-ZZ-NNA-030A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-7Z-ZZ00-NNAAA-030A-A (37 characters)

2.2.3.10 Configurations
These data modules must contain the various stores configurations, including weapons, fuel tanks, and special pods carried both internally and externally and should include details of the effect on weight, drag index, limitations and flight envelope where they are not covered in Flight characteristics (refer to Para 2.2.3.4), Performance data (refer to Para 2.2.3.8) or Role operation/Weapon system procedures (refer to Para 2.2.3.9) data modules.

Data modules must be coded:

YY-Y-15-8Z-ZZ-NNA-020A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-Y15-8Z-ZZ00-NNAAA-020A-A (37 characters)

**2.2.4 Flight crew checklist**

2.2.4.1 General

The purpose of the flight crew checklist must provide aircrew with drills for normal operation of the air vehicle, for air vehicle and system malfunctions, for emergency procedures and for special operations. Relevant operating data should also be included to enable the air vehicle to be operated safely and effectively.

2.2.4.2 Structure

By project or organization decision the checklist can be built up according to either of the following two models:

- **Multi-data modules checklist:** A compilation of separate data modules, each containing the drills of the corresponding aircrew information data module.
- **Comprehensive checklist:** Checklist consisting of one data module, containing all necessary drills related to one section (eg Normal procedures, Emergency procedures) of the aircrew information.

2.2.4.3 Data module coding

*2.2.4.3.1 Multi-data modules checklist*

The checklist data modules must have the same data module code as its Aircrew Information (AI) procedure data modules, except for the information code.

Example:

- AI procedure DMC-YY-A-15-44-ZZ-NNA-141A-A (System related emergencies)
- Checklist DMC-YY-A-15-44-ZZ-NNA-145A-A

*2.2.4.3.2 Comprehensive checklist*

The checklist must have a data module code with the same section/subsystem number, as the AI section/subsystem to which it relates.

Example:

- AI procedure DMC-YY-A-15-4Z-ZZ-NNA-141A-A (Emergency procedures, any data module)
- Checklist DMC-YY-A-15-40-00-NNA-145A-A

2.2.4.4 Preparation

Flight crew checklist are to incorporate all drills relating to equipment operation, including those required by non-flight deck aircrew, appropriate to the specific air vehicle and role. The order of drills will be project specific. Limitations and operating data required by the project or the organization should be included.

2.2.4.5 Sequence of phases, actions and checks

Phases, actions and checks are arranged chronologically and designed to avoid requiring the member of aircrew to retrace his steps. All checks should be made from left to right or top to bottom, except where chronology must take precedence. Checks on the ground should be grouped to minimize control manipulation and ground operating time. Phases can be added or deleted and checks can be rearranged to other phases to provide for specific situations.

2.2.4.6 Brevity

All instructions are concise, but brevity must not be achieved at the expense of accuracy or clarity.

2.2.4.7 Order of drills

The checklist must contain the following information; other information can be added as required by specific projects:

- **Normal drills:** Those drills which deal with the normal operation of the air vehicle and its equipment is laid out in chronological order, starting from the time that the aircrew approach

the air vehicle before flight until the time that they leave the air vehicle after engine shutdown.

- **Operating data:** As required.
- **Limitations:** As required.
- **System malfunction and emergency drills:** Single system emergency drills are written under generic headings such as "Fires", "Hydraulic system failures" etc. Bold face/Immediate drills are identified. Complex emergency drills, which require actions on more than one system, eg following an engine shutdown, must, where possible, be presented in full to prevent the need for cross reference to other drills.

2.2.4.8 Numbering
Numbering of checks within each drill can be used as individual project or organization requirements dictate.

2.2.4.9 Emergency drills
Emergency drills must normally start with the indications of the failure.

2.2.4.10 Special checks
An asterisk or obelus (dagger marking) can be used to identify special checks, eg alert or quick turn round checks. The meanings of such markings must be explained in the "Notes to Users" or at the head of the group of checks where the markings are used.

2.2.4.11 Tables
When tables are used they should normally be set to the full width of the area of the checklist. Column headings are in upper and lowercase, and columns are separated by vertical lines. Horizontal lines can be used as required.

2.2.4.12 Illustrations
Illustrations must not be used, unless it is impracticable to show the data effectively in any other way.

2.2.4.13 Safety precautions
Where applicable, a summary of safety precautions are provided. The summary must precede the normal drills and must include all general precautions.

2.2.4.14 Name
The name used in the checklist modules are identical to that used in the remainder of the CSDB for the production of other aircrew information. Abbreviations, as used in other parts of the CSDB, can be used as necessary.

2.2.4.15 Warnings, cautions and notes
Warnings, cautions and notes can be used in checklist format if necessary.

2.2.4.16 Limitations
The following limitations can be incorporated within checklists:

- Airframe limitations
- Engine limitations
- Approved fuels and oils
- System limitations

2.2.4.17 Operating data
Any operating data presented must be from a validated source.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**References to any other documents are to be minimized**. The project or the organization must decide whether references in a data module to other modules are made by reference to the data module code and compliant to the project rules. Refer to Para 2.2.3.6.4.

**Standards of performance**. The project or the organization must are to be agreed on the standards of performance. Refer to Para 2.2.3.8.6.

**Conditions or phases**. The project or the organization must decide whether the conditions or phases of flight listing can be supplemented by projects or organizations conditions or phases. Refer to Para 2.2.3.8.7.

**Checklist for Structures**. The project or the organization must decide which of the following two models are used to structure checklists (refer to Para 2.2.4.2):

**Multi-data modules checklist.** A compilation of separate data modules, each containing the drills of the corresponding aircrew information data module.

**Comprehensive checklist.** Checklist consisting of one data module, containing all necessary drills related to one section (eg Normal procedures, Emergency procedures) of the aircrew information

**Order of drills**. The project or the organization must decide on the order of drills will be project specific. Limitations and operating data required by the project or the organization should be included. Refer to Para 2.2.4.7.

**Supplementing the order of drills**. The project or the organization must decide whether to supplement the Order of Drills checklist listing. Refer to Para 2.2.4.7.

**Numbering of checks**. The project or the organization must decide on the numbering of checks within each drill. Refer to Para 2.2.4.8

# Chapter 5.2.3

## *Information sets - Land/Sea specific information sets*

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| Chap 5.2.3.4 | Land/sea specific information sets - Crew/Operator fault detection, isolation and resolution information |
| Chap 5.2.3.5 | Land/sea specific information sets - International, national and regulatory scheduled check information |

## 1 General

This chapter provides the references for the preparation and coding of land/sea specific information sets.

## 2 Land/sea specific information sets

These are as follows:

- Land/Sea specific information sets - Crew/Operator descriptive information, see Chap 5.2.3.1
- Land/Sea specific information sets - Crew/Operator operation, see Chap 5.2.3.2
- Land/Sea specific information sets - Crew/Operator sequential operation, see Chap 5.2.3.3
- Land/Sea specific information sets - Crew/Operator fault detection, isolation and resolution, see Chap 5.2.3.4

– Land/Sea specific information sets - International, national and regulatory scheduled check, see Chap 5.2.3.5

# 3 Business rules decisions

For all the chapters above, business rules decisions include, but are not limited to, the following:

**Data module coding strategy.** The project or the organization must decide the definition of the data module coding strategy to be applied.

**Project specific information sets**. The project or the organization must decide on the project specific information sets.

# Chapter 5.2.3.1

## *Land/sea specific information sets - Crew/Operator descriptive information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for crew/operator descriptive information for land/sea Product.

## 1.2 Scope

It the rules for the preparation of information needed to provide crew/operator with the necessary degree of understanding of the land/sea Product.

Unnecessary theory and superfluous engineering detail, which are not of direct concern to the crew/operator as defined by the project or the organization, is to be excluded. Inclusion of information that is a duplication of descriptions or any other material contained in other documents (land/sea Product publications, regulations or official publications) must be avoided. Performance information must be included.

This information set is divided into two groups:

- General information
- Description

### 1.2.1 General information

The information must contain the general information (eg general description, technical data, etc.) of the land/sea Product.

### 1.2.2 Land/Sea Product description for the Crew/Operator

The following three different description types can be used as defined by the project or the organization:

- Functional description (predominant descriptions of functions) of the land/sea Product.
- Physical breakdown orientated description (descriptions of each part of a physical breakdown) of the land/sea Product.
- External equipment description (descriptions of components or equipment which are outside of the defined project, for example ammunition, but for which the crew/operator must be provided information) of the land/sea Product.

## 1.3 Standards and definitions

### 1.3.1 Standards

The following chapters are applicable when using this chapter.

- Chap 3.9.1 - General writing rules
- Chap 3.9.2 - Illustration rules and multimedia
- Chap 3.9.3 - Warnings, cautions and notes
- Chap 3.4 - Zoning and access
- Chap 3.6 - Security and data restrictions
- Chap 3.7 - Quality assurance

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths. The project or the organization must establish their own data module coding strategy, using a code length that suits the project's needs.

### 1.3.2 Writing style

Where data modules for Product descriptions are used in common for land/sea crew/operator and maintainer information, they must be written in the style, scope and depth appropriate to land/sea crew/operator data modules.

### 1.3.3 References

Reference to any other documents inside this information set must be used in a structured way. To avoid repetition of information, related subject matter must be adequately referenced. Such references in a data module to other modules must be made by reference to the data module code and title and to other technical publications by reference to their identifier.

### 1.3.4 Definitions

The definitions as stated in Chap 9.2 must be used as appropriate.

# 2 Crew/Operator descriptive information content

## 2.1 Introduction

The introduction data module contains explanation of the purpose, scope, structure, special format and use of the technical content of this information set. They also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-00-00-00-00A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A00-00-0000-00AAA-018A-A (37 characters)

## 2.2 Land/Sea Product - General

### 2.2.1 General description

General description must contain an overview of the whole Product with the following topics:

- Illustration and or pictures of the land/sea Product
- Purpose of the land/sea Product
- General description of construction and use of the land/sea Product

Data modules must be coded:

YY-Y-15-00-YY-YXA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-00-0000-00AAA-043A-A (37 characters)

### 2.2.2 Technical data

Technical data include all necessary information about the land/sea Product and its components, eg weights and measures, performance data, limits (when they are in a descriptive manner: view-areas of the different crew-members/operators under use of optical components), etc.

Data modules must be coded:

YY-Y-YY-YY-YY-YXA-033A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A00-00-0000-00AAA-033A-A (37 characters)

### 2.2.3 Operation areas and devices

The description of operation areas covers all different kind of structures where the land/sea Product is divided into functional or tactical purpose groups. Furthermore a summary of all used devices or components must be added for the above defined groups.

Data modules must be coded:

YY-Y-15-00-00-YXA-055A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-00-0000-00AAA-055A-A (37 characters)

## 2.3 Land/Sea Product description

### 2.3.1 Technical description (functional breakdown orientated)

The functional breakdown orientated description of the land/sea Product covers all topics, appropriate for the land/sea crew/operator to realize the combine or function of more than one device or component. The goal must put the land/sea crew/operator in the position to understand the functionalities of the land/sea Product. The information must also be usable for training purposes.

Data modules must be coded:

YY-Y-15-05-YY-YXA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-05-0000-00AAA-043A-A (37 characters)

### 2.3.2 Technical description (physical breakdown orientated)

The components of the Product (if the information is necessary and on the level for the land/sea crew/operator) must have a description about the construction and its function in data modules as follows:

- Each control of the Product must be described and its location established.
- In some cases (especially automatic systems) it is advisable to explain the internal mechanization of the Product, so that the land/sea crew/operator can fully appreciate what can be expected of the Product. Where appropriate, software and its effects on the Product must be described.
- All dedicated indications and warning devices, which are part of the Product, must be described.

Illustrations must be included to illustrate all indications and controls. All types of illustrations permitted by Chap 3.9.2 can be used.

References between technical description data modules must be used if necessary (show dependency).

The information must also be usable for training purposes.

Data modules must be coded:

YY-Y-YY-YY-YY-YXA-044A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-AYY-YY-YYYY-00AAA-044A-A (37 characters)

### 2.3.3 Technical description (independent equipment)

All equipment not covered by the model identification definition but nevertheless used at the land/sea Product, eg ammunition, etc., describe the construction and its function on crew/operator level.

Data modules must be coded:

YY-Y-15-06-00-YXA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-06-0000-00AAA-XXXA-A (37 characters)

where the value for information code (XXX) is either 033 or 043.

### 2.3.4 Content and references

The different kind of descriptions are connected by references, as shown in Fig 1, to extend the information content and usability for the land/sea crew/operator. The functional breakdown orientated description gives the land/sea crew/operator an overview, the physical breakdown orientated description and details of the individual component.

ICN-AE-A-050203-A-U8025-00001-A-01-1

*Fig 1 Data and reference model descriptive information*

The physical breakdown allows an implicit connection between all other information on the same breakdown.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Description types.** The following three different description types can be used as defined by the project or the organization:

- Functional description (predominant descriptions of functions) of the land/sea Product.
- Physical breakdown orientated description (descriptions of each part of a physical breakdown) of the land/sea Product.
- External equipment description (descriptions of components or equipment which are outside of the defined project, for example ammunition, but for which the crew/operator must be provided information) of the land/sea Product.

# Chapter 5.2.3.2

## *Land/sea specific information sets - Crew/Operator operation information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for crew/operator operation information.

## 1.2 Scope

It covers the rules for the preparation of information needed to provide land/sea crew with the operation of the land/sea Product.

This information set is divided into seven groups:

- General information
- Operation
- Operating data manual
- Operating under special conditions
- Emergency procedures
- Transportation
- Equipment stowing

## 1.3 Standards and definitions

### 1.3.1 Standards

The following chapters are applicable when using this chapter:

- Chap 3.9.1 - General writing rules
- Chap 3.9.2 - Illustration rules and multimedia
- Chap 3.9.3 - Warnings, cautions and notes
- Chap 3.4 - Zoning and access
- Chap 3.6 - Security and data restrictions
- Chap 3.7 - Quality assurance

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths. The project or the organization must establish their own data module coding strategy, using a code length that suits the project or organization needs.

### 1.3.2 Writing style

Where data modules for Product operation are used in common for land/sea crew/operator and maintainer information, they must be written in the style, scope and depth appropriate to land/sea crew/operator data modules.

### 1.3.3 References

Reference to any other documents inside this information set must be used in a structured way. To avoid repetition of information, related subject matter must be adequately referenced so that the reader does not overlook important supplementary information. Such references in a data module to other modules must be made by reference to the data module code and title.

### 1.3.4 Definitions

The definitions as stated in Chap 9.2 must be used as appropriate.

# 2 Crew/Operator operation information

## 2.1 Introduction

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of this information set. They could also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-15-00-00-00A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-00-0000-00AAA-018A-A (37 characters)

## 2.2 Land/Sea Product operation - General

The information must contain the general information (such as, general introduction into operation, conditions, performance limits, etc.) of the land/sea Product.

Data modules must be coded:

YY-Y-15-30-YY-YYA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-30-YY-YYAAA-043A-A (37 characters)

## 2.3 Land/Sea Product operation

### 2.3.1 Operation (physical breakdown orientated)

The operation data modules must include all descriptions necessary to perform the operation of Product to put into operation, to operate during use or to turn off the defined Product. The operation description must be created as a step by step structure.

It must also include all preliminary requirements as a description or as a reference to the related data modules.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules must be coded:

YY-Y-YY-YY-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-YYYY-YYAAA-XXXA-A (37 characters)

where the value for information code (XXX) is 111, 112, 121, 131, 141 or 151.

### 2.3.2 Operation (functional breakdown orientated)

The operation data modules must include all descriptions necessary to perform the operation of components (functional groups) to put into operation, to operate during use or to turn off the defined components (functional groups). The operation description must be created as a step by step structure.

All dependencies between the single Product inside the defined component (functional group) must as far as the crew needs be explained or taken into consideration for the content of the data modules.

It must also include all preliminary requirements as a description or as a reference to the related data modules.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules must be coded:

YY-Y-15-3(1 – 8)-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-3(1 - 8)-YYYY-YYAAA-XXXA-A (37 characters)

where the value for information code (XXX) is 111, 112, 121, 131, 141 or 151.

### 2.3.3 Land/Sea Product operating data

These data modules must contain all data for active service that are not described in the topic land/sea Product operation.

These could be information of Product parameters in case of battle not for training use or other operation instruction only applicable under battle conditions.

Data modules must be coded:

YY-Y-15-2Y-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-2Y-YYYY-YYAAA-XXXA-A (37 characters)

where value for information code (XXX) is 111, 112, 121, 131, 141 or 151.

## 2.4 Operating under special conditions

### 2.4.1 Heat conditions

These data modules must contain all relevant additional operation instructions to realize the whole functionality of the land/sea Product under higher temperature.

Data modules must be coded:

YY-Y-15-51-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-51-YYYY-YYAAA-XXXA-A (37 characters)

### 2.4.2 Cold conditions

These data modules must contain all relevant additional operation instructions to realize the whole functionality of the land/sea Product under lower temperature.

Data modules must be coded:

YY-Y-15-51-YY-YYA-XXXB-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-51-YYYY-YYAAA-XXXB-A (37 characters)

### 2.4.3 Dust conditions

These data modules must contain all relevant additional operation instructions to realize the whole functionality of the land/sea Product used in areas by an abnormal influence of dust.

An example could be the shorter period of cleaning or changing of filters, etc.

Data modules must be coded:

YY-Y-15-51-YY-YYA-XXXC-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-51-YYYY-YYAAA-XXXC-A (37 characters)

**2.4.4 Recovery or tow away**

These data modules must contain the detail instructions for the

- preparation and preliminary requirements of the land/sea Product for the recovery under consideration of the safety instructions
- performing of the recovery and/or the afterwards tow away of the land/sea Product under consideration of the safety instructions

Only land/sea Product specific instructions must be created. Standard practices, or other general information about recovery or tow away, which are defined in other general publications must not be included. Only references must be included.

Data modules must be coded:

YY-Y-15-52-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-52-YYYY-YYAAA-XXXA-A (37 characters)

**2.4.5 Crossing of stretch water**

These data modules must contain the detail instructions for the

- preparation and preliminary requirements of the land/sea Product for the crossing of stretch water under consideration of the safety instructions
- performing of the crossing of stretch water and the afterwards close up procedures of the land/sea Product under consideration of the safety instructions

Only land/sea Product specific instructions must be created. Standard practices, or other general information about crossing of stretch water, which are defined in other general publications must not be included. Only references must be included.

Data modules must be coded:

YY-Y-15-53-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-53-YYYY-YYAAA-XXXA-A (37 characters)

**2.4.6 Nuclear, biological, chemical (NBC) conditions**

These data modules must contain the detail instructions for the

- preparation and performing of preliminary requirements for the land/sea Product under NBC conditions
- using of the land/sea Product under NBC conditions

Only land/sea Product specific instructions must be created. Standard practices, or other general information under NBC conditions, which are defined in other general publications must not be included. Only references must be included.

Data modules must be coded:

YY-Y-15-54-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-54-YYYY-YYAAA-XXXA-A (37 characters).

**2.4.7 In case of fire at the Land/Sea Product**

These data modules must contain all instructions to extinguish or to suppress fire at the land/sea Product.

Data modules must be coded:

YY-Y-15-55-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-55-YYYY-YYAAA-XXXA-A (37 characters)

**2.4.8 Make unserviceable or destruction of the Land/Sea Product**

These data modules must contain all instructions to destroy the land/sea Product systematically in case of

- the crew/operator has been ordered to perform the make unserviceable or destruction
- the tactical situation requires the make unserviceable or destruction

The instructions could be defined in different levels of make unserviceable or destruction.

Data modules must be coded:

YY-Y-15-59-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-59-YYYY-YYAAA-XXXA-A (37 characters)

## 2.5 Emergency procedures

These data modules must cover all information to

- use emergency exits if necessary
- operate the faulty land/sea Product under reduced readiness to work

Data modules must be coded:

YY-Y-15-40-YY-YYA-141A-A (17 characters)

or

YY-Y-15-40-YY-YYA-145A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-40-YYYY-YYAAA-141A-A (37 characters)

or

YYYYYYYYYYYYYY-YYYY-A15-40-YYYY-YYAAA-145A-A (37 characters)

## 2.6 Transportation

These data modules must describe all procedures to prepare and carry out the transportation of land/sea Product. Standard practices must only be included unless they are not described in other general publications.

It must also include all necessary safety instructions (as descriptions or as references).

The different types of transportation are:

- Transport by train - Data module must be coded: YY-Y-15-39-1Y-YYA-XXXA-A
- Transport by ship - Data module must be coded: YY-Y-15-39-2Y-YYA-XXXA-A
- Transport by plane - Data module must be coded: YY-Y-15-39-3Y-YYA-XXXA-A
- Transport on road (eg low-loader) - Data module must be coded: YY-Y-15-39-4Y-YYA-XXXA-A
- Transport defined by project - Data module must be coded: YY-Y-15-39-YY-YYA-XXXA-A

for project specific transport, definitions of the sub-subsystem, "YY" must be >= "5Y"

thru

- Transport by train - YYYYYYYYYYYYYY-YYYY-A15-39-1Y00-YYAAA-XXXA-A
- Transport by ship - YYYYYYYYYYYYYY-YYYY-A15-39-2Y00-YYAAA-XXXA-A
- Transport by plane - YYYYYYYYYYYYYY-YYYY-A15-39-3Y00-YYAAA-XXXA-A
- Transport by road - YYYYYYYYYYYYYY-YYYY-A15-39-4Y00-YYAAA-XXXA-A
- Defined by project - YYYYYYYYYYYYYY-YYYY-A15-39-YY00-YYAAA-XXXA-A

For project specific transport, definitions of the sub-subsystem, "YY00" must be >= "5Y00".

The values for information code (XXX) are 121, 131, 141, or 151 as appropriate.

## 2.7 Equipment stowing

These data modules must include all necessary information for

- give the crew/operator an overview of the stowing locations
- what equipment in which number has to be stowed in the defined locations

Data modules must be coded:

YY-Y-15-04-YY-YYA-056A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-04-YYYY-YYAAA-056A-A (37 characters)

# Chapter 5.2.3.3

## *Land/sea specific information sets - Crew/Operator sequential operation information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for land/sea crew/operator sequential operation list information.

## 1.2 Scope

It covers the rules for the preparation of information needed to provide land/sea crew/operator with the sequential operation of the land/sea Product and its subsystems in checklist form.

This information set is divided into four groups:

- General information
- Operation (sequential)
- Operating under special conditions (sequential)
- Transportation (sequential)

## 1.3 Standards and definitions

### 1.3.1 Standards

The following chapters are applicable when using this chapter:

- Chap 3.9.1 - General writing rules
- Chap 3.9.2 - Illustration rules and multimedia
- Chap 3.9.3 - Warnings, cautions and notes
- Chap 3.4 - Zoning and access
- Chap 3.6 - Security and data restrictions
- Chap 3.7 - Quality assurance

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths. The project or the organization must establish their own data module coding strategy, using a code length that suits the project or organization needs.

### 1.3.2 References

Reference to any other documents inside this information set must be used in a structured way. To avoid repetition of information, related subject matter must be adequately referenced so that the reader does not overlook important supplementary information. Such references in a data module to other modules must be made by reference to the data module code and title.

### 1.3.3 Definitions

The definitions as stated in Chap 9.2 must be used as appropriate.

# 2 Crew/Operator sequential operation information

## 2.1 Introduction

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of this information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-15-36-00-00A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-36-0000-00AAA-018A-A (37 characters)

### 2.1.1 Land/Sea Product sequential operation - General

The information must contain the general information (like general introduction into sequential operation lists, conditions, performance limits, etc.) of the land/sea Product.

Data modules containing a description attributed to crew are coded:

YY-Y-15-36-YY-YYA-043A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-36-YYYY-YYAAA-043A-A (37 characters)

### 2.1.2 Land/Sea Product sequential operation list

This data module must provide a sequential listing of the tasks. The data modules must be constructed using the inspectionDefinition branch of the schedules Schema. The attribute `taskSeqNumber` of the element <`taskItem`> must be used to capture the sequential number of the task. This list must also provide links to the listed tasks.

Data modules must be coded:

YY-Y-05-SS-00-NNA-000A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A05-SS-0000-NNAAA-000A-A (37 characters)

where:

- SS = 45 for a sequence of scheduled tasks
- SS = 55 for a sequence of unscheduled tasks
- SS = 65 for a sequence of "acceptance" tasks (for example hand over)
- NN defaults to "00" but if there was a sequence of sequenced tasks then NN must be set to the parent sequence

## 2.2 Land/Sea Product operation (sequential)

### 2.2.1 Preliminary requirements

The Preliminary Requirements for sequential operation data modules must include all necessary information to prepare the sequential operation of the land/sea Product to put into operation, to operate during use or to turn off the defined land/sea Product. The sequential operation description must be created as a step by step structure in checklist form.

It must include all preliminary requirements as a description or as a reference to the related data modules.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data module.

Data modules must be coded:

YY-Y-15-36-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-36-YYYY-YYAAA-XXXA-A (37 characters)

**2.2.2 Put into operation**

The sequential put into operation data modules must include all necessary information to perform sequential put into operation activities of the Product. The sequential put into operation description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-Y-15-37-YY-YYA-125A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-37-YYYY-YYAAA-125A-A (37 characters)

**2.2.3 Operation during use**

The sequential operation during use data modules must include all necessary information to perform sequential operation of the Product. The sequential operation description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-A-15-37-YY-YYA-135A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-37-YYYY-YYAAA-135A-A (37 characters)

**2.2.4 Emergency operation**

The sequential emergency operation data modules must include all necessary information to perform sequential emergency operation of the Product. The sequential emergency operation description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-Y-15-37-YY-YYA-145A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-37-YYYY-YYAAA-145A-A (37 characters)

**2.2.5 Operation to turn off the defined Product**

The sequential operation to turn off the defined land/sea Product data modules must include all necessary information to perform sequential operation to turn off the defined Product. The sequential operation to turn off the defined land/sea Product description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-Y-15-37-YY-YYA-155A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-37-YYYY-YYAAA-155A-A (37 characters)

**2.2.6 Close up operation**

The sequential close up operation procedures data module must include all necessary information to finalize the operation after use of the defined systems or subsystems. The sequential close up operation description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-Y-15-38-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-38-YYYY-YYAAA-XXXA-A (37 characters)

### 2.2.7 Operating data

The sequential operating data manual data modules must include all necessary information of active service that is not described in the topic land/sea Product operation. The sequential operating data manual description must be created as a step by step structure in checklist form.

Data modules must be coded:

YY-Y-15-2Y-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-2Y-YYYY-YYAAA-XXXA-A (37 characters)

The values for information code are 125, 135, 145, or 155 as appropriate.

## 2.3 Operating under special conditions (sequential)

### 2.3.1 Heat, cold or dust conditions

These data modules must contain all relevant additional sequential operation instructions to realize the whole functionality of the land/sea Product under higher or lower temperature or under dust conditions.

Data modules must be coded:

YY-Y-15-51-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-51-YYYY-YYAAA-XXXA-A (37 characters)

The values for information code are 125, 135, 145, or 155 as appropriate.

### 2.3.2 Recovery and towing

These data modules must contain all relevant additional sequential operation instructions to realize the necessary task for recovery and/or towing of the land/sea Product.

Data modules must be coded:

YY-Y-15-52-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-52-YYYY-YYAAA-XXXA-A (37 characters)

The values for information code are 125, 135, 145, or 155 as appropriate.

### 2.3.3 Crossing of stretch water

These data modules must contain all relevant additional sequential operation instructions to realize the whole functionality of the land/sea Product before, during and after the tactical operation, crossing of stretch water.

Data modules must be coded:

YY-Y-15-53-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-53-YYYY-YYAAA-XXXA-A (37 characters)

The values for information code are 125, 135, 145, or 155 as appropriate.

**2.3.4 (Nuclear, biological, chemical (NBC) conditions**

These data modules must contain all relevant additional sequential operation instructions to realize the whole functionality of the land/sea Product before, during and after operation under NBC conditions.

Data modules must be coded:

YY-Y-15-54-YY-YYA-XXXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-54-YYYY-YYAAA-XXXA-A (37 characters)

The values for information code are 125, 135, 145, or 155 as appropriate.

**2.3.5 Transportation**

These data modules must describe all sequential procedures to prepare and carry out the transportation of land/sea Product.

- Transport by train - data modules must be coded: YY-Y-15-39-1Y-YYA-XXXA-A
- Transport by ship - data modules must be coded: YY-Y-15-39-2Y-YYA-XXXA-A
- Transport by plain - data modules must be coded: YY-Y-15-39-3Y-YYA-XXXA-A
- Transport on road - data modules must be coded: YY-Y-15-39-4Y-YYA-XXXA-A
- Transport defined by project - data modules must be coded: YY-Y-15-39-YY-YYA-XXXA-A

For project specific transport, definitions of the sub-subsystem "YY" must be "5Y"

- Transport by train - YYYYYYYYYYYYYY-YYYY-A15-39-1Y00-YYAAA-XXXA-A
- Transport by ship - YYYYYYYYYYYYYY-YYYY-A15-39-2Y00-YYAAA-XXXA-A
- Transport by plain - YYYYYYYYYYYYYY-YYYY-A15-39-3Y00-YYAAA-XXXA-A
- Transport on road - YYYYYYYYYYYYYY-YYYY-A15-39-4Y00-YYAAA-XXXA-A
- Project specific - YYYYYYYYYYYYYY-YYYY-A15-39-YY00-YYAAA-XXXA-A

For project specific transport, definitions of the sub-subsystem "YY000" must be "5Y000".

The values for information code are 125, 135, 145, or 155 as appropriate.

# Chapter 5.2.3.4

## *Land/sea specific information sets - Crew/Operator fault detection, isolation and resolution information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for land/sea crew/operator fault detection and resolution information.

## 1.2 Scope

It covers the rules for the preparation of information needed to provide a land/sea crew/operator with fault detection and either the resolution of the detected faults or the further activities to solve the technical problems of the land/sea Product.

This information set is divided into three groups

- General information
- Functional test (crew/operator level)
- Fault detection and resolution

## 1.3 Standards and definitions

### 1.3.1 Standards

The following chapters are applicable when using this chapter.

- Chap 3.9.1 - General writing rules
- Chap 3.9.2 - Illustration rules and multimedia
- Chap 3.9.3 - Warnings, cautions and notes
- Chap 3.4 - Zoning and access
- Chap 3.6 - Security and data restrictions
- Chap 3.7 - Quality assurance

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths. The project or the organization must establish their own data module coding strategy, using a code length that suits the project or organization needs..

### 1.3.2 References

Reference to any other documents inside this information set must be used in a structured way. To avoid repetition of information, related subject matter must be adequately referenced, so that the reader does not overlook important supplementary information. Such references in a data module to other modules must be made by reference to the data module code and title.

### 1.3.3 Definitions

The definitions as stated in Chap 9.2 must be used as appropriate.

# 2 Crew/Operator fault detection, isolation and resolution information

## 2.1 Introduction

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of this information set. They must also contain any information of a general nature which is not detailed in any specific data modules.

Data modules must be coded:

YY-Y-15-34-00-00A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-34-0000-00AAA-018A-A (37 characters)

## 2.2 Land/Sea system crew/operator fault detection and resolution - General

The information must contain the general information (such as general introduction into land/sea crew/operator fault detection and resolution, etc.) of the land/sea Product.

Data modules must be coded:

YY-Y-15-34-YY-YYA-010A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-34-YYYY-YYAAA-010A-A (37 characters)

## 2.3 Functional test (Crew/Operator level)

### 2.3.1 Functional tests (manual)

The functional test data modules must include all necessary information to prepare and perform the manual functional test of the Product by the crew/operators. It must include all necessary preliminary requirements as a description or as a reference to the related data modules. Furthermore the step-by-step description of the functional tests and if necessary the close up procedures must be included.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules containing manual functional tests for physical breakdown orientated topics must be coded:

YY-Y-YY-YY-YY-YYA-321A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-AYY-YY-YYYY-YYAAA-321A-A (37 characters)

Data modules containing manual functional tests for functional breakdown orientated topics must be coded:

YY-Y-15-35-YY-YYA-321A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-35-YYYY-YYAAA-321A-A (37 characters)

### 2.3.2 Functional tests with built in test equipment

The functional test data modules must include all necessary information to prepare and perform the automatic or semi-automatic functional test using Built In Test Equipment (BITE) of the Product by the crew/operators. It must include all necessary preliminary requirements as a description or as a reference to the related data modules. Furthermore the step by step description of the functional tests and, if necessary, the close up procedures must be included.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules containing automatic or semi-automatic functional tests for physical breakdown orientated topics must be coded:

YY-Y-YY-YY-YY-YYA-322A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-AYY-YY-YYYY-YYAAA-322A-A (37 characters)

Data modules containing automatic or semi-automatic functional tests for functional breakdown orientated topics must be coded:

YY-Y-15-35-YY-YYA-322A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-35-YYYY-YYAAA-322A-A (37 characters)

## 2.4 Fault detection and resolution (Crew/Operator level)

### 2.4.1 Fault codes, symptoms and fault tracing for detection of faulty Land/Sea Product

The fault code, symptoms and fault tracing data modules must include all necessary information to allow the detection of faults from the Product by the crew/operators. It is the basis for the follow on fault detection process and it defines an entry point to the fault detection. It must include if necessary the preliminary requirements as a description or as a reference to the related data modules. Furthermore the step by step description of the handling of the fault codes or symptoms and if necessary the close up procedures must be included.

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules must be coded:

YY-Y-15-41-YY-YYA-410A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-41-YYYY-YYAAA-410A-A (37 characters)

### 2.4.2 Fault detection and resolution - Description

The Fault detection and resolution description data modules must include all necessary information to allow the detection of faults from the Product by the crew/operators. The descriptions could be in form of flowcharts or similar constructs with:

- descriptions of the actions inclusive the necessary preliminary requirements
- questions, if necessary with limits
- answers, probably as a selection list for the crew/operator
- measures to resolve the fault, also references to higher level of maintenance if this is not to clarify by the crew/operator (as a description or as a reference to the related data modules)

Safety conditions and instructions must be included inside the data modules or inserted as a reference to the related data modules.

Data modules must be coded:

YY-Y-15-42-YY-YYA-420A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A15-42-YYYY-YYAAA-420A-A (37 characters)

# Chapter 5.2.3.5

## *Land/sea specific information sets - International, national and regulatory scheduled check information*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding, where appropriate, of data modules for International National and Regulatory Scheduled Check (INRSC) information.

## 1.2 Scope

It covers the rules for the preparation of information needed to provide land approval personnel with descriptions about international national and regulatory scheduled check in checklist form of the land/sea Product.

- General Information
- Safety instructions
- Preliminary requirements and preparation of work
- Check of systems and subsystems
- Checks according law rules
- Operation tests

## 1.3 Standards, references and definitions

### 1.3.1 Standards

The following chapters are applicable when using this chapter.

- Chap 3.9.1 - General writing rules
- Chap 3.9.2 - Illustration rules and multimedia
- Chap 3.9.3 - Warnings, cautions and notes
- Chap 3.4 - Zoning and access
- Chap 3.6 - Security and data restrictions
- Chap 3.7 - Quality assurance

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths. The project or the organization must establish their own data module coding strategy, using a code length that suits the project or organization needs.

### 1.3.2 References

Reference to any other documents inside this information set must be used in a structured way. To avoid repetition of information, related subject matter should be adequately referenced so that the reader does not overlook important supplementary information. Such references in a data module to other modules must be made by reference to the data module code and title.

### 1.3.3 Definitions

The definitions as stated in Chap 9.2 must be used as appropriate.

# 2 International, national and regulatory scheduled check information

## 2.1 Introduction

The introduction data modules must contain explanation of the purpose, scope, structure, special format and use of the technical content of this information set. They must also contain any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules containing an introduction must be coded:

YY-Y-19-00-00-00A-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-00-0000-00AAA-018A-A (37 characters)

## 2.2 Land/Sea Product international, national and regulatory scheduled check - General

The information must contain the general information about land/sea Product international, national and regulatory scheduled check of the land/sea Product. It must cover general descriptions of use for INRSC work.

Data modules containing general information about international, national and regulatory check must be coded:

YY-Y-19-1Y-YY-YYA-018A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-1Y-YYYY-YYAAA-018A-A (37 characters)

## 2.3 Safety instructions

The information must contain the common safety instructions necessary to perform the INRSC information for land/sea Product.

Data modules containing common safety instructions must be coded:

YY-Y-19-2Y-YY-YYA-012A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-2Y-YYYY-YYAAA-012A-A (37 characters)

## 2.4 Preliminary requirements and preparation of work

The information must contain the common preliminary requirements to perform the INRSC information for land/sea Product.

Data modules containing common preliminary requirements must be coded:

YY-Y-19-3Y-YY-YYA-300A-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-3Y-YYYY-YYAAA-300A-A (37 characters)

## 2.5 Check of systems and subsystems

The information must contain the information for INRSC information land/sea Product. It must include necessary specific preliminary requirements and all safety instructions.

The INRSC could cover the checks for the following:

- establish the technical state of the land/sea Product
- establish the combat-readiness and the necessary measures to maintain the land/sea Product

Data modules containing checks of systems and subsystems must be coded:

YY-Y-19-4Y-YY-YYA-3XXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-4Y-YYYY-YYAAA-3XXA-A (37 characters)

## 2.6 Checks according law rules

The information according law rules must contain the checks for land/sea Product. It must include necessary specific preliminary requirements and all safety instructions.

The checks according law rules could cover the following:

- the keeping of law rules for the land/sea Product
- the mandatory checks and the belonging certification of the demand for technical status

Data modules containing checks according law rules must be coded:

YY-Y-19-5Y-YY-YYA-3XXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-5Y-YYYY-YYAAA-3XXA-A (37 characters)

## 2.7 Operation tests

The information according operation tests must include practical test and checks for the safe operation of land/sea Product. It must include necessary specific preliminary requirements and all safety instructions.

Data modules containing operation tests must be coded:

YY-Y-19-6Y-YY-YYA-3XXA-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-A19-6Y-YYYY-YYAAA-3XXA-A (37 characters)

# Chapter 5.3

## *Information sets and publications - Publications*

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## 1 General

This chapter provides rules for the preparation and coding of publications, and contains also generic requirements for the Product publications.

The required publications must be decided by the project.

This chapter contains:

- Common requirements, refer to Chap 5.3.1
- Requirements for air specific publications, refer to Chap 5.3.2
- Requirements for land/sea specific publications, refer to Chap 5.3.3

## 2 Purpose

The purpose of this chapter is to define the rules for the preparation and coding of publications. It also contains the generic requirements for the Product publications

## 3 Business rules decisions

For all the chapters above the business rules decisions include, but are not limited to, the following:

**Definitions of publications for land/sea systems**. The project or organization must decide on the definitions of the publications for land/sea systems.

**Project specific publications**. The project or organization must agree on project specific publications.

# Chapter 5.3.1

## *Publications - Common requirements*

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| Chap 5.3.1.2 | Common requirements - Technical content |
| Chap 5.3.1.3 | Common requirements - Illustrated parts data |

## 1 General

The following common requirements are contained in the chapters referenced:

- List of applicable publications, refer to Chap 5.3.1.1
- Front matter, refer to Chap 5.3.1.1
- Technical content, refer to Chap 5.3.1.2
- IPD, refer to Chap 5.3.1.3

## 2 Scope

General information related to one publication, eg front matter, introduction, must be coded:

YY-Y-YY-YY-00-**NN**Y-**YYY**Y-Y (17 characters)

or

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-**NN**YYY-**YYY**Y-Y (37 characters)

where

- "**NN**" in the disassembly code is a sequential number starting from "00" if more than one data module is needed.
- "**YYY**" in the information code is the type of information.

The third element of the SNS is always 00 or 0000.

**Note**

Some information sets have predefined values for population of the first and second element of the SNS. These values must be used also for the equivalent publications. For example front matter data modules for storage information (refer to Chap 5.2.1.3.5) must have the SNS 10-30-00 or Y10-30-0000.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Project specific publications.** The project or the organization must decide on the publications to be produced.

# Chapter 5.3.1.1

## *Common requirements - Front matter*

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| Chap 3.9.5.3 | Data modules - Applicability |
| Chap 5.2.1.3.5 | Maintenance information - Storage |
| Chap 6.2.3 | Page-oriented publications - Layout |

# 1 General

This chapter covers the rules for the preparation of front matter information that gives the status of a publication or volume, an overview of the contents and provides some general data related to a publication or volume.

For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths.

# 2 Front matter

## 2.1 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions.

## 2.2 General

The content of the front matter depends of the publication media and of the content of the publication (eg if illustrations are included, if symbols, terms, abbreviations must be explained).

It should be noted that some front matter can be auto-generated and some can be authored, in which case refer to Chap 3.9.4. Refer to Chap 6.2.3 for examples of presentation of front matter for page-oriented publications. Chap 3.9.4 details the content of the front matter. Chap 3.9.5.3 details the content of the Product Cross-reference Table (PCT), Condition Cross-reference Table (CCT) and Applicability Cross-reference Table (ACT).

Front matter in publications or volumes thereof can include the data modules given in Table 2 and Table 3. Chap 3.9.4 states the rules for mandatory and optional use of the front matter data modules.

## 2.3 Data module coding

The basic coding of front matter data modules are shown in Table 2 and Table 3.

**Note**

Some information sets have predefined values for population of the first and second element of the SNS. These values must be used also for the equivalent publications. Eg front matter data modules for storage information (refer to Chap 5.2.1.3.5) must have the SNS 10-30-00 or Y10-30-0000.

For Table 2 and Table 3, "NN" in the disassembly code is a sequential number starting from "00" if more than one data module is needed.

The information code variant must be used to differentiate front matter data modules with the same SNS and information code.

*Table 2 Front matter (17 character example)*

| Order | Title | Abbr | Data module code for the Product | Remarks |
|---|---|---|---|---|
| 1 | Title page | | YY-Y-YY-YY-00-NNY-001Y-Y | For page oriented only |
| 2 | List of effective pages | LOEP | YY-Y-YY-YY-00-NNY-00RY-Y | For page oriented only.<br>Alt IC = 002 |
| 3 | List of effective data modules | LOEDM | YY-Y-YY-YY-00-NNY-00SY-Y | Alt IC = 002 |
| 4 | Change record | CR | YY-Y-YY-YY-00-NNY-00TY-Y | Alt IC = 003 |
| 5 | Highlights | HIGH | YY-Y-YY-YY-00-NNY-00UY-Y | Not for IPD<br>Alt IC = 003 |
| 6 | Access illustration | | YY-Y-YY-YY-00-NNY-004Y-Y | For IETP only |
| 7 | List of abbreviations | LOA | YY-Y-YY-YY-00-NNY-005Y-Y | |
| 8 | List of terms | LOT | YY-Y-YY-YY-00-NNY-006Y-Y | |
| 9 | List of symbols | LOS | YY-Y-YY-YY-00-NNY-007Y-Y | |
| 10 | Technical standard record | TSR | YY-Y-YY-YY-00-NNY-008Y-Y | Not for IPD |
| 11 | Table of contents | TOC | YY-Y-YY-YY-00-NNY-009Y-Y | |

| Order | Title | Abbr | Data module code for the Product | Remarks |
|---|---|---|---|---|
| 12 | List of applicable specifications and documentation | LOASD | YY-Y-YY-YY-00-NNY-00VY-Y | Not for IPD.<br>Alt IC = 017 |
| 13 | List of support equipment (normally used in front matter) | LOSE | YY-Y-YY-YY-00-NNY-00BY-Y | For IETP only.<br>Not for IPD |
| 14 | List of supplies (normally used in front matter) | LOSU | YY-Y-YY-YY-00-NNY-00CY-Y | For IETP only.<br>Not for IPD |
| 15 | List of spares (normally used in front matter) | LOSP | YY-Y-YY-YY-00-NNY-00DY-Y | For IETP only.<br>Not for IPD |
| 16 | List of illustrations (normally used in front matter) | LOI | YY-Y-YY-YY-00-NNY-00AY-Y | For IETP only |
| 17 | Product cross-reference table | PCT | YY-Y-YY-YY-00-NNY-00PY-Y | |
| 18 | Conditions cross-reference table | CCT | YY-Y-YY-YY-00-NNY-00QY-Y | |
| 19 | Applicability cross-reference table | ACT | YY-Y-YY-YY-00-NNY-00WY-Y | |

*Table 3 Front matter (37 character example)*

| Order | Title | Abbr | Data module code for the Product | Remarks |
|---|---|---|---|---|
| 1 | Title page | | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-001Y-Y | For page oriented only |
| 2 | List of effective pages | LOEP | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00RY-Y | For page oriented only.<br>Alt IC = 002 |
| 3 | List of effective data modules | LOEDM | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00SY-Y | Alt IC = 002 |
| 4 | Change record | CR | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00TY-Y | Alt IC = 003 |
| 5 | Highlights | HIGH | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00UY-Y | Not for IPD.<br>Alt IC = 003 |
| 6 | Access illustration | | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-004Y-Y | For IETP only |

| Order | Title | Abbr | Data module code for the Product | Remarks |
|---|---|---|---|---|
| 7 | List of abbreviations | LOA | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-005Y-Y | |
| 8 | List of terms | LOT | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-006Y-Y | |
| 9 | List of symbols | LOS | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-007Y-Y | |
| 10 | Technical standard record | TSR | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-008Y-Y | Not for IPD |
| 11 | Table of contents | TOC | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-009Y-Y | |
| 12 | List of applicable specifications and documentation | LOASD | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00VY-Y | Not for IPD.<br>Alt IC = 017 |
| 13 | List of support equipment (normally used in front matter) | LOSE | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00BY-Y | For IETP only.<br>Not for IPD |
| 14 | List of supplies (normally used in front matter) | LOSU | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00CY-Y | For IETP only.<br>Not for IPD |
| 15 | List of spares (normally used in front matter) | LOSP | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00DY-Y | For IETP only.<br>Not for IPD |
| 16 | List of illustrations (normally used in front matter) | LOI | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00AY-Y | For IETP only |
| 17 | Product cross-reference table | PCT | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00PY-Y | |
| 18 | Conditions cross-reference table | CCT | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00QY-Y | |
| 19 | Applicability cross-reference table | ACT | YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-00WY-Y | |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Front matter to be included in page-oriented and IETP, respectively.** The project or organization must decide which front matter is to be included (mandatory or optional) in each of the page-oriented publications and in the IETP. The decisions must be based on the rules given in Chap 3.9.4.

# Chapter 5.3.1.2

## *Common requirements - Technical content*

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# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation coding, where appropriate, and compilation of data modules for the technical content of publications.

## 1.2 Scope

It covers the rules for the preparation and compilation of information to enable skilled personnel to access and handle the information in an efficient way in order to perform the tasks of the respective publication scope.

## 1.3 Standards and definitions

The standards and definitions given in this chapter are applicable with no exceptions. For the purposes of explanation, data module codes are shown in both 17 character and 37 character lengths.

# 2 Technical content

The technical content must consist of an introduction followed by the technical information belonging to that publication.

## 2.1 Introduction

The introduction data module must contain explanation of the purpose, scope, structure, special format and use of the technical content of the publication. They must also contain any necessary information of a nature which is not detailed in any of the specific data modules.

The following information must be provided or referenced:

- the purpose and scope of the publication and its subsets and if required with additional information about system/equipment effectively
- the nature and structure of the publication and its subsets
- references to general information contained in the information sets which were integrated in the publication (eg zoning and access information)
- information about publishing authorization / certification / copy rights
- definition of used warnings, cautions and notes, refer to Chap 3.9.3
- explanation of the used change marks and highlights, refer to Chap 3.9.5.2.1.1
- information about updating and commenting, refer to Chap 3.5, Chap 4.9.3 and Chap 4.6
- description of headings of tables if this is not contained in general information of information sets which were integrated in the publication (eg tables of the List of Applicable Publications (LOAP)), refer to Chap 5.3.1.1
- other general information which is not contained in the data modules of the technical information of the publication

The data modules must be coded:

YY-Y-YY-YY-00-NNY-018Y-A (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY-YY-0000-NNYYY-018Y-A (37 characters)

where "NN" in the disassembly code is a sequential number starting from "00" if more than one data module is needed.

## 2.2 Technical information

These data modules must include all information sets or parts of information set, legacy data and other data compiled for the specific publication as decided by the project or organization.

# Chapter 5.3.1.3

## *Common requirements - Illustrated parts data*

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| Chap 3.9.5.1 | Data modules - Identification and status section |
| Chap 4.3.2 | Data module code - System difference code |
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| Chap 4.3.7 | Data module code - Information code variant |
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| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |

# 1 General

## 1.1 Purpose

This chapter contains the rules for the preparation and coding of data modules for IPD. Rules for preparation of digital and paper deliverables are included as well as rules for creation of data modules from a S2000M provisioning database.

This chapter is based on the provisioning process given in the S2000M but can also be used for non-S2000M projects.

## 1.2 Scope

It covers the rules for the publication of spare parts information. These rules are in line with S2000M Chapter 1A.

Para 2 gives the build-up and content of an IPD Publication (IPDP), page-oriented and/or interactive, which follows the common rules given in this specification. An IPD publication produced in accordance with Para 2 will be an integrated information set in a total technical publication package.

The specific functions of the IPD are:

- identification of spare parts
- identification of physical relationship of parts
- identification of the method of supply

The spare parts information in the form of data modules can be prepared from:

- a S2000M provisioning database

– engineering data for non-S2000M projects

The principles for preparing IPD information is shown in Fig 1.

ICN-S1000D-A-050303-A-F6117-00001-A-001-01

*Fig 1 Preparation of the IPD data modules*

By project decision, the IPD can be produced as a stand alone publication and hence has its own publication module. For non-complex equipment (hydraulic pump, Ultra High Frequency (UHF) transmitter, etc), as the number of data modules often is low, these IPD data modules can be provided as, eg part of the equipment maintenance publication.

IPD information is to be prepared in the language specified by the customer. Customers' national security rules are to be considered. Refer to Chap 3.6.

## 1.3 Definitions

The following definitions and those stated in Chap 9.2 are used as appropriate.

– IPD **figure:** An IPD data module. The data module includes data and illustrations, one or more, relative to a system, subsystem or sub-subsystem or an assembly.
– IPD **figure number:** The running number of IPD figures (data modules) within the same Model Identification (MI) and SNS code. The IPD figure number is derived from the Catalogue sequence number (CSN).
– IPD **figure number variant:** The variant number of IPD figures. The IPD figure number variant is derived from the CSN.

# 2 IPD Content

## 2.1 General

The complete set of IPD data modules is specified in Para 2.2 and Para 2.3.

An IPD information set can be either chapterized or non-chapterized:

– A chapterized IPD information set contains data modules which have data module code with the basic SNS, SNS, as given in Chap 8. These information sets are created either from a S2000M provisioning database or from engineering databases.
– A non-chapterized IPD information set contains only data modules which have data module code with a specific structure in the SNS "positions". Refer to Para 2.3.2.2. Non-chapterized IPD information sets are only created from a S2000M provisioning databases.

**Note**

For non-chapterized IPD data modules only the 6 character structure of the SNS is allowed as defined in Chap 4.3.3.

**Note**

Front matter (refer to Para 2.2) and introductory data modules (refer to Para 2.3.3) must use the information code variant to give a unique data module code in the CSDB.

## 2.2 Front matter

For content of front matter refer to Chap 5.3.1.2.

For coding of the chapterized IPD refer to Chap 5.3.1.

Data modules for non chapterized IPD must be coded:

YY-Y-**ZR**-YY-YY-NNY-XXXY-Y (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-**ZZR-YY-YYYY**-NNYYY-XXXA-Z (37 characters)

- "ZR-YY-YY" or "ZZR-YY-YYYY". Refer to Para 2.3.2.2.
- "NN" and "NNN". Refer to Chap 5.3.1.

## 2.3 Technical content

### 2.3.1 General requirements

The IPD publication must contain the following information types:

- Introduction
- IPD modules
- Cross reference index. Refer to Para 2.3.5.

### 2.3.2 Data module coding

To assist in the codification of data modules, the following rules must be used. For system difference code, information code variant and item location code, the rules are given in Chap 4.3.2, Chap 4.3.7 and Chap 4.3.8 respectively.

Data modules for chapterized IPD must be coded:

YY-Y-YY**-YY-YY**-NNY-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY-YYYY**-NNYYY-XXXA-Z (37 characters)

Data modules for non-chapterized IPD must be coded:

YY-Y-**ZR-YY-YY**-NNY-XXXA-Z (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-ZZR**-YY-YYYY**-NNYYY-XXXA-Z (37 characters)

- "YY**-YY-YY**"/"**ZR-YY-YY**" or "YYY**-YY-YYYY**"/"ZZR-YY-YYYY", in the SNS code, as given in Para 2.3.2.1 (chapterized IPDP) and Para 2.3.2.2 (non-chapterized IPDP).
- "NN", in the disassembly code, is a sequential number starting from "01", if more than one data module is needed for the same SNS.

- When the data module is generated from a S2000M provisioning database this is the IPD figure number. IPD figure number is equivalent to figure number S2000M and is a part of the Catalogue sequence number (CSN).

  **Note**
  S2000M allows "NN" to use an alpha character in the first position.

– "Y" or "YYY" in the disassembly code variant, gives the variants of the data modules, starting with "A" or "AAA" for the initial variant.
  - When the data module is generated from a S2000M provisioning database this is the IPD figure number variant. IPD figure number variant is equivalent to Figure Number Variant in S2000M and is a part of the CSN. The IPD figure number variant starts with the figure "0" for the initial data module with a given SNS-number. When there is a need to produce variants (modified items) or to "insert" new data modules, the disassembly code variant is used the standard way now starting with "A" for the first variant.
– "XXX", the information code, is :
  - 941 = IPD
  - 942 = IPD cross reference index

2.3.2.1 Parts data module coding for chapterized IPDP
"YY-YY-YY" or "YYY-YY-YYYY" must be the SNS of the described system or equipment

Example:

SNS code 29-10-00 = Main hydraulic

– A1-A-29-10-00-0**10**-941A-Z(Parts data module, IPD figure number = **1**, IPD figure number variant = **0** = initial data module within 29-10-00)
– A1-A-29-10-00-0**1A**-941A-Z (Parts data module, IPD figure number = **1**, IPD figure number variant = **A** = new data module)
– A1-A-29-10-00-00A-942A-Z (IPD cross reference index)

2.3.2.2 Parts data module coding for non-chapterized IPDP
"ZR-YY-YY" or "ZZR-YY-YY00" is built up as follows:

– "Z" or “ZZ” identifies that the data module is non-chapterized.
– "R" identifies the responsible partner company code used as a status element in the identification and status section. Refer to Chap 3.9.5.1.
– "YY-YY" or "YY-YY00" is a sequential number starting from "00-01", if more than one set of IPD data modules is needed.
  - When the data module is generated from a S2000M provisioning database this must be the last four digits of the initial provisioning project number (S2000M).

Example:

– A1-A-ZD-00-35-0**10**-941A-Z (Parts data module, IPD figure number = **1**, IPD figure number variant = **0** = initial data module within ZD-00-35)
– A1-A-ZD-00-35-0**2A**-941A-Z (Parts data module, IPD figure number = **2**, IPD figure number variant = **A** = new data module)
– A1-A-ZD-00-35-00A-942A-Z (IPD cross reference index)

**2.3.3 Introduction**

2.3.3.1 General
The introduction data modules must contain explanations of the purpose, scope, structure, special format and use of the technical content of the IPD publication. They must also contain a

list of incorporated modifications and any necessary information of a general nature which is not detailed in any of the specific data modules.

Data modules must be coded:

YY-Y-YY**-YY-YY**-NNA-018A-Y (17 characters)

thru

YYYYYYYYYYYYYY-YYYY-YYY**-YY-YYYY**-NNAAA-018A-Y (37 characters)

- "YY**-YY-YY**" or "YYY**-YY-YYYY**", the introduction is relative to the whole publication, so it must be allocated according to the data module code actually used for the technical content. Refer to Para 2.3.2.
- "NN", the disassembly code, is a sequential number starting from "00", if more than one data module is needed.

The information code variant is used to distinguish between the different information sets.

Example:

- Chapterized IPD:
  - Aircraft: A1-A-00-00-00-00A-018A-A or (SUPERAIRCRAFT)1-AAAA-A00-00-0000-00AAA-018A-A
  - Engine: A1-A-00-72-00-00A-018A-A or (BASICENGINE)007-AAAA-A00-72-0000-00AAA-018A-A
- Non-chapterized IPD: A1-A-ZD-00-35-00A-018A-A

2.3.3.2 List of incorporated modifications in IPDP

A list of incorporated modification in the introduction to each IPDP will be produced from the change record incorporated in the provisioning database.

To enable the IPDP user to determine the precise relationship of components, the IPDP is to record every configuration standard likely to be encountered. In the IPDP text, the configuration changes/modifications will be identified against line items through data elements which include:

- Interchangeability (Interchangeability codes will be set for the preceding (old) and succeeding (new) line entries)
- Usable on code Equipment
- Usable on code Assembly
- Effectivity
- Model version

The change authority will be also shown for all newly introduced items eg Modification XXXX.

Some customers can require that, during the production of an IPDP, the contractor should omit configuration standards that are superseded by modifications fully embodied in their fleets.

**2.3.4 IPD modules**

The items relative to an assembly are organized in IPD figures and supported with the appropriate illustration. In cases where the content of an IPD figure is complex, the illustration will be spread over several illustration sheets, eg Fig 1 Hydraulic pump (Sheet 1 of 2), Fig 1 Hydraulic pump (Sheet 2 of 2) in accordance with the following:

- Each illustration sheet has its own illustration control number, ICN.
- Each IPD figure must be defined as one parts data module.
- Each parts data module must include all IPD data related to one IPD figure.

2.3.4.1 Parts data elements

Table 2 gives all mandatory (M) and optional (O) parts data elements independently of their use in page oriented or electronic IPDP. Detailed information on each element is presented in the S2000M data dictionary. Conditional data elements as defined in S2000M are also marked optional (O).

*Table 2 Parts data elements*

| Text element identifier | Data element name | M / O | Remarks |
|---|---|---|---|
| ASP | Attaching, storage or shipping part | O | |
| CAN | Change authority number | O | |
| CMK | Calibration marker | O | |
| CSN | Catalogue sequence number | M | Position 7 thru 13 gives the Fig/Fig variant/Item/Item variant |
| CTL | Category 1 container location | O | |
| DFL | Description for location | O | |
| DFP | Description for part | M | |
| EFY | Effectivity | O | |
| FTC | Fitment code | O | |
| ICN | Illustration control number | O | Composite data element composed of MOI, SDC, SNC, RPC, ORT, SEQ, ILV, IIN, ISC |
| ICY | Interchangeability | O | |
| ILS | Integrated logistic support number | O | |
| IND | Indenture | M | |
| IPP | Initial provisioning project number | M | |
| IPS | Initial provisioning project number subject | M | |
| ISN | Item sequence number | M | |
| LGE | Language code | M | |
| MFC | NATO supply code for manufacturers | M | = NCAGE |
| MFM | Select or manufacture from range | O | |
| MOI | Model identification | M | |
| MOV | Model version | O | |
| NIL | Not illustrated | O | |
| NSN | NATO stock number | O | Composite data element composed of NSC and NIN |
| NSC | NATO supply class | M | |

| Text element identifier | Data element name | M / O | Remarks |
|---|---|---|---|
| NIN | NATO item identification number | O | |
| PNR | Part number | M | |
| PSC | Physical Security pilferage Code | O | |
| QNA | Quantity per next higher assembly | M | |
| QUI | Quantity per unit of issue | O | |
| RFD | Reference designator | O | |
| RFS | Reason for selection | O | |
| RTX | Refer to | O | |
| SID | Subject identification | M | Composite data element composed of MFC and PNR |
| SMF | Select or manufacture from identifier | O | |
| SMR | Source maintenance recoverability | M | |
| SNS | Subject NATO stock number | O | Composite data element composed of NSC and NIN |
| SRV | Service | M | |
| STR | Special storage | O | |
| UCA | Usable on code assembly | O | |
| UCE | Usable on code equipment | O | |
| UOI | Unit of issue | O | |
| UOM | Unit of measure | O | |

2.3.4.2 Page-oriented parts data modules

The illustration must always start on a left-hand page followed by text, the detail parts list, on the right-hand page. Where either the illustration or text outnumbers the other, the additional illustrations and text must continue on both left-hand and right-hand pages.

The front page (Page 1) gives the title of the data module and if applicable the part number of the assembly or equipment. A location illustration or an illustration of the assembly or equipment can follow.

The detail parts list contains the following elements. Refer to Table 3:

**Note**

The three-character acronyms (in brackets) give the text element identifier specified in S2000M.

1 Fig (M): The figure number and variant must appear on the first line on each text page. No other details are to appear on the same line. Where an item is listed but not illustrated on the accompanying illustration, this must be marked with a dash in this column and on the same line as the item number. Part of CSN.

2 Item (M): The item number and variants are a part of the Catalogue sequence number (CSN). Zeros in the item number must be suppressed.

3 Units per assembly/Unit of issue (O/O): The number of units required for the next higher assembly (QNA) and the code for standard unit/ quantity delivered to the customer (UOI).

4 NCAGE (O): Identifies the supplier or design authority by its NATO CAGE (MFC).

5 Part No./NATO stock No. (M/O): The part number of the item. Part numbers (PNR) exceeding the space available must be split arbitrarily with the overflow on the second line. NATO stock numbers (NSN) must be located on the line immediately below the part number and be indented two spaces from the left.

6 Description (M/O): The description column must contain the mandatory DFP together with the optional Description For Location (DFL). Additionally, supplementary information which relates to the part and its location should also appear. The layout of the description field is as follows:

- Indentation: The spacing must be one bullet per indent given by the indenture code (IND).
- Continuation lines of description must be to the same indent as the first line of the description.
- Item spacing: Words can be hyphenated when passing from one line to the next, however, an item must not be divided by page breaks. A reasonable space between items to aid legibility.
- Attaching parts: Attaching parts must be distinguished by the replacement of the indentation bullets with asterisks.
- The width of the description column must be approximately 50 mm.
- The description column is also used to convey additional information to the IPD user, such as
  - Refer to (RTX)
  - Category 1 container location (CTL)
  - Select or manufacture from identifier (SMF)
  - Select or manufacture from range (MFM)
- The additional information is to appear in the description block at the same indent level as the item to which it refers.

For detailed information refer to Para 2.4.5.

7 * Usable on code assy ● Model Version (MV)/Effect(*O●O/O): Usable on code assembly (UCA) must be preceded with an asterisk and appear on the same line as the part number. Model version (MOV) and Effectivity (EFY) must appear on the line immediately below the Usable on code assembly. When an item is common to the entire customer's range of air vehicle, engine or equipment, in all Model versions, then they must be left blank. If different ranges and/or Model versions are applicable then these must be shown in multiple consecutive lines in this column. The MV/Effectivity must be preceded by a bullet.

8 ICY (O): Interchangeability (ICY).

- (M) Mandatory
- (O) Optional. By project decision some of the optional data can be excluded, eg NCAGE (complete column 4), usable on code assembly, ICY (complete column 8)

*Table 3 Detail parts list - Example*

| Fig (1) | Item (2) | Units per assembly /Unit of issue (3) | NCAGE (4) | Part No. NATO stock No. (5) | Description (6) | * Usable on code assy • MV/Effect (7) | ICY (8) |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| | 0 | REF | | A11B400000 | Wheels and brackets (Refer to A1-A-32-00-00-01A-941A-A Item 15) | | |
| | 1 | 1 | | A20201-43 1630-14-338-8823 | • Rim, NLG (Refer to Publication reference No.) | | |
| | 2 | 2 EA | | A20249-43 1630-14-338-8823 | • Rim, NLG (Refer to Publication reference No.) | | |
| | 3 | 1 | | 380x150-4-6 Tubeless 1630-14-338-8828 | • Tire | | |
| | 5 | 2 EA | | | | | |
| | 6 | 3 EA | | | • Tacho generator | *A | -1 |
| | 6 | 3 EA | | A21521 668-14-347-0241 | • Tacho generator | *B | 2- |
| | 9 | | | | • • Generator | *A | |
| | 9 | | | | • • Generator | *B | |
| | 10 | | | | • • Connector | | |
| | 11 | | | | • • Bracket | *A | |
| | 11 | | | | • • Bracket | *B | |

2.3.4.3 Interactive parts data modules
Each IETP parts data module must include all parts data and illustrations related to one IPD figure. The mandatory and optional elements are given in Para 2.3.4.1.

**2.3.5 Cross reference index**
The following search keys must be used:

*Table 4 Search keys in cross reference index*

| Text element identifier | Data element name Search key | Search key code (SKC) | Optional/Mandatory |
|---|---|---|---|
| PNR | Part number | P | M |

| Text element identifier | Data element name Search key | Search key code (SKC) | Optional/Mandatory |
|---|---|---|---|
| NSN | NATO stock number | N | O |
| RFD | Reference designator | R | O |
| ILS | Integrated logistic support number | I | O |

Each IPD page oriented publication requires a cross reference index ordered in alphanumeric sequence.

The following elements can be presented as given in Table 5:

1 SKC (M): Search key code from Table 4.

2 Search key (M): The part number (PNR), NATO stock number (NSN), reference designator (RFD) and the integrated logistic support number (ILS)

3 Part No. (M)

4 NCAGE (O): NATO CAGE (MFC)

5 NATO stock No. (O): must not be repeated if it also is the search key

6 SNS (M)

7 Fig - Item (M)

**Note**
- (M) Mandatory
- (O) Optional. By project decision some of the optional data can be excluded

*Table 5 Cross reference index - Example*

| SKC (1) | Search key (2) | Part No. (3) | NCAGE (4) | NATO stock No. (5) | SNS (6) | Fig-Item (7) |
|---|---|---|---|---|---|---|
| .... | .... | | | | | |
| R | +XF2 | 960-78923 | F6198 | 5995-14-278-3448 | 36-10-20 | 04A-010 |
| P | 1322 3-355/C7-244-A5 | 1322 3-355/C7-244-A5601-001 | D1081 | 1680-12-909-9595 | 24-10-05 | 03 - 025 |
| N | 1680-12-909-9595 | 1322 3-355/C7-244-A5601-001 | D1081 | | 24-10-05 | 03 - 025 |
| N | 5995-14-278-3448 | 960-78923 | F6198 | | 36-10-20 | 04A-010 |
| .... | .... | | | | | |
| .... | .... | | | | | |

For interactive IPDP, a cross reference index capability must be implemented in the form of viewer search functionality using the search keys as given in Table 4. In this case it is unnecessary to generate cross reference index data modules.

## 2.4 Page-oriented IPD Publications (IPDP)

### 2.4.1 General

An IPDP is built up of the following data modules:

- Front matter, eg List of effective pages. Refer to Chap 5.3.1.2.
- Table of content. Refer to Para 2.4.3.2.
- Introduction data modules. Refer to Para 2.4.3.2.
- Main body
  - Chapter contents table (for chapterized IPDP only)
  - Figure data modules = Illustration and text
- Cross reference index data modules

### 2.4.2 IPDP format

The rules and examples of presentation of a page-oriented IPDP are given in Chap 6.2.

### 2.4.3 Chapterized IPDP

2.4.3.1 Chapterization

The chapterization used must be in accordance with Chap 4.3.3 allocation of chapters/systems.

2.4.3.2 Table of content and introduction

The introductory material for a chapterized IPDP comprises of the following:

- IPDP contents table. Refer to Table 6.
- Introduction. The introduction must contain a statement on the purpose of the IPDP and an explanation of how to use the IPDP, as well as an explanation of the meaning and coding of data presented within the IPDP. It must contain details such as:
  - Abbreviations used
  - Explanation of Model version, Effectivity and Usable On Codes
  - List of incorporated modifications
  - An illustration of the general arrangement of the aircraft showing overall dimensions
  - An illustration of fuselage frame stations
  - An illustration of wing rib structure
  - An illustration of major assemblies together with maximum weights and dimensions
  - An illustration and checking list of engine module and sub module breakdown

*Table 6 Chapterized IPDP contents table (Printed issue) - Example*

| CHAPTER | FIG | TITLE | PAGE |
|---|---|---|---|
| | | TITLE | |
| | | INTRODUCTION | 1 |
| 11-20-00 | 1 | EXTERIOR PLACARDS | 1 |
| 11-30-00 | 1 | INTERIOR PLACARDS | 2 |
| 21-20-00 | 1 | BLEED AIR TUBES IN WING CENTRE | 5 |
| 21-20-00 | 2 | BLEED AIR TUBES IN ENGINE COMPARTMENT | 1 |

| CHAPTER | FIG | TITLE | PAGE |
|---|---|---|---|
| 21-20-00 | 3 | MOUNTING BLEED AIR TUBES | 3 |
| \| | \| | \| | |
| V | V | V | |
| 53-20-00 | 1 | STRUCTURE INSTALLATION CENTRE SECTION | 11 |
| \| | \| | \| | |
| V | V | V | |
| 95-10-00 | 1 | EJECTION SEAT | 3 |
| \| | \| | \| | |
| V | V | V | |
| | | CROSS REFERENCE INDEX | 1 |

The main body of the IPDP will contain the illustrations and text organized into chapters, sub-subchapters, units and figures. Each chapter will begin with a chapter contents table.

*2.4.3.2.1 Chapter contents table*

The chapter contents table identifies the chapter number and title, the breakdown of the chapter giving the sub-subchapter numbers, the unit number, the figure number, the figure title, on which they appear as shown in Table 7.

*Table 7 Chapter contents table (Printed issue) - Example*

| CHAPTER | FIG | TITLE |
|---|---|---|
| 32-00-00 | 1 | LANDING GEAR |
| 32-10-00 | 1 | MAIN GEAR AND DOORS |
| \| | \| | \| |
| \| | \| | \| |
| V | V | V |
| 32-50-00 | 1 | STEERING CONTROL SYSTEM |
| \| | \| | \| |
| V | V | V |
| 32-60-00 | 1 | POSITION AND WARNING |

*2.4.3.2.2 Illustrations and text layout*

For any figure, illustrations must always start on a left-hand page and text on the right-hand page. Where either illustrations or text outnumber the other, the additional illustrations or text must continue on both left-hand and right-hand pages.

The layout of each text page must conform to the following criteria:

- **Chapter/Subchapter/Sub-subchapter and unit number**. This must appear in the bottom right-hand corner. It must appear in the form of a 2-digit chapter number, followed by a hyphen followed by a 2-digit subchapter/sub-subchapter number followed by a hyphen followed by a 2-digit unit number.
- **Figure/Item number**. The figure number and variant must appear on the first line of each half-frame of text, no other details must appear on the same line. The figure number and variant must be left justified. Item numbers and variants must be right justified and leading zeroes must be suppressed. The fourth position is reserved for the variant. If a variant is not allocated, this position remains blank.
- **Not illustrated**. Where an item is listed but not illustrated on the accompanying illustration, this must be signified by a dash which must precede the item number and be vertically aligned with the first character of the figure number.
- **Part Number/NATO stock number**. The part number field must accommodate the printing of 18 characters. Part numbers longer than 18 characters must be split arbitrarily with the overflow on the second line commencing with the 19th character. NATO Stock Numbers (NSN) must be located on the line immediately below the part number and be indented by two spaces from the first digit of the part number.
- **Description**. The description field should contain the DFP together with the DFL. Additionally, supplementary information which relates to the part and its location should also appear. The layout of the description field is as follows:
  - Indentation. The spacing must be two characters per indent given by the indenture code and each indent must be represented by a single dot.
  - Continuation lines of description must be to the same indent as the first line of the description
  - Item spacing. Words can be divided when passing from one line to the next. However, descriptions must not be divided when passing from one frame to the next.
  - There must be one blank line between items
  - Attaching parts. Attaching parts must be distinguished by the replacement of the indentation dots with asterisks.
  - The width of the description block must be 31 characters
  - The description block is also used to convey additional to the IPDP user, such as:
  - Refer to
  - Category 1 container location
  - Select or manufacture from identifier/range
  - For detailed information, refer to Para 2.4.5.
  - Additional information is to appear in the description block at the same indent level as the item to which it refers.
- **Model Version and Effectivity**. The MV and Effectivity (EFFECT) must appear on the line immediately below the Usable on Code Assembly (UCA). When an item is common to all of the customer's range of aircraft or engines, in all MV, then it must be left blank. If different ranges and/or, MV are applicable then these must be shown in multiple consecutive lines in this column.
- **Other information**. The following information is to appear in this column.
  - Effectivity (8 alphanumeric characters)
  - Usable on Code Assembly (6 alphanumeric characters)
  - Interchangeability, ICY, (2 alphanumeric characters)
  - Quantity Per Next Higher Assembly, QNHA, (4 alphanumeric characters)
  - Unit of Issue, UI, (2 alpha characters)
  - Source Maintenance Recoverability, SMR, (6 alphanumeric characters)

### 2.4.4 Non-chapterized IPDP

2.4.4.1 Table of content and introduction

The introductory material for a non-chapterized IPDP comprises of the following:

- IPDP contents table. Refer to Table 8.
- Introduction. IPDP Introductions must be produced in conjunction with the customer. The introduction can comprise two parts:
  - General introduction. The general introduction must be prepared in such a way that it is common to all IPDPs in a series. It must contain a statement on the purpose of the IPDP and an explanation of how to use the IPDP, as well as an explanation of the meaning and coding of data presented within the IPDP.
  - Specific introduction. The specific introduction must contain:
    - Abbreviations used
    - Explanation of Usable On Codes
    - List of incorporated modifications
    - An illustration of major assemblies together with maximum weights and dimensions

*Table 8 Non-chapterized IPDP contents table (Printed Issue) - Example*

| FIG | TITLE | PAGE |
|---|---|---|
| | TITLE | |
| | INTRODUCTION | 1 |
| 1 | PYLON OUTBORD | 1 |
| 2 | LEADING EDGE ASSY | 6 |
| \| | \| | |
| V | V | |
| 19 | ELECTRICAL EQUIPMENT | 52 |
| \| | \| | |
| \| | \| | |
| \| | \| | |
| V | V | |

2.4.4.2 Main body - Illustrations and text layout

The main body of the IPDP will contain the illustrations and text organized into figures. The first figure must follow the preliminary material and start on the same microfiche.

The illustration and text layout for a non-chapterized IPDP follow the same conventions as for the chapterized IPDP, with the following exceptions:

- Chapter/Subchapter/Sub-subchapter and unit number. This is not applicable and positions must be left blank.
- Usable On Code Equipment. The usable on code equipment appears in lieu of effectivity.

**2.4.5 Conversion of coded data into text for IPDP**

2.4.5.1 Compilation instructions

Throughout the compilation instructions there are certain data conditions which call for the inclusion of specific phrases in the DFP or DFL, eg "Repair part" or "Programmed PROM". Because these are held in their respective description field, when the IPDP is produced they will automatically be presented and therefore they need no further consideration for processing.

2.4.5.2 Construction of description block

In the construction of the description block the contents of the DFP should appear first, followed by the contents of the DFL, followed by supplementary information. DFL and supplementary information are given in brackets. Different types of information within the brackets are separated by oblique strokes [/]. There are no brackets between DFL and supplementary information. The supplementary information is to be presented in the description block in the same sequence as Para 2.4.5.3.1 thru Para 2.4.5.3.10.

2.4.5.3 Supplementary information

The supplementary information is derived by processing the codes of various data elements as below. Where a data element is in bold type, eg "**C1CL**", "**RT**", this indicates that the literal contents of this data field are to be used.

*2.4.5.3.1 Change Authority Number (CAN)*

When filled add "Mod **CAN**" to the description block of the new item. The customer and contractor have to decide which types of CAN are presented in this manner.

*2.4.5.3.2 Integrated Logistic Support Number (ILSN)*

When filled add "ILS**N**" to the description block.

*2.4.5.3.3 Attaching, Storage or Shipping Part (ASSP)*

Code "1" - Replace indenture dots with [*]
Code "2" - Add "Storage parts" to description block
Code "3" - Add "Shipping part" to description block

*2.4.5.3.4 Calibration Marker (CM)*

Code "1" - Add "Calibration required" to description block.

*2.4.5.3.5 Category 1 Container Location (C1CL)*

When filled, add "Container see **C1CL**" to description block, however, omit the ISN data from C1CL.

*2.4.5.3.6 Fitment Code (FC)*

Print the following in the description block, if:

- FC of "1" print "Minor fitting required"
- FC of "m" print "Major fitting required"

*2.4.5.3.7 Refer To (RT)*

When the contents of RT do not begin with "IPPN", add "Refer to **RT**", without ISN, in the description block. When the contents of the RT do begin with "IPPN", add to the description block "Refer to "PUB NO"" where "PUB NO" is the national publication reference of the IPPN quoted.

*2.4.5.3.8 Select or Manufacture From Range (SMFR)*

When this data element is filled, then the SMFI must also be filled. The supplementary information is dependent upon what is contained in the SMFI. Print the following in the description block, if:

- SMFI of "t" print "Select on test from SMF**R**"

- SMFI of "m" print "Manufacture from SMF**R**"
- SMFI of "r" print "Rework from SMF**R**"
- SMFI of "p" print "Repair from SMF**R**"

*2.4.5.3.9* *Select or Manufacture From Identifier (SMFI)*
When SMFI of "f", add to description block "Select on fit"
When SMFI of "t", and SMFR is blank add to description block, "Select on test".

For other SMFI-codes refer to the text above.

*2.4.5.3.10* *Unit of Measure (UM) and Quantity Per Unit of Issue (QPUI)*
Add to the description block "Supplied in **QPUI**, **UM**".

2.4.5.4 Special processing
The following data elements also require special processing and should be presented in the IPDP to the instructions given below.

*2.4.5.4.1* *Indenture (I)*
Step the description block according to indenture number.

*2.4.5.4.2* *Reference Designators (RD)*
Print RD in IPDP-cross reference index only, in accordance with Para 2.4.7 below.

**2.4.6 IPDP illustrations**
The IPDP illustrations are to be prepared in accordance with the rules given in Chap 3.9.2.

**2.4.7 IPDP cross reference index**
All IPDPs are to include a single IPDP-cross reference index. This index must be in alpha-numeric sequence and will use four different data elements as its search key. In order to identify the data element which is being used as the search key for a particular entry, a search key code should be provided as follows:

*Table 9 Search keys in cross reference index*

| Data element name<br>Search key | Search key code (SKC) |
|---|---|
| Part number | P |
| NATO stock number | N |
| Reference designator | R |
| Integrated logistic support number | I |

It should be noted that the data element being used as the search key, and provided in the second column of the IPDP-cross reference index, is not repeated in its own data element column. However, this is not the case when a part number of more than 20 characters is being used as the search key; in this instance the full part number must be shown in the part number column. Additionally, because the ILSN does not have its own data element column it would appear only in the search key field.

When the IP data contains a range of reference designators held against a single record, this record must be repeated so as to reflect a separate entry in the IPDP-cross reference index, for each of the reference designators in the range. These entries should also be repeated, as

appropriate, using the part number and NSN as the search key. The location referred to in each case could be that of the single record.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Parts data elements**. The project or the organization must decide which of the optional data can be excluded from the parts data and detail parts list presentation. Refer to Para 2.3.4.1.

# Chapter 5.3.2

## *Publications - Air specific publications*

## Table of contents

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References ..... 1
1 General ..... 1
2 Scope ..... 1
3 Business rules decisions ..... 2

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## *References*

*Table 1 References*

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|---|---|
| Chap 5.2 | Information sets and publications - Information sets |
| Chap 5.3.2.1 | Air specific publications - Aircrew information |
| Chap 5.3.2.2 | Air specific publications - Cross servicing guide |

## 1 General

This chapter provides general and specific rules for the preparation of publications for air systems.

## 2 Scope

The required publications must be decided by the project or organization. A checklist of possible publications is contained below:

- List of applicable publications
  - Aircrew information
    - Flight manual
    - Aircraft operation
    - Performance data
    - Check lists
    - Quick reference manual
  - Air vehicle mass and balance
  - Maintenance
    - Air vehicle maintenance
    - Air vehicle description
    - Maintenance procedures
    - Check lists
    - Work cards

  - Air vehicle fault isolation
  - Air vehicle schematic diagrams
  - Air vehicle wiring data
  - Air vehicle maintenance planning
- Maintenance requirements
  - Check lists
  - Work cards
  - Engine standard practices
  - Engine maintenance
  - Power plant build-up
  - Equipment maintenance
  - Airborne equipment
  - Engine accessories
  - Ground support equipment
  - Training equipment
- Loading
  - Air vehicle cargo loading
  - Air vehicle weapon loading
  - Air vehicle stores loading
- Air vehicle cross servicing
- Air vehicle role change
- Air vehicle structure repair
- Air vehicle non-destructive testing
- Air vehicle corrosion control
- IPD
- Air vehicle battle damage repair
- Air vehicle recovery
- Air vehicle storage
- Illustrated tool and equipment
- Common information and data
  - Standard practices structure
  - Standard practices systems
  - Standard practices electric/electronic
  - Regulatory information
- Material data
  - Material data sheets
  - List of consumable materials
  - Time change items (tci) data
- Service bulletins / Service information

The definition of the contents of the publications should be based on the requirements of the corresponding information sets. Refer to Chap 5.2.

Subsequently some specific requirements to publications are contained:

- Aircrew information, refer to Chap 5.3.2.1
- Cross servicing guide, refer to Chap 5.3.2.2

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Project specific publications.** The project or the organization must decide on the publications to be produced.

# Chapter 5.3.2.1

## *Air specific publications - Aircrew information*

## Table of contents

Page

Air specific publications - Aircrew information....1
References....1
1 General....1
2 Aircrew information....1
2.1 General description....1
2.2 Flight manual....1
2.3 Operating data manual....1
2.4 Flight crew checklist....2

## List of tables

1 References....1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 5.2.2.7 | Air specific information sets - Aircrew information |

## 1 General

By project or organization decision Aircrew information can be split in the following publications:

- General description (GD)
- Flight manual (FM)
- Operating data manual (ODM)
- Flight crew checklist

## 2 Aircrew information

### 2.1 General description

The GD must contain the description (functioning) of the air system and its systems and equipment (refer to Chap 5.2.2.7).

### 2.2 Flight manual

The FM must contain all specific information necessary for aircrew to perform the air system's missions (refer to Chap 5.2.2.7).

### 2.3 Operating data manual

The ODM must contain performance data used by the operator for flight planning purposes (refer to Chap 5.2.2.7).

## 2.4 Flight crew checklist

The flight crew checklist must contain a compilation of all drills for normal operation of the air vehicle, for air system and system malfunctions, for emergency procedures and for special operations (refer to Chap 5.2.2.7).

**Note**

Supplementary information, such as operating data, can be included if essential to aircrew.

# Chapter 5.3.2.2

## *Air specific publications - Cross servicing guide*

## Table of contents

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1 General ..... 1
2 Cross servicing guide ..... 1
2.1 Section I - Leading particulars ..... 1
2.2 Section II - Air system handling, launching and recovery ..... 2
2.3 Section III - Replenishment, servicing points, engine starting and cooling ..... 2
2.4 Section IV - Inspection and servicing procedures ..... 2
2.5 Section V - Main systems ..... 2
2.6 Section VI - Armament ..... 2
2.7 Section VII - Locally-manufactured items ..... 2
2.8 Glossary ..... 3
2.9 Index ..... 3

## List of tables

1 References ..... 1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 5.2.2.3 | Air specific information sets - Cross servicing information |

## 1 General

An Air vehicle Cross-Servicing Guide (ACSG) must enable services to be performed on air vehicle by an organization other than to which the air vehicle is assigned, according to an established operational air vehicle cross-servicing requirement, and for which there can be a charge.

## 2 Cross servicing guide

The breakdown of the Air vehicle Cross-Servicing Guide must be as follows:

### 2.1 Section I - Leading particulars

- How to use section I
- General description and operation of the air vehicle
- Safety chart(s)
- Danger areas
- Walkways
- Dimensions and weight data
- Access and inspection openings diagrams

- Interior arrangements of compartments
- Radio and radar equipment essential for flight
- Armament installation

## 2.2 Section II - Air system handling, launching and recovery

- How to use section II
- List of handling equipment requirements
- Performance parameters for launching and recovery of air vehicles
- Handling safety chart
- Air vehicle overturn danger chart
- Methods of grounding
- Towing and winching
- Deck securing and picketing (mooring)
- Nose, wing, fin and rotor blade folding and unfolding
- Gust locking procedures
- Safety devices and protective covers
- Emergency access and crew evacuation
- Fire fighting
- Slinging and hoisting
- Jacking

## 2.3 Section III - Replenishment, servicing points, engine starting and cooling

- How to use section III
- Servicing and drain points
- List of consumable materials
- Types of replenishment connections for charging main systems
- Capacity of systems and methods of replenishment or charging
- Lubricating charts and symbols
- External hydraulic power application
- External electrical power application
- External pneumatic power application
- Engine starting
- External air conditioning requirements
- Drag chutes

## 2.4 Section IV - Inspection and servicing procedures

- How to use section IV
- Access and inspection procedures
- Inspection

## 2.5 Section V - Main systems

- How to use section V
- Main systems

## 2.6 Section VI - Armament

- How to use section VI
- Non-nuclear munitions

## 2.7 Section VII - Locally-manufactured items

- How to use section VII
- Locally-manufactured items

## 2.8 Glossary

## 2.9 Index

The index must list the subject matter of the air vehicle Cross-Servicing Guide in alphabetical order and must immediately follow the Glossary and will therefore be the last element of the publication.

For further details refer to Chap 5.2.2.3.

# Chapter 5.3.3

## *Publications - Land/Sea specific publications*

## Table of contents

**Page**

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1 General ..... 1
2 Land/sea specific publications ..... 1
2.1 Checklist ..... 1
2.2 User reference guide ..... 2
3 Business rules decisions ..... 2

## List of tables

1 References ..... 1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

This chapter provides rules for the preparation of publications for land/sea Products. The required publications must be decided by the project or organization.

## 2 Land/sea specific publications

### 2.1 Checklist

A checklist of possible publications is as shown below:

- List of applicable publications
- User reference guide (URG) or Operator's handbook
  - Crew/operator information - Description
  - Crew/operator information - Operation
  - Crew/operator information - Sequential operation
  - Crew/operator information - Fault detection, isolation and resolution
  - Crew/operator information - National checks
  - Crew/operator information - Maintenance
- Mass and Balance
- Maintenance
  - Description
  - Maintenance procedures
  - Check lists
  - Work cards
  - Fault detection, isolation and resolution
  - Schematic diagrams

- Wiring data
- Cross servicing
- Structure repair
- Non-destructive testing
- Corrosion control
- IPD
- Illustrated tools and equipment
- Battle damage repair

– Maintenance planning
  - Maintenance requirements
  - Check lists
  - Work cards

– Loading and storage
  - Cargo loading
  - Weapon loading
  - Stores loading
  - Storage

– Operation
  - Operation
  - Role change
  - Recovery

– Material data
  - Material data sheets
  - List of consumables/expendables

– Service bulletins

## 2.2 User reference guide

When producing the URG or Operator's handbook, the selection of data modules will be based on the skill level, which can be set to an appropriate level that indicates that the crew/operator is also a maintainer.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Project specific publications.** The project or the organization must decide on the publications to be produced.

# Chapter 6

## *Information presentation/use*

## Table of contents

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Chap 6.2.1 Page-oriented publications - Page layout, paper publications, headers and footers ..... S1000D-A-06-02-0100-00A-040A-A
Chap 6.2.2 Page-oriented publications - Typography - Layout elements ..... S1000D-A-06-02-0200-00A-040A-A
Chap 6.2.3 Page-oriented publications - Layout ..... S1000D-A-06-02-0300-00A-040A-A
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Chap 6.2.3.2 Layout - Description - Rules and examples ..... S1000D-A-06-02-0302-00A-040A-A
Chap 6.2.3.3 Layout - Procedural data modules - Rules and examples ..... S1000D-A-06-02-0303-00A-040A-A
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Chap 6.2.3.5 Layout - IPD publication - Examples ..... S1000D-A-06-02-0305-00A-040A-A
Chap 6.3 Information presentation/use - Interactive electronic technical publications ..... S1000D-A-06-03-0000-00A-040A-A
Chap 6.3.1 IETP - Output specification ..... S1000D-A-06-03-0100-00A-040A-A
Chap 6.4 Information presentation/use - Functionality ..... S1000D-A-06-04-0000-00A-040A-A
Chap 6.4.1 Functionality - Background and explanation ..... S1000D-A-06-04-0100-00A-040A-A
Chap 6.4.2 Functionality - Functionality matrix ..... S1000D-A-06-04-0200-00A-040A-A
Chap 6.4.3 Functionality - Acquisition management ..... S1000D-A-06-04-0300-00A-040A-A

# Chapter 6.1

## *Information presentation/use - Introduction*

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2 Content ....1
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2.2 IETPs ....2
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| Chap No./Document No. | Title |
|---|---|
| Chap 6.2 | Information presentation/use - Page-oriented publications |
| Chap 6.3 | Information presentation/use - Interactive electronic technical publications |
| Chap 6.4 | Information presentation/use - Functionality |

## 1 General

This chapter contains the guidance and rules on the presentation and use of information. The two distribution mainstreams are:

– page-oriented presentation on paper or screen

and

– interactive electronic presentation on screen of pre-packed IETPs

The chapter also includes a comprehensive functionality matrix for evaluation of or specifying output functionality.

## 2 Content

### 2.1 Page-oriented publications

Chap 6.2 gives the rules for the S1000D standard page-oriented presentation of publications. The chapter includes the typographical information needed to set up any type of output production environment, either using traditional production methods by word processors or using XML editors. Rules and examples of front matter, descriptions, procedures, etc, are given.

## 2.2 Interactive Electronic Technical Publications (IETPs)

Chap 6.3 gives the basic rules for presentation of Interactive Electronic Technical Publications (IETPs). Guidance for further interactivity is also given.

## 2.3 Output functionality

Chap 6.4 gives the details for output functionality that is facilitated by producing information in accordance with S1000D.

# Chapter 6.2

## *Information presentation/use - Page-oriented publications*

## Table of contents

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2 Page-oriented publications ....1
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2.2 Typography - Layout elements ....2
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| Chap 5 | Information sets and publications |
| Chap 6.2.1 | Page-oriented publications - Page layout, paper publications, headers and footers |
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |
| Chap 6.2.3 | Page-oriented publications - Layout |

# 1 General

A page-oriented publication is built up of front matter and several documents, all stored as data modules in the CSDB. The detailed specifications for the information set content and the arrangement of the documents to make a publication from the information set are given in Chap 5.

The layout in page-oriented presentations is based on the paper paradigm, which gives the possibility to present the formatted data modules on paper or on screen.

The paper publication is the printed output from the data modules and the screen presentation is the displayed output from the data modules.

# 2 Page-oriented publications

## 2.1 Page layout, paper publications, headers and footers

Chap 6.2.1 gives the detailed rules for the page layout of standard and oversize pages. Rules for headers and footers are detailed together with basic rules for paper publications.

## 2.2 Typography - Layout elements

Chap 6.2.2 gives the detailed typographic rules for all layout elements used to present the XML information in the data modules to the S1000D standard page-oriented presentation.

This chapter provides the basic rules for producing formatted output using for example, Formatted Output Specification Instances (FOSI), XML stylesheets (written in the Extensible Stylesheet Language) or cascading style sheets.

## 2.3 Layout examples

Chap 6.2.3 gives detailed rules and examples of S1000D standard presentations of front matter, descriptive, procedural, etc, data modules using the layout elements given in Chap 6.2.2.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the S1000D standard page-oriented presentation chapters**. The project or the organization must decide whether to accept S1000D standard page-oriented presentation given in Chap 6.2.2 and Chap 6.2.3 or to use any other rules for presentation to meet specific project or organization requirements. The business rules must specify the information needed to contract the desired presentation.

# Chapter 6.2.1

## *Page-oriented publications - Page layout, paper publications, headers and footers*

## Table of contents

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3 Layout sheet for ANSI A- and ANSI B-size .....6
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5 Header and footer on oversize pages .....8
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8 Layout and typography for header and footer - A5 .....14
9 Layout and typography for header and footer - Index card (5 inch x 8 inch) .....15

## References

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 3.9.2.1 | Illustration rules and multimedia - Illustrations, General |
| Chap 3.9.5.1 | Data modules - Identification and status section |
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |

# 1 General

This chapter gives the S1000D standard page-oriented presentation page layout rules (type and image widths and heights, margins, etc) for European A4, A3 and A5 pages, and North American (ANSI) A-size, ANSI B-size and Index card pages presented on paper or on screen. The typography for headers and footers is also given.

The layout examples provided are for right-hand pages. For left-hand pages (when double-sided printing) mirror images of the right-hand examples provided can be used. The page image area stays the same.

When other page sizes are used, a similar and consistent presentation layout must be used.

The typography for all other presentation elements is given in Chap 6.2.2.

Project allowed deviations are given in Para 3.

# 2 Page layout

## 2.1 General

The page layout is composed to suit A4 (European 210 mm x 297 mm) and ANSI A-size (North American 8 ½ inch x 11 inch) including foldout pages in A3 (European 420 mm x 297 mm) and ANSI B-size (North American 17 inch x 11 inch) respectively. A smaller size publication is allowed using A5 (European 148,5 mm x 210 mm) or Index card (North American 5 inch x 8 inch).

The examples of text pages in A4, A5, ANSI A-size, and Index card publications gives the default presentation as single column pages.

Double column text is allowed by project decision. No mix of single and double column presentation in the same data module is allowed.

A3L (L = Landscape) and ANSI B-size publications are normally used for page-oriented wiring data and schematic diagram publications. For details on foldout pages refer to Para 2.6.1, Para 2.6.2 and Para 2.4.1.4.

**Note**

Projects can decide on other page sizes. However, using other page and paper sizes can affect the presentation and authoring, and thus the reuse of the data modules in other projects or by other customers.

**Note**

The A4 layout given in Fig 1 is suitable for both A4 and ANSI A-size pages. By using this layout the composed pages can be printed globally without defining "local" paper sizes.

**Note**

Text pages in A3L/ANSI B-size publications can be A4/ANSI A-size pages or A3L/ANSI B-size pages built up by two A4/ANSI A-size text page images.

All text must be presented with a sans serif type (eg Helvetica, Univers, Swiss, Arial).

Layout sheet for A4 and A3L is shown in Fig 1 and the layout sheet for A5 is shown in Fig 2. Layout sheet for ANSI A- and ANSI B-size is shown in Fig 3 and the layout sheet for Index cards is shown in Fig 4. These sheets show margins, header and footer areas, type limits and the page image area. Location of header and footer on oversize pages, refer to Fig 5.

ICN-3627-S1000D0434-001-01

*Fig 1 Layout sheet for A4 and A3L*

ICN-3627-S1000D0481-001-01

*Fig 2 Layout sheet for A5*

ICN-3627-S1000D0377-001-01

*Fig 3 Layout sheet for ANSI A- and ANSI B-size*

This is a draft copy of Issue 002-01.
Printed 2005-02-13 10:12.

ACME Printshop. Printed in Utopia

ICN-3627-S1000D0382-001-01

*Fig 4 Layout sheet for Index card (5 inch x 8 inch)*

ICN-AE-A-060201-G-S3627-00379-A-01-1

*Fig 5 Header and footer on oversize pages*

## 2.2 Inwork markings

When a data module in the stage of "inwork" is presented as a paper copy or PDF file, it is recommended to present its issue number and the time of printing on each page.

The issue number and its "inwork" number, derived from the attribute values in the element `<issueInfo issueNumber="002" inWork="01">`, separated by a hyphen to be presented in 8 pt, centered in the inner margin. Refer to Fig 1, Fig 2, Fig 3, Fig 4 and Fig 5.

Example: "This is a draft copy of Issue 002-01. Printed 2004-02-29 10:12."

## 2.3 Produced by - Printed in

Responsible for producing the page-oriented output can, by project decision, be given on each page.

The producer's name is presented in 6 pt in the margin. Refer to Fig 1, Fig 2, Fig 3, Fig 4 and Fig 5 for detailed location.

Example of "Produced by": Saab (AB)

When printed on paper for distribution, a notification on in which country the page has been printed, can be added after producer's name.

Example of "Produced by. Printed in": Saab AB. Printed in Sweden

## 2.4 Header and footer

The header and footer must provide a discrete identification of the page. Applicability annotation and security marking can also be included. Manufacturer's, project's or sponsor's logotype can be included in the header.

The header and footer are separated from the page image area by a black line of 1 pt width across the full image width.

Layout and typography for header and footer is shown in Fig 6 (A4 and A3) and Fig 7 (ANSI A- and B-size), Fig 8 (A5) and Fig 9 (Index card).

For left-hand pages use mirror images of the right-hand examples provided.

Font sizes given in this Para 2.4 are given for A4, A3, ANSI A- and B-size pages. Table 2, Fig 8 and Fig 9 gives the font sizes for A5 and Index card pages.

### 2.4.1 Page identification

The page identification comprises a publication module code, the data module code, the issue date and page number. When the publication uses applicability annotations (refer to Para 2.4.1.5) this must be included in the page identification.

#### 2.4.1.1 Publication module code

The publication module code for the complete publication must be located in the header. The publication module code is located in the top outside corner and presented in 11 pt bold, aligned to the outer type limit.

#### 2.4.1.2 Document identifier

The document identifier, which is equal to the data module code, must be located in the footer. The data module code is located in the top outside corner of the footer and is presented in 11 pt bold, aligned to the outer type limit.

#### 2.4.1.3 Issue date

The issue date must be located in the bottom of the footer. The issue date precedes the page number by two blank spaces and must be presented in 11 pt bold. In the markup, it is represented in the element <`issueDate`> as described in Chap 3.9.5.1.

Example: 2003-05-31

#### 2.4.1.4 Page number

Each printed page must have a page number. The page number must be located in the footer. The page number is located in the bottom outside corner of the footer preceded by "Page". The page number including "Page" must be presented in 11 pt bold, aligned to the outer type limit.

An A4, A5, ANSI A-size or Index card without any information within a document must have a header and footer and thus a page number, except for the last page in the document, which must have no header or footer. There is no need for marking a blank page within a document with "Intentionally left blank". A blank last page must not be marked.

Oversize pages (foldouts) are normally printed on one (right-hand) side only and placed at the end of the document. When foldouts are placed at the end of the document, page numbers must follow on from the standard size pages without regard to the blank backing pages. Where

foldouts are interspersed within the document, they must be numbered only on the printed sides indicating that no pages are missing.

**Recommendation**: Double number the foldout pages to keep the right-hand pages throughout the publication with an odd page number, eg 11/12, 13/14, when interspersed and printed on one (right-hand) side only.

2.4.1.5 Applicability annotation block

For customized page-oriented publications an applicability annotation block is presented in the inside margin of the footer. The applicability must be expressed, by project decision, with serial number of the Product, with an "Applicability" code or with a human readable expression. When a code is used, the publication must contain an explanation of the code employed in the publication.

If a publication uses applicability annotation blocks all footers must contain the text "Applicable to:" as a caption in the applicability annotation block followed by serial numbers, codes or a human readable expression. When the applicability includes all instances of the Product, the code "All" must be used.

The applicability annotation, code or human readable expression in the footer is derived from the element <`applic`> in the Identification and status section.

The applicability annotation block, including the caption "Applicable to:" is located in the top inside corner of the footer and must be presented in 10 pt lowercase aligned to the inner image width.

### 2.4.2 Security marking

Each page in a publication must have a security marking except, by project decision, for unclassified publications. The marking must correspond to the highest classified information within the data module.

The classification markings must be located in both the header and the footer. The text must be presented in 11 pt bold, uppercase, centered at top and the bottom of the page. In the markup, it is represented in the element <`security`> as the projects meaning of the value of the attribute `securityClassification` as described in Chap 3.9.5.1.

As an alternative the project can decide to present the commercial classification (value of attribute `commercialClassification`) and/or the national caveat (value of attribute `caveat`) in the header and/or footer. The project can also decide to present the security markings in sentence case (instead of in uppercase) and to exclude the presentation of security markings for unclassified publications. Refer to Para 3.

The binder and the title page must be marked according to the highest classified information in the publication or volume thereof.

### 2.4.3 Logotype

Each page in a publication or each page in discrete data modules can, by project decision, have a logotype (manufacturer's, project's or sponsor's) located in the top outside corner of the header. The maximum height is limited by the height of the header. The element <`logo`> in element <`dmStatus`> contains the reference to the logotype.

### 2.4.4 End of data module

The last printed page in a data module must be identified by a statement indicating the end of the data module. This statement must be either the static phrase "**End of data module**" or the dynamic phrase comprised of the words "**End of**" followed by the data module title. Projects must determine which phrase will be published.

**Recommendation**: It is recommended that the end of data module statement be written in 11 p bold, placed in the footer.

**Note**

The end of data module statement is not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for generating pages.

ICN-3627-S1000D0380-001-01

*Fig 6 Layout and typography for header and footer - A4 and A3*

ICN-3627-S1000D0378-001-01

*Fig 7 Layout and typography for header and footer - ANSI A- and ANSI B-sizes*

**Page header** 122mm x 15 mm

**Page footer** 122 mm x 14 mm

ICN-3627-S1000D0384-001-01

*Fig 8 Layout and typography for header and footer - A5*

ICN-3627-S1000D0383-001-01

*Fig 9 Layout and typography for header and footer - Index card (5 inch x 8 inch)*

### 2.4.5 Elements in header and footer

The following table gives the elements creating the document header and footer.

*Table 2 Elements in header and footer*

| Element | Character image<br>A4, A3, ANSI A- and ANSI B-size | A5 and Index cards | Derived from |
|---|---|---|---|
| Publication code | 11 pt bold | 10 pt bold | <pmCode> |

| Element | Character image<br>A4, A3, ANSI A- and ANSI B-size | A5 and Index cards | Derived from |
|---|---|---|---|
| Data module code | 11 pt bold | 10 pt bold | <dmCode> |
| Page date | 11 pt bold | 10 pt bold | <issueDate> |
| Page number | 11 pt bold | 10 pt bold | Generated by the page make-up system |
| Applicability annotation block | 10 pt | 9 pt | The interpretation of the element <applic> |
| Security marking | 10 pt | 9 pt | The interpretation of the attribute securityClassification in the element <security> |
| Logotype | | | <logo> |
| Inwork markings | 8 pt | 8 pt | <issueInfo> |

## 2.5 Double column text

For pages produced with double column text, the columns must be equally split over the page image width with a gutter approximately six millimeters (¼ inch) wide between the columns.

The illustration size and orientation rules specified in Chap 3.9.2.1 apply to double column text pages.

Tables can be placed within a column or be spread across the full page image width.

Titles must not cross over the full page image width except for Centerheads (refer to Chap 6.2.2), full width figures, and full width tables.

Text must be presented for the reader in the way that the text flows from top to bottom "through" any page image wide illustration or table. Centerheads, because of their default placement centered across a full page, are allowed to "break" the flow. Care must be taken when determining layout and placement so that the users are not confused by an illustration that is interspersed with text.

## 2.6 Paper publications

### 2.6.1 Paper and printing

It is recommended to use white paper with good strength characteristics and of sufficient weight and substance to eliminate show-through when printed on both sides.

Standard paper sizes used in publications are listed in Table 3.

**Note**

Projects can specify other paper sizes.

*Table 3 Standard paper sizes*

| Binder size | Paper size | | Note |
|---|---|---|---|
| | **Standard size** | **Optional oversize pages (foldouts). To be avoided.** | |
| A5 | A5 | A4L | L = Landscape. Refer to Para 2.6.2 |
| 5" by 8" | 5" by 8" | | Index card size |
| A4 | A4 | A3L | |
| A-size | A-size | B-size | ANSI sizes |
| A3L | A3L | - | |

The standard size paper given in Table 3 is normally printed on both sides and the optional oversize papers on one side only.

**Note**

A3L paper in A3L binders are normally printed on both sides.

A form of printing must be used which results in a black image suitable for reproduction by eg xerography. The quality of the printed characters, lines, etc must be uniform within the page, from page to page, and from page revision to page revision.

### 2.6.2 Folding

Oversize pages in a publication must be folded to present the header and the footer.

**Recommendation**: Place oversize pages at the end of the document.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Decide on page size per publication.** The project or the organization must decide the page size (including sizes when foldouts are allowed, see below) per publication. Refer to Para 2.1.

**Use of inwork markings.** The project or organization must decide whether to present the inwork markings or not. The details must be documented. Refer to Para 2.2.

**Use and presentation of Produced by - Printed in.** The project or organization must decide whether to present or not the responsible producer of the page-oriented output and/or where the publication was printed .. Refer to Para 2.3.

**Use of mirrored headers and footers.** The project or the organization must decide whether to use mirrored headers and footers or not. Refer to 2.4.

**Presentation of publication module code.** The project or the organization must decide whether to use the S1000D standard page-oriented presentation rules for the publication module code or to create project or organization specific rules for the presentation. Refer to Para 2.4.1.1.

**Presentation of data module code.** The project or the organization must decide whether to use the S1000D standard page-oriented presentation rules for the data module code or to create project or organization specific rules for the presentation. Refer to Para 2.4.1.2.

**Presentation of issue date.** The project or the organization must decide whether to use the S1000D standard page-oriented presentation rules for the issue date or to create project or organization specific rules for the presentation. Refer to Para 2.4.1.3.

**Presentation of page number.** The project or the organization must decide whether to use the S1000D standard page-oriented presentation rules for the page number or to create project or organization specific rules for the presentation. Refer to Para 2.4.1.4.

**Presentation of applicability annotation.** The project or the organization must decide whether to use the S1000D standard page-oriented presentation rules for the applicability annotation or to create project or organization specific rules for the presentation. Refer to Para 2.4.1.5.

**Use of commercial classification and/or caveat as security markings.** The project or the organization must decide whether to use the commercial classification (value of attribute `commercialClassification`) and/or national caveat (value of attribute `caveat`) as an alternative to the security classification (value of the attribute `securityClassification`). Refer to Para 2.4.2.

**Presentation of security markings.** The project or the organization must decide whether to present the security markings in sentence case instead of in uppercase. Refer to Para 2.4.2.

**Exclude security markings for unclassified publications.** The project or the organization must decide whether to exclude the presentation of security markings for unclassified publications or not. Refer to Para 2.4.2.

**Presentation of the element <`logo`>.** The project or organization must decide whether to present any of the logotypes given in the element <`logo`> or not and how this element is presented, eg size, color. Refer to Para 2.4.3.

**End of data module statement.** The project or the organization must determine the text that will be used to identify the end of a data module (either "End of data module" or "End of" followed by the data module title). Refer to Para 2.4.4.

**Placement of the end of data module statement.** The project or the organization must determine whether the "End of" statement is published in the footer or in the body of the page. Refer to Para 2.4.4.

**Use of double column text**. The project or the organization must decide whether to use double column text or not, and under what circumstances. Typography for double column page layout must be documented. Refer to Para 2.5.

**Use of foldouts.** The project or the organization must decide whether to use foldouts or not, and in what circumstances, eg interspersed or at the end of the publication. Refer to Para 2.6.

**Double sided printing of foldout pages.** The project or the organization must decide whether to use double sided printing on foldout pages. Refer to Para 2.6.

**Page numbering of foldout pages.** The project or the organization must decide whether to use double numbering of pages when printed on one (right-hand) side only. Eg 11/12, 13/14. Refer to Para 2.6.

# Chapter 6.2.2

## *Page-oriented publications - Typography - Layout elements*

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| Chap 6.2.3.3 | Layout - Procedural data modules - Rules and examples |
| Chap 6.2.3.5 | Layout - IPD publication - Examples |

| Chap No./Document No. | Title |
|---|---|
| Chap 6.3.1 | IETP - Output specification |
| Chap 7.3.3 | CSDB objects - Multimedia |

# 1 General

This chapter gives the rules for S1000D standard page-oriented presentation of the technical content in page-oriented publications.

These rules also apply when using double column layout (refer to Chap 6.2.1).

As given in Chap 6.2, the project or the organization must decide whether to accept S1000D standard page-oriented presentation given in this chapter or to use any other rules for presentation to meet specific project requirements. These project specific business rules must specify the information needed to contract the desired presentation.

**Note**

Paragraph, step numbers, etc, captions like "Para", "Table" in cross-references and "WARNING", "Note", etc are not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation. Refer to additional notes in the paragraphs below.

Project allowed deviations are summarized in Para 3.

# 2 Typography - layout elements

## 2.1 Fonts and leading

The type font for all text elements must be of sans serif type, eg Arial, Helvetica.

The leading between the lines for all text elements is depending of the font size. Refer to Para 2.4 and Para 2.5.

**Note**

Leading is the "vertical space" between the layout elements (text paragraphs, table title lines, headings, etc).

If there is an extra leading after a component and an extra leading before the following component, the resulting leading is the highest value of the two. If the leadings are the same the resulting leading between the elements is the sum of the two. Refer to Fig 4.

## 2.2 Live matter

Text and headings (excluding centerheads, refer to Para 2.3.2.1) must be left justified and ragged right.

## 2.3 Titles - Headings

### 2.3.1 General

In the following, "headings" are used for the different levels of titles in the data modules.

In descriptive data modules, titles must be included for the element <`table`> and the element <`figure`>. If used in the element <`levelledPara`>, titles must be presented on levels one thru level five.

**Note**

Presentation of the titles for paragraphs on level six thru level eight are not given. The use of these elements is discouraged and their use and presentation are project decisions.

In procedural, crew and fault data modules, titles must be included for the element the <table> and the element <figure>. Titles can also, by project decision, be presented for the element <proceduralStep> and the element <crewDrillStep>.

**Note**

Presentation of the titles for steps on level six thru level eight are not given. The use of these elements is discouraged and their use and presentation are project decisions.

Presentation of the element <levelledPara> is given in Para 2.4.

Presentation of the element <proceduralStep> and the element <crewDrillStep> is given in Para 2.5.

Presentation of list titles is given in Para 2.6.

Presentation of table titles is given in Para 2.8.

Presentation of figure titles is given in Para 2.9.

### 2.3.2 Typography and use

The typography and use of headings is presented in Table 2. Leadings to adjacent elements are presented in Table 3.

*Table 2 Order and typography of headings*

| Order | Layout element | Point size/Leading | Typestyle | Live matter | Numbered |
|---|---|---|---|---|---|
| 1 | Centerhead No. 1 | 14/16 pt | Bold | Centered | No |
| 2 | Centerhead No. 2 | 14/16 pt | Bold, italic | Centered | No |
| 3 | Sidehead 0 | 14/16 pt | Bold | Left justified | No |
| 4 | Sidehead 1 | 14/16 pt | Bold | Left justified | Yes |
| 5 | Sidehead 2 | 12/14 pt | Bold | Left justified | Yes |
| 6 | Sidehead 3 | 10/11 pt | Bold | Left justified | Yes |
| 7 | Sidehead 4 | 10/11 pt | Roman | Left justified | Yes |
| 8 | Sidehead 5 | 10/11 pt | Italic | Left justified | Yes |

*Table 3 Leadings to adjacent headings and text paragraphs*

| Order | Layout element | Leading to next lower level of heading[1] | Leading to a follow-on text paragraph[1] | Leading text paragraph to the heading[1] | Leading table footer end line to the heading[1] |
|---|---|---|---|---|---|
| 1 | Centerhead No. 1 | 28 pt/10 mm | 17 pt/6 mm | 27 pt | 35 pt |
| 2 | Centerhead No. 2 | 28 pt/10 mm | 17 pt/6 mm | 27 pt | 35 pt |
| 3 | Sidehead 0 | 28 tp/10 mm | 17 pt/6 mm | 27 pt | 35 pt |
| 4 | Sidehead 1 | 14 pt | 15 pt | 27 pt | 35 pt |
| 5 | Sidehead 2 | 11 pt | 12 pt | 25 pt | 34 pt |

| Order | Layout element | Leading to next lower level of heading[1] | Leading to a follow-on text paragraph[1] | Leading text paragraph to the heading[1] | Leading table footer end line to the heading[1] |
|---|---|---|---|---|---|
| 6 | Sidehead 3 | 11 pt | 11 pt | 23 pt | 32 pt |
| 7 | Sidehead 4 | 11 pt | 11 pt | 23 pt | 32 pt |
| 8 | Sidehead 5 | - | 11 pt | 19 pt | 28 pt |

1 The leadings given are the leadings between the baselines of the components

Headings must always be kept with the next element. Thus headings must not be placed at the bottom of a page.

2.3.2.1 Centerheads

Two centerheads are available, a centerhead No. 1 and, if required, a centerhead No. 2.

The centerhead No. 1, which is used only once in a document, presents together with a centerhead No. 2 the title of the document.

Centerhead No. 1 is derived from the element <techName> and centerhead No. 2 from the optional element <infoName>.

By project decision, the document title, including both element <techName> and element <infoName> can be presented as a centerhead No. 1. In this case the two elements must be separated by a hyphen [-] surrounded by spaces [ ].

Centerhead No. 2 is also used for "fixed text strings" (captions), eg References, Preliminary requirements, Description, Procedure.

**Note**

These centerheads are not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation of titles and the "fixed text strings".

2.3.2.2 Sidehead 0

Sidehead 0 must be used for the following three introductory lists in a document:

1 Table of contents

2 List of figures

3 List of tables

**Note**

These three sideheads and their related lists are not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for these introductory lists.

An extra leading of 12 pt is added before the first heading (Centerhead No. 2 thru Sidehead 4) after the last of the three introductory lists, giving a total of 24 pt before.

Sidehead 0 must also be also used in procedural and specialized information data modules to present captions, eg Required conditions, Required persons in the preliminary requirements of a procedure. These sideheads are fixed text strings and auto-generated by the editing system when data modules are written in an XML editor.

**Note**

In the context of this chapter, the word "caption" means "fixed text strings" like Fig, Table, Para, *Legend to Fig X*:, Safety requirements, WARNING, Note. It does not refer to the S1000D elements <`caption`> or <`captionGroup`>, which are defined in Chap 3.9.5.2.1.4.

The captions for each data module type are given in Chap 6.2.3.

*2.3.2.2.1 Table of contents*

The mandatory table of contents must include the document title and all sideheads 1, 2 and 3. The word "Page" written in 10 pt roman, aligning the right type limit, must follow on the same line as the sidehead. In the table the number of the sideheads, the sideheads themselves and the page numbers must be written in 10/11 pt roman. The entries in the table, starting with the number, must align the left type limit. The text of the sideheads (the title) must be indented 14 mm from the left type limit. The page numbers must align the right type limit. A dotted leader must appear between the end of the sideheads and the page numbers.

An extra leading of 2 pt must be added before all sidehead 1 in the table of contents.

By project decision, the number of sidehead levels to be presented in the table of contents has to be agreed.

*2.3.2.2.2 List of tables*

The optional list of tables must include all table titles in the document. The presentation rules given for table of contents apply.

By project decision, the caption Table can be added before the table number.

*2.3.2.2.3 List of figures*

The optional list of figures must include all figure titles in the document. The presentation rules given for table of contents apply.

By project decision, the caption Fig can be added before the figure number.

2.3.2.3 Sidehead 1 thru 5

Sidehead 1 thru sidehead 5 are used for presentation of the titles for paragraphs of text and steps. Sidehead 1 is used for level 1, sidehead 2 for level 2, etc. The use of sidehead 1 thru 5, refer to Para 2.3.2 for typography.

2.3.2.4 Numbering of sideheads

All sideheads 1 thru 5 must be numbered with Arabic numerals separated with a period [.]. There must be no period [.] after the last digit of the number.

The number must all use the same type-size and type styles as the sidehead itself. The number must align with the left limit of the page image area. The title itself must be aligned with the left type limit.

### 2.3.3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- presentation of document title
- number of sidehead levels in the table of contents
- presentation of list of tables
- use of the caption table in the list of tables
- presentation of list of figures
- use of the caption Fig in the list of figures
- presentation (layout) of titles
- presentation of the titles on the element <`levelledPara`>
- presentation of the titles on the element <`proceduralStep`>

– presentation of the titles on the element <crewDrillStep >

## 2.4 Paragraphs of text

One or more paragraphs of text (element <para>) can follow sidehead 1 thru 4. Normally, only one paragraph of text runs on from sidehead 5.

Paragraphs of text must be presented in 10/11 pt roman. Ragged (unjustified) right-hand edge is recommended.

The leading between two text paragraphs (base line to base line from the last line of a paragraph to the first line of the following paragraph) must be 20 pt (equal to an extra 8 pt leading after each text paragraph).

A paragraph must not be divided due to a page-break in the way that only one single line is placed on top of the following page. At least two lines must in this case go on to the following page.

## 2.5 Step

When used with titles the rules for sideheads apply. Refer to Para 2.3.

When used without titles, the step number and the text from the element <para> must be presented in 10/11 pt roman. The number aligns the left limit of the page image area. The text itself must be aligned with the left type limit.

The rules for paragraphs of text apply. Refer to Para 2.4.

For the presentations of warnings, cautions and notes within a step, refer to Para 2.10.

Example, refer to Chap 6.2.3.3.

## 2.6 Lists

### 2.6.1 General

Lists consist of two main parts, a title and the list items. The title is optional.

The list title line must be aligned to the left type limit and presented in 10/11 pt. Bold must be used for titles for random lists and sequential lists. Italic must be used for definition lists and legends.

The normal leading from a preceding headline, paragraph, list item, figure title line, table footer (closing line), last line in a warning, caution or note, etc, to the list title line must be used. The leading between the title line and the first list item must be 14 pt (equal to an extra 4 pt leading added after the title).

The basic value for list item leading is 10/11 pt. The values of the extra leadings between and after list items are given in the following paragraphs.

**Note**

The prefixes are not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation.

### 2.6.2 Random lists - Unordered lists and simple lists

#### 2.6.2.1 General

Simple lists are recognized by the value "pf01" of attribute listItemPrefix.

Unordered lists are the default lists recognized by the value "pf02" of attribute listItemPrefix. There are three levels of unordered lists, all indented with a multiple of 7 mm.

The prefixes must be consistently used and presented throughout each data module.

**Recommendation**: For easy readability use the same set of prefixes and presentation of the prefixes throughout the project.

2.6.2.2 Prefix, indents and leading in unordered lists

The following rules apply to the presentation of unordered lists (the default prefix value "pf02" is used):

- Unordered list items at level 1, start with an en-dash [-] as the prefix aligning the left type limit. The text must be indented 7 mm.
- The list items within unordered lists on all three levels must be separated by normal leading, 11 pt, giving no extra leading between the same levels of unordered list items.
- An extra leading of 8 pt must be added after the last list item on each of the three levels.
  - Subunordered (level 2) list items start with a bullet [●] as the prefix indented 7 mm from the left type limit.
  - The text must be indented 7 mm further (14 mm from left type limit).
    - Sub-subunordered (level 3) list items starts with en-dash [-] as the prefix indented 14 mm from the left type limit. The text must be indented 7 mm further (21 mm from left type limit).
    - Each list item, on any level, can consist of one or more paragraphs.

      The paragraphs within a list item must be separated by an extra leading of 8 pt. This applies on all levels.

      An extra leading of 8 pt must be added after the last paragraph in a list item.

2.6.2.3 Prefix, indents and leading in simple lists

Simple lists are presented just like an unordered list at level 1, but without any prefix.

**2.6.3 Sequential lists - Ordered lists**

2.6.3.1 General

There are two levels of ordered lists, both indented with a multiple of 7 mm.

Only one ordered list must be placed under a sidehead. One subordered list can follow each ordered list item.

Ordered lists must not be used to provide procedural step information.

2.6.3.2 Indents and leading in ordered lists

The following rules apply to the presentation of ordered lists:

1 Ordered lists must be numbered with Arabic numerals. The number, starting with "1", must align the left type limit.

2 The text must be indented 7 mm.

3 The additional leading after each list item on both levels must be the same as for text paragraphs, 8 pt.

4 There must be no period [.] after the last digit of the number.

4.1 Subordered lists must be numbered. The number must start with the number of the preceding item followed by a number starting with "1". The numbers must be separated by a period [.].

4.2 The number in subordered lists must be indented 7 mm from the left type limit. The text must be indented 7 mm further (14 mm from left type limit). The text indent can be extended in steps of 7 mm as necessary, eg if one of the numbers is larger than 9, eg 6.12, 12.6, 10.10. The indentation must be consistent within each ordered or subordered list.

Each list item, on any level, can consist of one or more paragraphs and must be separated by an extra leading of 8 pt.

5 Ordered lists can include subunordered (level 2) and sub-subunordered lists.

- Subunordered (level 2) list items can be included in ordered lists.
- The presentation rules from Para 2.6.2 must be used.
  - Sub-subunordered (level 3) list items can also be included in ordered and subordered lists.
  - Each subunordered and sub-subunordered list can consist of one ore more paragraphs. The rules for leadings are given in Para 2.6.2.2.

### 2.6.4 Definition lists and legends

There is only one level to a definition list and to a legend.

The definition list and the legend must be aligned to the left type limit and be presented in 10/11 pt.

#### 2.6.4.1 Indents and leading in definition lists

The presentation of a definition list is the same as for an informal table (refer to Para 2.8.2) with the following differences:

- no leading before the first row
- a leading of 8 pt between rows and paragraph within a row

**Note**

Column titles are allowed as in informal tables.

Two columns must be used for presentation of the term (element <`listItemTerm`>) and its definition (element <`listItemDefinition`>). The definition can consist of more than one paragraph.

If a title is used, eg *Definition of terms:* in the example below, and the definition list continues on the next page, the title must be repeated followed by two spaces and the caption "*(Continued)*" on the top of the continuation page.

The first column with the term has a width of 50 mm and the second column with the definition has a width of 100 mm.

If <`definitionListHeader`> is used to specify column titles, the column titles must be presented in 10 pt bold and underlined.

Layout example 1 - Title without column titles:

**Definition of terms:**

| | |
|---|---|
| Structural damage, category 1 | Damage on load bearing items that can be tolerated or cannot be repaired or replaced in battle damage repair conditions.<br><br>This damage is less than the specified limit and has no effect on the ability of the Product to complete at least one mission. Tolerated damage requires only clean-out or stop drilling of cracks. |
| Structural damage, category 2 | Damage on load bearing items that must be repaired or replaced when damage exceeds the specified limit. |

**Definition of terms:**

| | |
|---|---|
| Substitute material | A material which has less ultimate tensile strength than the original but which can be used for the BDR of an item by adapting it. |

Layout example 2 - No list title with column titles:

| Name | Description |
|---|---|
| Nomenclature | Name of the part |
| Part number | Number assigned to the part |

2.6.4.2 Prefix, indents and leading in legends

The presentation of a legend is the same as for an informal table (refer to Para 2.8.2) with the following differences:

- mandatory use of a title (caption)
- no leading before the first row
- having a leading of 4 pt between rows

Four columns must be used for presentation of a legend. The item numbers (element <listItemTerm>) are given in column 1 and 3 and the corresponding definition (element <listItemDefinition>) in column 2 and 4.

The columns with item number (column 1 and 3) are aligned to left type limit. The width of the item number column is 7 mm.

The column giving the definition has a width of 68 mm.

The caption, *Legend to Fig X:,* must be presented in front of the legend.

When a full-page legend is split on two or more pages, the item numbers (and their definition) must be presented in consecutive order on the first page and then continue on the following page. Refer to Fig 1.

If the legend continues on the next page, the caption must be repeated followed by two spaces and the text *(Continued)* on the top of the continuation page.

**Note**

The caption is not entered in the data modules when data modules are written in an XML editor or a WYSIWYG-editor with an automatic function for presentation of legends.

Layout example, refer to Fig 1.

*Legend to Fig 3:*

| | | | |
|---|---|---|---|
| 1 | Bracket assembly | 16 | Nut |
| 2 | Screw | 17 | Bar, small |
| 3 | Washer | 18 | Bar, big |

---

*Legend to Fig 3: (Continued)*

| | | | |
|---|---|---|---|
| 4 | Bar, even bigger | 19 | Screw |
| 5 | Screw | 20 | Nut |
| 6 | Washer | 21 | Washer |
| … | | … | |
| | | 29 | Clamp |
| 15 | Support assy | | |

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*Fig 1 Legend split over two pages*

**2.6.5 Business rules decisions**

Business rules decisions include, but are not limited to, the following:

– prefixes to be used for random lists

## 2.7 Footnotes

### 2.7.1 General

Footnotes used in regular text (inline footnotes) and in tables (table footnotes) are marked up the same way (refer to Chap 3.9.5.2.1) but presented different.

The recommended way of presenting the footnote markers is as superscripted numbers. Thus the examples below are based on that recommendation.

Projects have to decide if numbers has to be superscripted or presented in parenthesis following the item.

### 2.7.2 Inline footnotes

Inline footnotes must be numbered (when the recommended superscripted numbers are used) in numerical order within the complete data module. If the same footnote is referenced several times within the table, the same number must be used.

The publishing systems must present inline footnotes at the bottom of the page, or by project decision, at the end of the complete data module.

Example[1], refer to the end of this data module.

---

[1] This is a footnote. It must be presented in 8/9 pt.

### 2.7.3 Table footnotes

Table footnotes must be numbered (when the recommended superscripted numbers are used) in numerical order within each table. If the same footnote is referenced several times the same number must be used.

The publishing system must present table footnotes at the bottom of the complete table. The table footer must not be split due to page break. At least one row of the table must follow the table footer to the next page.

By project decision, if the table breaks to a new page, the publishing system can present the relevant footnotes at the bottom of the table before the page break. The table closing line must only appear after the complete table footer.

Examples, refer to Para 2.8.1.

### 2.7.4 Interactive presentation

Rules for presentation of footnotes in IETPs are presented in Chap 6.3.1.

### 2.7.5 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- presentation of footnote numbers
- presentation of inline footnotes
- presentation of table footnotes
- use of vertical lines in formal tables

## 2.8 Tables

### 2.8.1 Formal tables

There are two standard widths of tables, image width (attribute `pgwide` value "`1`") and type (column) width (attribute `pgwide` value "`0`"). All tables must be presented in portrait. The text in cells of portrait tables is parallel to the text in the page header and footer.

A formal table consists of four parts, the **table title line**, the **table head**, the **table rows** and the **table footer**.

The **table title line** must be centered above the table head and be written in 10/11 pt italic. An extra leading of 12 pt must be added before the table title line and 2 pt after. The caption "*Table*" followed by the number of the table, starting from "1" within each data module, must be separated from the title itself by two spaces.

The **table head** starts with a horizontal line, followed by the column headings written in 10/11 pt bold. An additional leading of 4 pt must be added before and after the table heading text.

The table title and table head must not be split due to a page break. Nor must a table be split with only one row on the first page.

Column references can be used to facilitate cross-reference between the text and the table columns. These numerical references must be written within brackets. Example, refer to Table 4.

The table head ends with a horizontal line.

If a table continues on the next page, the closing horizontal line must be omitted on the incomplete table. The table title line followed by two spaces and the caption *(Continued)* and the table head must appear at the top of the continuation page.

The **table rows** entries (from element <`tbody`>) must be written in 10/11 pt. An additional leading of 4 pt must be added before and after each row (giving 8 pt leading between the entries or 19 pt baseline to baseline).

Lengthy tables must have a reasonable space between the table rows to aid legibility. The practice of every fifth - sixth line having extra leading is preferred.

**Note**

The extra leading can be entered by the application adding an extra 4 pt after eg every fifth row.

The **table footer** starts with a horizontal line followed by any text entry or footnotes in 8/9 pt. The footnote content is indented 7 mm. An additional leading of 2 pt is added before and after each footnote. The table footer ends with a horizontal closing line. Rules for presentation of table footnotes are given in Para 2.7.3.

If there are no text entries or footnotes in the table footer, only the horizontal line must be presented.

All horizontal lines must be 1/2 pt.

After the table footer, an additional leading giving the subsequent element a total leading from table closing line to its base line of:

- 28 pt - text paragraphs or a list items
- 32 pt - table title lines
- 28 thru 35 pt for headings. For details refer to Table 3.

For markup example of Table 4 below, refer to Chap 3.9.5.2.1.6.

**Note**

Vertical lines (rules) in tables must be avoided.

**Note**

The rendering of the table must be based on the elements and attributes in the XML files.

The author must apply elements and attributes as defined in Chap 3.9.5.2.1.6 in order to achieve the layout described in this chapter.

Layout example:

*Table 4 Example of a column width table with footnotes*

| **Col 1 heading (1)** | **Col 2 heading (2)** | **Col 3 heading (3)** |
|---|---|---|
| Row 1 entry 1 has a footnote[1] | Row 1 entry 2 | Row 1 entry 3 |
| Row 2 entry 1 continues on a second line | Row 2 entry 2 | Row 2 entry 3[2] |
| Row 3 entry 1 also has a footnote[2] | Row 3 entry 2 | Row 3 entry 3 |

1 This is a footnote for entry 1
2 This is another footnote which is used twice

Fig 2 shows Table 4 with all footnotes at the end of the complete table.

Fig 3 shows the equivalent table with the relevant footnotes on each page.

*Table 3 Example of an image width table with footnotes - Split over two pages*

| Col 1 heading | Col 2 heading | Col 3 heading |
|---|---|---|
| Row 1 entry 1 has a footnote[1] | Row 1 entry 2 | Row 1 entry 3 |
| Row 2 entry 1 continues on a second line | Row 2 entry 2 | Row 2 entry 3[2] |

*Table 3 Example of an image width table with footnotes - Split over two pages (Continued)*

| Col 1 heading | Col 2 heading | Col 3 heading |
|---|---|---|
| Row 3 entry 1 also has a footnote[2] | Row 3 entry 2 | Row 3 entry 3 |

1 This is a footnote for entry 1
2 This is another footnote which is used twice

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*Fig 2 Table split over two pages, footnotes at the end of the table*

*Table 3 Example of an image width table with footnotes - Split over two pages*

| Col 1 heading | Col 2 heading | Col 3 heading |
|---|---|---|
| Row 1 entry 1 has a footnote[1] | Row 1 entry 2 | Row 1 entry 3 |
| Row 2 entry 1 continues on a second line | Row 2 entry 2 | Row 2 entry 3[2] |

1 This is a footnote for entry 1
2 This is another footnote which is used twice

*Table 3 Example of an image width table with footnotes - Split over two pages (Continued)*

| Col 1 heading | Col 2 heading | Col 3 heading |
|---|---|---|
| Row 3 entry 1 also has a footnote[2] | Row 3 entry 2 | Row 3 entry 3 |

2 This is another footnote which is used twice

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*Fig 3 Table split over two pages, footnotes on the relevant page*

### 2.8.2 Informal tables

An informal table is a table without regular table title line, table head and table footer.

The table title, if used, follows the rules for titles in lists, refer to Para 2.6.1.

The table row rules in Para 2.8.1 apply with the following differences:

- no extra leading before the first row in the table
- the additional leading after the table footer is measured from baseline to baseline

Example:

The Top-8 colors:

| | |
|---|---|
| 1 | Shocking pink |
| 2 | Lavender-blue |
| 3 | Rust-brown |
| 4 | Bluish-black |
| 5 | Vivid red |
| 6 | Pastel green |
| 7 | Dirty yellow |
| 8 | Dark black |

### 2.8.3 Tabular data modules

Data modules presenting the majority of the information in tabular format only, can have deviations from the rules for formal tables.

#### 2.8.3.1 Front matter data modules

List of effective pages, IC 00R, List of effective data modules, IC 00S, Change record data modules, IC 00T, Highlight data modules, IC 00U, and table of contents, IC 009, have no table title lines in front of the listed data modules or list of reason for change.

For details and examples, refer to Chap 6.2.3.1.

#### 2.8.3.2 IPD modules

IPD modules, IC 941, and IPD cross reference index, IC 942, have the table header starting lines omitted (and tie the table header direct to the page header line). No table title lines are used.

For details and examples, refer to Chap 6.2.3.5.

### 2.8.4 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- use of vertical lines in formal tables

## 2.9 Figures

### 2.9.1 Formal figures

As the publications and documents are produced from data modules the placement of the figure is given from the data module. Normally no manual attempt to move the figure to another page, due to an automatic page break, must be done.

The illustration sizes are given in Chap 3.9.2.

A figure consists of two parts, an **illustration sheet** (or sheets) and a **figure title line** for each illustration sheet.

The normal leading from a preceding headline, paragraph, list item, table footer (closing line), figure title line, last line in a warning, caution or note, etc, to the illustration top limit must be used. For example, 8 pt after a text paragraph or figure title line.

The **illustration sheet** is placed within a predefined illustration reproduction area. The dimensions are given in Chap 3.9.2. No extra leading must be added before or after the illustration reproduction area.

The **figure title line** must be centered on the first line following the illustration bottom limit. The title must be written in 10/11 pt italic, lowercase. An extra 8 pt leading must be added after the figure title line. The abbreviation "*Fig*" followed by the number of the figure, starting from "1" within each data module, must be separated from the title itself by two spaces.

When an illustration requires several illustration sheets, *(Sheet X of Y)* must be added after the title. The default presentation mode is to use the same figure number for all illustration sheets.

As an alternative, by project decision, an individual figure number can be appended to each illustration sheet eg:

- Fig 7.1  Computer (Sheet 1 of 2) and Fig  7.2 Computer (Sheet 2 of 2)
- Fig 2  Pump (ACDC) (Sheet 1 of 2) and Fig 3  Pump ACDC (Sheet 2 of 2)

For the handling of multi sheet figures, refer to Chap 3.9.2.

The ICN, ICN, must be presented in 10 pt, right justified in the lower right hand corner within the illustration reproduction area.

**Note**

The ICNs, which are not included in the illustration, are derived from the XML attribute `infoEntityIdent` and put in place by the page layout system.

### 2.9.2 Examples of illustration sizes

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*Fig 4 Flexi height illustration 170 mm x 210 mm showing extra leading after and before an element*

ICN- S3627-S100D0385-002-01

*Fig 5 Flexi height illustration 170 mm x 102 mm - Point size and leading*

The frame gives the dimensions of a

Full page

illustration

ICN-S3627-S1000D0387-001-01

*Fig 6 Full page illustration 170 mm x 222 mm*

### 2.9.3 Symbols

Symbols are illustrations presented without a figure reference line and the ICN. The symbols can be presented inline with regular text. If the symbol is taller than the current font, the leading must be adjusted to fit the height of the symbols. The symbols are normally aligned to the baseline, but can be centered between text lines if preferred.

Examples - Aligned to the baseline:

A warning can include the general warning symbol. The general warning symbol, , can be omitted or substituted with other, to the warning, relevant symbols eg .

"Click the acknowledge button, , when the caution pop-up has been read and understood.".

Refer to examples in Para 2.10.1.2.

### 2.9.4 Business rules decisions

Business rules decisions include, but are not limited to, the following:

– use of the alternative individual numbering of multi sheet illustrations

## 2.10 Warnings, cautions and notes

### 2.10.1 General

The use of warnings, cautions and notes are given in Chap 3.9.3.

There are two variants of presenting warnings and cautions:

– Symbolic - symbolic frame, with or without color
– Textual - text based without color and frames

The symbolic variant is mainly aimed, but not limited, for screen display as it can includes colored frames.

The textual variant is the basic variant mainly aimed for page-oriented paper presentation.

Both variants can include symbols. Refer to Para 2.9.3.

#### 2.10.1.1 Warnings - Textual

The caption WARNING must be presented in 12/14 pt bold, uppercase underlined, centered on the width of the warning itself. The normal leading from a preceding headline, paragraph, list item, table footer (closing line), figure title line, last line in a warning, caution or note, etc, to the illustration top limit must be used, eg 8 pt after a text paragraph or figure title line. An extra leading of 8 pt must be added after the warning caption.

The warning must be presented in 10/11 pt bold, lowercase. The extra leading after paragraphs and list items in a warning must be the same as for "ordinary" paragraphs and list items.

The caption WARNING, symbols, if any, and the warning itself must not be split due to a page-break.

A warning is effective throughout the whole operational or procedural data module if it is applied in the element <`description`> before the first element <`levelledPara`> or in the element <`safetyRqmts`> in the element <`preliminaryRqmts`>.

A warning is the first information given in the step of a procedure.

The S1000D standard page-oriented presentation of warnings is to locate it inside a step/para on the first "empty" text line in the step after the step number and the title if any.

Presentation of the warning before the step/para number is allowed by project decision.

No mix of the two presentation methods is allowed.

A warning is effective to the step/para and all its substeps/subparas.

A warning must not be located between paragraphs.

A warnings must be located and presented in the same way for all steps.

A warnings can begin with symbols, element <`symbol`>. These graphics are intended to be standardized symbols. Symbols must be presented immediately after the caption WARNING.

A warning can include:

– attention random lists, element <`attentionRandomList`> (one level only)
– initial symbols

The list item prefix must be a bullet.

**Note**

The attribute `listItemPrefix` in element <`attentionRandomList`> is given the value "`pf07`" by the author or the authoring application. Refer to Chap 3.9.5.2.1.3.

Below follows the different presentations variants of warnings:

*2.10.1.1.1 A warning without symbols*

**WARNING**

**When you do Step 3, make sure that the tire is fully deflated before you remove the tire. The removal of the tire with the tire inflated is dangerous.**

*2.10.1.1.2 A warning with symbols, several paragraphs and a random list*

**WARNING**

**When you do Step 3, make sure that the tire is fully deflated before you remove the tire.**

**The removal of the tire with the tire inflated is dangerous.**

- **attention random list items allowed**
- **attention random list items allowed**

*2.10.1.1.3 A warning in a procedure without titles*

The example below shows a warning in a procedure without a step title.

**WARNING**

**When you do Step 3, make sure that the tire is fully deflated before you remove the tire. The removal of the tire with the tire inflated is dangerous.**

2.10.1.2 Warnings - Symbolic

The layout text elements, including leadings, are the same as for the textual warnings with the following differences:

– The warning caption must not underlined

– The warning text being centered in a symbolic warning
– An extra leading of 8 pt after the frame

The difference is in the "symbolic" frame.

The symbol can be omitted or substituted with other, to the warning, relevant symbols eg as given in Para 2.10.1.1.2.

Fig 5 in Chap 6.3.1 shows a warning with an acknowledge button, OK, which is used in interactive publications only. Refer to Chap 6.3.1.

2.10.1.3 Cautions

Follows the same rules as warnings given in Para 2.10.1.1 and Para 2.10.1.2 with the following differences:

– Cautions are preceded by any warnings

2.10.1.4 Notes

Notes given in the beginning of a procedural step must be preceded by any warning and cautions.

The caption Note, or Note X if more than one, must be presented in 10/11 pt bold, lowercase. The normal leading from a preceding headline, paragraph, list item, table footer (closing line), figure title line, last line in a warning, caution or note, etc, to the illustration top limit is used, eg 8 pt after a text paragraph or figure title line. No extra leading must be added after the caption.

The word Note must align the left type limit when it refers to a paragraph and be indented to align the text of the list item to which it pertains. The note itself must be indented 7 mm from the left limit of the word Note and is presented in 10/11 pt, lowercase, on the following line. An extra leading of 8 pt must be added after the note.

The word **Note** or **Note X** and the note itself must not be split due to a page break.

Projects can decide on the use of numbered notes must be consistent throughout the data module starting with Note 1 for the first note in the data module.

A note can consist of one or more paragraphs. The paragraphs within a note must be separated by an additional leading of 8 pt. This applies on all levels.

The following shows the presentation of the four levels of notes:

**Note**

This note refers to a paragraph or a step.

This is a second paragraph to the note.

– Below follows a note to an ordered or unordered list item.

**Note**

This note refers to an ordered or unordered list.

- Below follows a note to an ordered or subunordered list item.

**Note**

This note refers to a subordered or subunordered list.

– And finally, below follows two numbered notes to a sub-subordered or sub-subunordered list item. They are numbered just to show how it is presented. Normally use of numbered notes must be consistently done throughout the data module.

**Note 1**

This note refers to a sub-subordered or sub-subunordered list.

**Note 2**

This is the second note to the sub-subunordered list.

A note can also include one random lists and one sequential list. The latter can in turn include one level of random list. The layout rules for the list items (indents, leading and presentation in 10/11 pt) apply. Refer to Para 2.6.

The list item prefix must be a dash.

**Note**

The attribute `listItemPrefix` in element <`attentionRandomList`> is given the value "`pf03`" by the author or the authoring application. Refer to Chap 3.9.5.2.1.3.

The following shows the presentation of lists in notes:

**Note**

This note refers to a paragraph or a step.

This is a second paragraph to the note.

– This is the first item in an unordered list (element <`attentionRandomlListItem`>) within the note. It is used for all items in the list except for the last (see also the next list item which includes more than one paragraph) that has extra leading at the end.
– This is the second item in an unordered list within the note. This list item includes more than one paragraph.
– This is the second paragraph (element <`attentionListItemPara`>) in the unordered list item. The same rules as for list paragraphs apply.
– This is the last unordered list item in this note.

The note can also include one level of an unordered list:

1 This is the first sequential list item (element <attentionSequentialListItem>) within the note. The sequential list items can include one level of unordered list items.

The sequential lists within a note can include one or more paragraphs.

– This is the first unordered list item (element <attentionRandomlListItem>) within the sequential list.

This is the second paragraph in the unordered list within the sequential list.

– The same rules as for list rules apply.

2 This is the last item in the note. Only one sequential list is allowed in a note.

### 2.10.2 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- presentation of warnings and cautions
- use of symbols in warnings and cautions
- use of symbolic presentation of warnings and cautions
- use of numbered notes within a data module

## 2.11 Mathematical expressions

To be Determined (TBD)

## 2.12 Highlighted text

To highlight (emphasize) a word, an expression or a sentence bold must be used as the default value. The presentation is driven by the value, eg "em01", of the attribute emphasisType.

## 2.13 Change marks

### 2.13.1 General

Change marks must show the changes from the previous issue delivered to the customer.

Changes given the attribute changeMark is "1" can be identified with a change bar in the form of a vertical black line, 2 to 4 pt wide, to the left of the left type limit adjacent to the changed lines, or in the case of tabular data, against the row that contains the change.

**Note**

The vertical black line to the left is the default value. Any other visual representation is by project decision.

Changes to figures, including their title lines, must be marked at the figure title line.

Table of contents, List of figures and List of tables in data modules must not be change marked.

Title pages, List of effective pages, List of effective data modules, Change records, Highlight pages and table of contents pages must not be change marked.

Examples of coding are given in Chap 3.9.5.2.1.1.

### 2.13.2 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- presentation of change marks

## 2.14 References

References to data modules and technical publications are presented in lexical order, with data modules first, in the beginning of a data module under the caption "References" and as inline references in the text.

### 2.14.1 The references table in data modules

Descriptive, procedural, fault information, maintenance planning, etc include a standardized reference table immediately following the introductory lists: Table of contents, List of tables or List of figures. The references table is presented under the caption References (Centerhead No.2) as Table 1 with the table title References.

The table presents the data module code, the publication module code or a non S1000D publication code together with the corresponding title, as given by the element <refs>, for all in the data module referenced publications and data modules. Publications not having a code are presented by the title only. This means:

– The data module reference is derived from the element <dmRef> which gives the data module code from the element <dmCode> contained in the element <dmRefIdent>.

  For projects that include the issue number (in element <issueInfo> contained in element <dmRefIdent>) in the data module reference, this will be displayed after the data module code and be preceded by the word "Issue".

  For projects that include the title of the data module (in element <dmTitle> contained in element <dmRefAddressItems>) in the data module reference, the data module title will be displayed in the second column.

  **Note**
  It is recommended to include the data module titles.

– The publication module reference is derived from the element <pmRef> which gives the publication code from the element <pmCode> contained in element <pmRefIdent> together with the element <pmTitle> contained in element <pmRefAddressItems>.

  For projects that include the issue date (in element <issueDate> contained in element <pmRefAddressItems>) in the publication module reference, this will be presented after the publication identifier.

– A non S1000D publication reference is derived from the element <externalPubRef> using the element <externalPubCode> and/or the element <externalPubTitle> contained in element <externalPubRefIdent>.

No other elements and attributes on the element <refs>, than those given above, have any effect on the formatted output for page-oriented presentation.

The absence of the element <refs> will be presented with "None". Refer to Fig 7.

The alternate title of publication modules (element <shortPmTitle>) and non S1000D publications (element <shortExternalPubTitle>) must be presented in bold and underlined on anew line to differ from the presentation of the full title. Refer to Fig 8.

Detailed rules for specific data module types are given in Chap 6.2.3.

For examples of a table with and without references, refer to Fig 7.

## References

*Table 1 References*

| Data module/Technical publication | Title |
|---|---|
| S1000DBIKE-AAA-D00-00-00-00AA-258A-A | Bicycle - Other procedures to clean |
| S1000DBIKE-AAA-D00-00-00-00AA-041A-A Issue 004 | Bicycle - Description of how it is made |
| S1000DBIKE-TPSMG-BMP01-00 | Bicycle maintenance publication |
| | Biker's little red booklet - Moff's memoirs |
| ISBN 1-871802-04-0 | |

## References

*Table 1 References*

| Data module/Technical publication | Title |
|---|---|
| None | |

ICN-S3627-S1000D0435-001-01

*Fig 7 Presentation of references under the caption "References" - Example*

## References

*Table 1 References*

| Data module/Technical publication | Title/Alternate title |
|---|---|
| S1000DBIKE-AAA-D00-00-00-00AA-258A-A | Bicycle - Other procedures to clean |
| ISO-66891D:1887 | Short introduction to the noble art of cleaning a two wheels bicycle outdoors in good weather condition<br>**How to clean a dirty bike** |

ICN-S3627-S1000D0497-001-01

*Fig 8 Presentation of references under the caption References when using alternate title - Example*

### 2.14.2 Inline references

The presentation of references to data modules are done by presentation of the data module code derived from the element <dmRefIdent>. The content of the element <dmTitle> is not presented.

The presentation of references to publication modules are done by presentation of the publication module code derived from the element <pmRefAddressIdent>. The content of the element <pmTitle> or the <shortPmTile> is not presented.

The presentation of non S1000D references are derived from the element <externalPubCode>, the element <externalPubTitle> or the element <shortExternalPubTitle>.

### 2.14.3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

- presentation of data module titles in the reference table
- presentation of publication module/non S1000D publication titles in the reference table
- inline presentation of non S1000D publication titles

## 2.15 Cross-references

### 2.15.1 General

Cross-references to elements within the current data module must display a generated text caption. The generated caption depends on the value of the attribute `internalRefTargetType` which must match the target element type. The table below shows the available values for the attribute `internalRefTargetType` together with the generated caption text.

If the element <`internalRef`> includes text content it must have its attribute `internalRefTargetType` set to value "`other`".

*Table 5 Presentation of* `internalRefTargetType`

| Cross-reference to | Used attribute `internalRefTargetType` value | Output example with generated caption text | Comments |
|---|---|---|---|
| <`figure`> | "`figure`" | Fig 1 | "Fig" + space + target figure number |
| <`hotspot`> | "`hotspot`" | Fig 2 [15] | "Fig" + space + target figure number + space + Target hotspot attribute `applicationStructureName` value within square brackets |
| <`multimedia`> | "`multimedia`" | | Refer to Chap 7.3.3 |
| <`multimediaObject`> | "`multimediaobject`" | | Refer to Chap 7.3.3 |
| <`levelledPara`> | "`para`" | Para 1.2.2 | "Para" + space + target paragraph number |
| <`parameter`> | "`para`" | | Refer to Chap 7.3.3 |
| <`graphic`> | "`sheet`" | Fig 3, Sheet 2 | "Fig" + space + target figure number + comma [,] +"Sheet" + target sheet number |
| <`spareDescr`> | "`spares`" | Inner-tube | Text content of the child element <`name`>[1] |
| <`proceduralStep`> | "`step`" | Step 3 | "Step" + space + target figure number |

| Cross-reference to | Used attribute `internalRefTargetType` value | Output example with generated caption text | Comments |
|---|---|---|---|
| <supportEquipDescr> | "supequip" | Tire pressure gage | Text content of the child element <name>[1] |
| <supplyDescr> | "supply" | General lubricant | Text content of the child element <name>[1] |
| <table> | "table" | Table 4 | "Table" + space + target figure number |
| Any other element with an id attribute | "other" | No generated text | Rules and restrictions for linking to other elements must be defined by project business rules |

1 By project decision the abbreviated alternate name (element <shortName>) can be used.

No other attributes on the element <internalRef>, than given in Table 5, have any effect on the formatted output for page based data modules.

White space before and after an element <internalRef> must be inserted by the author of the data module, not added by the style sheet. This is to ensure correct spacing for any surrounding punctuation.

### 2.15.2 Business rules decisions

Business rules decisions include, but are not limited to, the following:

– presentation of name of spares, supplies and support equipment

## 2.16 Applicability

Rules for presentation of applicability TBD.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Presentation of document title.** The project or the organization must decide whether to present the document title as a centerhead No. 1 and a centerhead No. 2 or as a centerhead No. 1 only (including both element <techName> and element <infoName>). Refer to Para 2.3.

**Number of sidehead levels in Table of contents.** The project or the organization must decide whether to present more than three sidehead levels in the table of contents. Refer to Para 2.3.2.2.1.

**Presentation of List of tables.** The project or the organization must decide whether to present the List of tables or not. Refer to Para 2.3.2.2.2.

**Use of the caption Table in the List of tables.** The project or the organization must decide whether to present the caption "Table" before the figure number in the List of tables. Refer to Para 2.3.2.2.2.

**Presentation of List of figures.** The project or the organization must decide whether to present the List of figures or not. Refer to Para 2.3.2.2.3.

**Use of the caption Fig in the List of figures.** The project or the organization must decide whether to present the caption "Fig" before the figure number in the List of figures. Refer to Para 2.3.2.2.3.

**Presentation (layout) of titles.** The project or the organization must decide whether to use the S1000D standard presentation rules for titles (sidehead 1 thru sidehead 5 or if used thru sidehead 8) or to create project or organization specific rules such as type size, leading and justification. Refer to Para 2.3.2.3.

**Presentation of the titles on the element <levelledPara>.** The project or the organization must decide whether to present the titles for the element <levelledPara> on level six thru eight or not. Refer to Para 2.4.

**Presentation of the titles on the element <proceduralStep>.** The project or the organization must decide whether to present the titles for the element <proceduralStep> or not and to which level. Refer to Para 2.5.

**Presentation of the titles on the element <crewDrillStep>.** The project or the organization must decide whether to present the titles for the element <crewDrillStep> or not and to which level. Refer to Para 2.5.

**Prefixes to be used for random lists.** The project or the organization must decide whether to use a consistent set of prefixes for random list throughout the project or not. Refer to Para 2.6.2.

**Presentation of footnote numbers.** The project or the organization must decide whether to present the footnote number must be superscripted (default) or presented within parenthesis. Refer to Para 2.7.

**Presentation of inline footnotes.** The project or the organization must decide whether to present the inline footnotes at the bottom of the page (default) o r at the end of the data module. Refer to Para 2.7.

**Presentation of table footnotes.** The project or the organization must decide whether to present the footnotes on the relevant page or not, if the table is split over several pages. Refer to Fig 2 and Fig 3. Refer to Para 2.7.

**Use of vertical lines in formal tables.** The project or the organization must decide whether to, in exceptional cases, allow vertical lines in formal table or not. Refer to Para 2.8.

**Use of the alternative individual numbering of multi sheet illustrations.** The project or the organization must decide whether to use one of the alternative methods for individual numbering of multi sheet illustrations or not. The chosen method must be used throughout the project. Refer to Para 2.9.

**Presentation of warnings and cautions.** The project or the organization must decide whether to use the alternative rule to present the warnings before the step/para number or not. Refer to Para 2.10.

**Note**

Projects must be aware of potential hazards when allowing step numbers to follow the warning and ensure that there is a clear connection in the presentation between the warning and the associated steps.

**Use of symbols in warnings and cautions.** The project or the organization must decide whether to use symbols in warnings and cautions or not. The symbols must be standardized and documented. Refer to Para 2.10.

**Use of symbolic presentation of warnings and cautions.** The project or the organization must decide whether to use symbolic presentations of warnings and cautions or not. Refer to Para 2.10.

**Use of numbered notes within a data module.** The project or the organization must decide whether to use numbered notes within a data module or not. Refer to Para 2.10.

**Presentation of change marks.** The project or the organization must decide whether to use an alternative visual presentation as change marker or not. Refer to Para 2.13.

**Presentation of data module titles in the reference table.** The project or the organization must decide whether to present the data module title or not in the reference table. Refer to Para 2.14.1.

**Presentation of publication module/non S1000D publication titles in the reference table.** The project or the organization must decide whether to present the title (element <pmTitle>/element <externalPubTitle>) or the short title (element <shortPmTitle>/element <shortExternalPubTitle>), or both, in the reference table. Refer to Para 2.14.1.

**Inline presentation of non S1000D publication titles.** The project or the organization must decide whether to present the external publication code (element <externalPubCode>), the title (element <externalPubTitle>) or the short title (element <shortExternalPubTitle>) as the inline reference. Refer to Para 2.14.2.

**Presentation of name of spares, supplies and support equipment.** The project or the organization must decide whether to present the name (element <name>) or the abbreviated alternate name (element <shortName>), as the cross-reference in the text. Refer to Para 2.14.2.

# Chapter 6.2.3

## *Page-oriented publications - Layout*

## Table of contents

Page

Page-oriented publications - Layout ....1
References ....1
1 General ....1

## List of tables

1 References ....1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |
| Chap 6.2.3.1 | Layout - Description - Rules and examples |
| Chap 6.2.3.2 | Layout - Description - Rules and examples |
| Chap 6.2.3.3 | Layout - Procedural data modules - Rules and examples |
| Chap 6.2.3.4 | Layout - Fault information data modules - Rules and examples |
| Chap 6.2.3.5 | Layout - IPD publication - Examples |

## 1 General

This chapter gives the rules for and examples of S1000D standard page-oriented presentation of data modules using the layout elements given in Chap 6.2.2. It is used to build for example, XML Style Sheets (written in the XML Style Sheet Language). If a traditional authoring environment is used, it is used as the input for setting up the authoring application.

Rules and examples are given for:

- Chap 6.2.3.1 Layout - Description - Rules and examples
- Chap 6.2.3.2 Layout - Description - Rules and examples
- Chap 6.2.3.3 Layout - Procedural data modules - Rules and examples
- Chap 6.2.3.4 Layout - Fault information data module - Rules and examples
- Chap 6.2.3.5 Layout - Illustrated parts data modules - Rules and examples

# Chapter 6.2.3.1

## *Layout - Description - Rules and examples*

## Table of contents

**Page**


Layout - Description - Rules and examples ....1
References ....1
1 General ....2
2 Rules and examples ....3
2.1 General ....3
2.1.1 The front matter data modules, except PCT, CCT and ACT ....3
2.1.2 The front matter data modules PCT, CCT and ACT ....3
2.2 Title page ....3
2.3 List of effective pages ....6
2.4 List of effective data modules ....6
2.5 Change record ....6
2.6 Highlights ....6
2.7 Technical standard record ....12
2.8 Table of contents ....12
2.9 Product cross-reference table ....15
2.10 Conditions cross-reference table ....15
2.11 Applicability cross-reference table ....15


## List of tables


1 References ....1


## List of figures


1 Layout - Title page ....4
2 Layout - Title page - Example ....5
3 Layout - List of effective pages - Example ....7
4 Layout - List of effective data modules - Example ....8
5 Layout - Change record - Example ....9
6 Layout - Highlights - Example ....10
7 Layout - Highlights with updating procedure - Example ....11
8 Layout - Technical standards record - Example ....13
9 Layout - Table of contents - Example ....14


## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 3.9.4 | Authoring - Front matter |
| Chap 5.2.1.18 | Common information sets - Common information and data |
| Chap 6.2.1 | Page-oriented publications - Page layout, paper |

| Chap No./Document No. | Title |
|---|---|
| | publications, headers and footers |
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |

# 1 General

This chapter gives the rules for and examples of S1000D standard page-oriented presentations of the below listed front matter data modules.

**Note**

In some of the examples the security classification is in lowercase "by project decision".

The rules and examples in this chapter include:

- Title page - IC 001
- List of effective pages - List of Effective Pages (LOEP) - IC 00R (or IC 002)
- List of effective data modules - List Of Effective Data Module (LOEDM) - IC 00S (or IC 002)
- Change record - Change Record (CR) - IC 00T (or IC 003)
- Highlights - IC 00U (or IC 003)
- Technical standard record - Technical Standard Record (TSR) - IC 008
- Table of contents - TOC - IC 009
- Product cross-reference table - Product Cross-reference Table (PCT) - IC 00P
- Conditions cross-reference table - Conditions Cross-reference Table (CCT) - IC 00Q
- Applicability cross-reference table- Applicability Cross-reference Table (ACT) - IC 00W

Examples of:

- List of abbreviations - List of Abbreviations (LOA) - IC 005
- List of terms - List of Terms (LOT) - IC 006
- List of symbols - List of Symbols (LOS) - IC 007
- List of applicable specifications and documentation - List of Applicable Specifications and Documentation (LOASD) - IC 00V (or IC 017) are given in Chap 5.2.1.18.

The following front matter data modules, for a given publication, can be auto generated with the publication module as base. The publication module and all data modules being included in the publication contain all necessary data:

- List of effective pages
- List of effective data modules
- Change record - CR
- Highlights - HIGH
- Table of contents

If properly marked up in the data modules the following front matter data modules can be auto generated:

- List of abbreviations
- List of terms

Title pages, Technical standard record, List of symbols and List of applicable specifications and documentation have to be authored.

# 2 Rules and examples

## 2.1 General

The front matter data modules must use the layout given in Chap 6.2.1 and Chap 6.2.2 with the following significant rules:

- Only element <infoName> must be presented as the title. Thus the element <infoName> takes the place (centerhead No. 1) of element <techName> in the layout.
- Standard introductory and explanatory text paragraphs and lists are presented, eg after the title and in front of the tables. These standardized paragraphs and lists are given below for each of the front matter types.
- Issue number and issue date included in the standard introductory text are derived from identification and status section of the data module.
- The standardized tables given for each front matter type must be used.
- Table of contents, List of tables or List of figures of the front matter itself must not be presented.
- The standardized Reference table must not be presented
- No table title lines are used.

For further details on each type of front matter, see below. Refer to Chap 3.9.4.

### 2.1.1 The front matter data modules, except PCT, CCT and ACT

The front matter data modules, except PCT, CCT and ACT, use the tagging for descriptive data modules.

### 2.1.2 The front matter data modules PCT, CCT and ACT

The front matter data module:

- PCT uses the tagging for the PCT Schema
- CCT uses the tagging for the CCT Schema
- ACT uses the tagging for the ACT Schema

## 2.2 Title page

Each of these objects must be presented left justified to the left image limit.

The layout rules are given in Fig 1.

The first line of each of the following object starts on fixed distances from the top of the page.

- Product/Project/Country (M). This information is to be agreed between publication producer and the customer.
- Publication/Volume title (M). Content derived from element <pmTitle>
- Publication module code (M). Content derived from element <pmCode>
- Issue number (M). Content derived from attribute issueInfo

The following objects must be presented at the lower part of the title page. Starting with manufacturer's information at the very bottom, these objects expand as necessary.

- Manufacturer’s information (M)
- Publishing authority (M)
- Data restrictions (C). Content derived from element <dataRestrictions>
- Project’s or authority’s logotype (O)

An example of a Title page is given as Fig 2.

Security classification S1000DBIKE-G9899-AMP00-16

**Mountain bike** *(O) Product/Project/Country (18 pt, bold)*

# Advance maintenance publication - Pedals - Volume 16 *(M) Publication/Volume title (24 pt, bold)*

**S1000DBIKE-G9899-AMP00-16** *(M) Publication module code (14 pt, bold)*

**Issue No. 064** *(M) Issue number (14 pt, bold)*

*Project's or authority's logotype (O)*

*Note: Project's logotype, Data restrictions, Publishing authority and Manufacturer's information "expands" from the bottom of the page.*

*Data restrictions (C) (8 pt)*

*Publishing authority (M)*

Manufacturer:

*Manufacturer's information (M)*

Applicable to: All S1000DBIKE-AAA-DA2-20-0000-00A-001A-A

End of data module

Security classification 2006-10-02 Page 1

ICN-AE-060203 -G-S3627-00418-A-02-1

*Fig 1 Layout - Title page*

NATO/Unclassified J3-ZXXXX-AMP02-00

GRIPEN SOUTH AFRICA

Gripen 39 C/D South Africa

# Aircraft maintenance publication - Maintenance plan

**J3-ZXXXX-AMP02-00**

**Issue No. 003**

PER ASPERA AD ASTRA

**SOUTH AFRICAN AIR FORCE**

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NSN: 7610-18-179-4792
Publication No.: J3-ZXXXX-AMP02-00 Issue 003

Manufacturer:

SAAB TECHNOLOGIES SAAB

Saab Aerotech
Aircraft Services
SE-581 88 Linköping - Sweden

Applicable to: All J3-A-02-00-00-00A-001A-A

**End of data module**

NATO/Unclassified 2004-11-14 Page 1

ICN-AE-A-060203-G-S3627-00425-A-02-1

*Fig 2 Layout - Title page - Example*

## 2.3 List of effective pages

The rules given in Para 2 must be used.

An example of a List of effective pages page is presented as Fig 3 which also includes the standard introductory and explanatory text paragraphs.

## 2.4 List of effective data modules

The rules given in Para 2 must be used.

Number of pages is only given when used for page-oriented distribution.

An example of a List of effective data modules page is presented as Fig 4 which also includes the standard introductory and explanatory text paragraphs.

## 2.5 Change record

The rules given in Para 2 must be used.

An example of a Change record page is presented as Fig 5 which also includes the standard introductory and explanatory text paragraphs.

## 2.6 Highlights

The rules given in Para 2 must be used.

The issue number of the publication must be presented as a centerhead No. 2.

An example of a Highlight page is presented as Fig 6.

A variant of a highlight data module is an "extended" highlight data module for paper publications which includes the procedure for updating of the publication. Refer to Fig 7.

The project or organization must decide on which variant to be used.

The examples include the standard introductory and explanatory text paragraphs.

NATO/Unclassified J3-S3627-AMP00-00

## List of effective pages

This publication includes the following pages after insertion of issue 003, dated 2004-11-14.

C = Changed page

N = New page

| Data module code | Page | | Issue date | Applicable to |
|---|---|---|---|---|
| J3-A-00-00-00-00A-001A-A | 1 | C | 2004-11-14 | All |
| J3-A-00-00-00-00A-00RA-A | 1 | C | 2004-11-14 | All |
| | 2 | C | 2004-11-14 | All |
| | 3 | C | 2004-11-14 | All |
| J3-A-00-00-00-00A-00TA-A | 1 | | 2002-11-01 | All |
| J3-A-00-00-00-00A-00UA-A | 1 | C | 2004-11-14 | All |
| J3-A-01-00-01-00A-040A-A | 1 | | 2003-11-01 | 39A |
| | 2 | | 2003-11-01 | 39A |
| | 3 | | 2003-11-01 | 39A |
| | 4 | | 2003-11-01 | 39A |
| | 5 | | 2003-11-01 | 39A |
| J3-A-01-00-01-00A-040B-A | 1 | | 2003-11-01 | 39B |
| | 2 | | 2003-11-01 | 39B |
| | 3 | | 2003-11-01 | 39B |
| | 4 | | 2003-11-01 | 39B |
| | 5 | | 2003-11-01 | 39B |
| | 6 | | 2003-11-01 | 39B |
| | 7 | | 2003-11-01 | 39B |
| J3-A-01-20-01-02A-040A-A | 1 | C | 2004-11-14 | All |
| | 2 | C | 2004-11-14 | All |
| | 3 | C | 2004-11-14 | All |
| | 4 | C | 2004-11-14 | All |
| | 5 | C | 2004-11-14 | All |
| | 6 | C | 2004-11-14 | All |
| | 7 | C | 2004-11-14 | All |
| | 8 | C | 2004-11-14 | All |

Applicable to: All J3-A-00-00-00-00A-00RA-A

End of data module

NATO/Unclassified 2004-11-14 Page 1

ICN-AE-A-060203-G-S3627-00426-A-02-1

*Fig 3 Layout - List of effective pages - Example*

NATO/Unclassified J3-S3627-AMP00-00

## List of effective data modules

The listed documents are included in issue 003, dated 2004-11-14, of this publication.

C = Changed data module

N = New data module

| Document title | Data module code | | Issue date | No. of pages | Applicable to |
|---|---|---|---|---|---|
| Title page | J3-A-00-00-00-00A-001A-A | C | 2004-11-14 | 1 | All |
| List of effective data modules | J3-A-00-00-00-00A-00SA-A | C | 2004-11-14 | 1 | All |
| Change record | J3-A-00-00-00-00A-00TA-A | | 2002-11-01 | 1 | All |
| Highlights | J3-A-00-00-00-00A-00UA-A | C | 2004-11-14 | 1 | All |
| Techname - Description of how it is made and its function | J3-A-01-00-01-00A-040A-A | | 2003-11-01 | 5 | 39A |
| Techname - Description of how it is made and its function | J3-A-01-00-01-00A-040B-A | | 2003-11-01 | 7 | 39B |
| Techname - Description of how it is made and its function | J3-A-01-20-01-02A-040A-A | C | 2004-11-14 | 8 | All |
| Techname - Description of how it is made and its function | J3-A-01-30-01-00A-040A-A | | 2003-11-01 | 3 | 39A |
| Techname - Description of how it is made and its function | J3-A-01-30-01-00A-040C-A | | 2003-11-01 | 3 | 39B |
| Techname - Description of how it is made and its function | J3-A-01-40-01-04A-040A-A | N | 2004-11-14 | 6 | All |

Applicable to: All J3-A-00-00-00-00A-00SA-A

End of data module

NATO/Unclassified 2004-11-14 Page 1

ICN-AE-A-060203-G-S3627-00427-A-02-1

*Fig 4 Layout - List of effective data modules - Example*

NATO/Unclassified J3-S3627-AMP00-00

## Change record

Make sure that the previous revisions have been incorporated.

Incorporated revisions must be recorded with the date of incorporation and a signature.

| Issue | Incorporated date | by (signature) | Issue | Incorporated date | by (signature) |
|---|---|---|---|---|---|
| 001 | 2002-11-01 | Initial issue | 026 | | |
| 002 | 2003-11-16 | D_Racula | 027 | | |
| 003 | | | 028 | | |
| 004 | | | 029 | | |
| 005 | | | 030 | | |
| 006 | | | 031 | | |
| 007 | | | 032 | | |
| 008 | | | 033 | | |
| 009 | | | 034 | | |
| 010 | | | 035 | | |
| 011 | | | 036 | | |
| 012 | | | 037 | | |
| 013 | | | 038 | | |
| 014 | | | 039 | | |
| 015 | | | 040 | | |
| 016 | | | 041 | | |
| 017 | | | 042 | | |
| 018 | | | 043 | | |
| 019 | | | 044 | | |
| 020 | | | 045 | | |
| 021 | | | 046 | | |
| 022 | | | 047 | | |
| 023 | | | 048 | | |
| 024 | | | 049 | | |
| 025 | | | 050 | | |

Applicable to: All J3-A-00-00-00-00A-00TA-A

End of data module

NATO/Unclassified 2002-11-01 Page 1

ICN-AE-A-060203-G-S3627-00428-A-02-1

*Fig 5 Layout - Change record - Example*

NATO/Unclassified J3-S3627-AMP00-00

## Highlights

### *Issue 003*

The listed changes are introduced in issue 003, dated 2004-11-14, of this publication.

| Data module | Reason for change |
|---|---|
| J3-A-01-20-01-02A-040A-A | New warning in Preliminary requirements. Tail number 457 included. |
| J3-A-01-40-01-02A-040A-A | New description. |

Applicable to: All J3-A-00-00-00-00A-00UA-A

**End of data module**

NATO/Unclassified 2004-11-14 Page 1

ICN-AE-A-060203-G-S3627-00429-A-02-1

*Fig 6 Layout - Highlights - Example*

NATO/Unclassified J3-S3627-AMP00-00

## Highlights

### *Issue 003*

The listed changes are introduced in issue 003, dated 2004-11-14, of this publication.

| Data module | Reason for change |
|---|---|
| J3-A-01-20-01-02A-040A-A | New warning in Preliminary requirements. Tail number 457 included. |
| J3-A-01-40-01-02A-040A-A | New description. |

## 1 Updating procedure

Remove or insert data modules as listed in Table 1.

I = Insert data module

R = Remove data module

*Table 1 Data modules to be removed or inserted*

| Data module | Title | | Issue date | No. of pages | Applicable to |
|---|---|---|---|---|---|
| J3-A-00-00-00-00A-001A-A | Title page | R | 2003-11-01 | 1 | All |
| | | I | 2004-11-14 | 1 | All |
| J3-A-00-00-00-00A-00SA-A | List of effective data modules | R | 2003-11-01 | 1 | All |
| | | I | 2004-11-14 | 1 | All |
| J3-A-00-00-00-00A-00UA-A | Highlights | R | 2003-11-01 | 1 | All |
| | | I | 2004-11-14 | 1 | All |
| J3-A-01-20-01-02A-040A-A | Techname - Description of how it is made and its function | R | 2003-11-01 | 8 | All |
| | Techname - Description of how it is made and its function | I | 2004-11-14 | 7 | All |
| J3-A-01-30-02-00A-040A-A | Techname - Description of how it is made and its function | R | 2003-11-01 | 3 | 39A |
| J3-A-01-30-02-00A-040A-A | Techname - Description of how it is made and its function | R | 2003-11-01 | 3 | 39B |
| J3-A-01-30-03-02A-040A-A | Techname - Description of how it is made and its function | R | 2002-11-16 | 6 | All |
| J3-A-01-40-01-02A-040A-A | Techname - Description of how it is made and its function | I | 2004-11-14 | 6 | All |

Applicable to: All J3-A-00-00-00-00A-00UA-A

**End of data module**

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*Fig 7 Layout - Highlights with updating procedure - Example*

## 2.7 Technical standard record

The rules given in Para 2 must be used.

An example of a Technical standard record page is presented as Fig 8 which also includes the standard introductory and explanatory text paragraph.

## 2.8 Table of contents

The rules given in Para 2 must be used.

An example of a Table of contents page is presented as Fig 9 which also includes the standard introductory and explanatory text paragraph.

NATO/Unclassified E1-P2233-AMP29-00

## Technical standard record

The following record confirms that this publication incorporates all technical changes necessitated by the following modifications listed below.

| | |
|---|---|
| Mod No. | ESA 65 |
| | ESA70 |
| | ESA3690 |
| | ESA7174 |
| | DT28 |
| | DT30 |
| | PA562 |
| | PA569 |
| | SE132 |
| | TR20 |
| | TR22 |
| | TR23 |
| | TR25 |
| Service bulletin | E1-A-29-21-00-05B-930A-A |
| | E1-A-29-21-00-06A-930A-A |
| | E1-A-29-22-00-11A-930A-A |
| | E1-A-29-23-00-05C-930A-A |

Applicable to: All E1-A-29-00-00-00A-008A-A

**End of data module**

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*Fig 8 Layout - Technical standards record - Example*

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## Table of contents

The listed documents are included in issue 003, dated 2004-11-14, of this publication.

| Document title | Data module code | Issue date | No. of pages | Applicable to |
|---|---|---|---|---|
| Highlights | J3-A-00-00-00-00A-003A-A | 2004-11-14 | 1 | All |
| Techname - Description of how it is made and its function | J3-A-01-00-01-00A-040A-A | 2003-11-01 | 5 | 39A |
| Techname - Description of how it is made and its function | J3-A-01-00-01-00A-040B-A | 2003-11-01 | 7 | 39B |
| Techname - Description of how it is made and its function | J3-A-01-20-01-02A-040A-A | 2004-11-14 | 8 | All |
| Techname - Description of how it is made and its function | J3-A-01-30-01-00A-040A-A | 2003-11-01 | 3 | 39A |
| Techname - Description of how it is made and its function | J3-A-01-30-01-00A-040C-A | 2003-11-01 | 3 | 39B |
| Techname - Description of how it is made and its function | J3-A-01-40-01-04A-040A-A | 2004-11-14 | 6 | All |

Applicable to: All J3-A-00-00-00-00A-009A-A

End of data module

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*Fig 9 Layout - Table of contents - Example*

## 2.9 Product cross-reference table

The product cross-reference table uses the tagging from the PCT Schema. The data presented is derived from the PCT data module. Further details are To be Determined (TBD).

## 2.10 Conditions cross-reference table

The conditions cross-reference table uses the tagging from the CCT Schema. The data presented is derived from the CCT data module. Further details are TBD.

## 2.11 Applicability cross-reference table

The applicability cross-reference table uses the tagging from the ACT Schema. The data presented is derived from the ACT data module. Further details are TBD.

# Chapter 6.2.3.2

## *Layout - Description - Rules and examples*

## Table of contents

**Page**

Layout - Description - Rules and examples ..... 1
References ..... 1
1 General ..... 1
2 Rules and examples ..... 1

## List of tables

1 References ..... 1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |

## 1 General

This chapter gives the rules for S1000D standard page-oriented presentation of descriptive data modules using the layout elements given in Chap 6.2.2. It is used to build for example, XML Style Sheets in an XML environment. If a traditional authoring environment is used, it must be used as the input for setting up the authoring application.

## 2 Rules and examples

Rules for S1000D standard presentation of descriptive data modules accompanied by example data modules will be included in the next issue of S1000D.

**Note**

The presentation rules given in Issue 3.0 still apply.

# Chapter 6.2.3.3

## *Layout - Procedural data modules - Rules and examples*

## Table of contents

**Page**

Layout - Procedural data modules - Rules and examples ..... 1
References ..... 1
1 General ..... 1
2 Rules and examples ..... 1

## List of tables

1 References ..... 1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |

## 1 General

This chapter gives the rules for S1000D standard page-oriented presentation of procedural data modules using the layout elements given in Chap 6.2.2. It is used to build for example, XML Style Sheets in an XML environment. If a traditional authoring environment is used, it must be used as the input for setting up the authoring application.

## 2 Rules and examples

Rules for S1000D standard presentation of procedural data modules accompanied by example data modules will be included in the next issue of S1000D.

**Note**

The presentation rules given in Issue 3.0 still apply.

# Chapter 6.2.3.4

## *Layout - Fault information data modules - Rules and examples*

## Table of contents

**Page**

Layout - Fault information data modules - Rules and examples....1
References....1
1 General....1
2 Rules and examples....1

## List of tables

1 References....1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |

## 1 General

This chapter gives the rules for S1000D standard page-oriented presentation of fault information modules using the layout elements given in Chap 6.2.2. It is used to build for example, XML Style Sheets in an XML environment. If a traditional authoring environment is used, it must be used as the input for setting up the authoring application.

## 2 Rules and examples

Rules for S1000D standard presentation of fault information data modules accompanied by example data modules will be included in the next issue of S1000D.

**Note**

The presentation rules given in Issue 3.0 still apply.

# Chapter 6.2.3.5

## *Layout - IPD publication - Examples*

## Table of contents

**Page**

Layout - IPD publication - Examples ..... 1
References ..... 1
1 General ..... 1

## List of tables

1 References ..... 1

## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

This chapter will include examples of IPD data modules. It will be available in a coming issue.

# Chapter 6.3

## *Information presentation/use - Interactive electronic technical publications*

## Table of contents

**Page**

Information presentation/use - Interactive electronic technical publications.....1
References.....1
1 General.....1

## List of tables

1 References.....1

## *References*

*Table 1 References*

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|---|---|
| Chap 6.3.1 | IETP - Output specification |
| Chap 6.4 | Information presentation/use - Functionality |
| Chap 7.4 | Information processing - Generation of publications |

## 1 General

An IETP is built up of front matter and several documents all stored as data modules in the CSDB. The detailed specifications for the generation of IETP are given in Chap 7.4.

- Chap 6.3.1 provides rules and guidance for look and feel, and printed output from an IETP. It is not meant to be a design document.
- Chap 6.4 is to be used in conjunction with this chapter to give guidance on functionality.

# Chapter 6.3.1

## *IETP - Output specification*

## Table of contents

Page


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2 Layout and styles ....3
2.1 Screen sizes ....3
2.2 Stylesheets ....3
2.3 Screen layout ....3
2.3.1 Outer shell ....3
2.3.2 Title bar ....3
2.3.3 Inner shell ....3
2.3.4 Table of contents panel ....4
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*Table 1 References*

| Chap No./Document No. | Title |
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| Chap 3.9.2 | Authoring - Illustration rules and multimedia |
| Chap 3.9.3 | Authoring - Warnings, cautions and notes |
| Chap 3.9.5.2.1.1 | Common constructs - Change marking |
| Chap 3.9.5.2.1.6 | Common constructs - Tables |
| Chap 3.9.5.2.3 | Content section - Procedural information |
| Chap 3.9.5.2.4 | Content section - Fault information |
| Chap 3.9.5.2.6 | Content section - Crew/Operator information |
| Chap 4.6 | Information management - Comment |
| Chap 6.2 | Information presentation/use - Page-oriented publications |
| Chap 6.2.2 | Page-oriented publications - Typography - Layout elements |
| Chap 6.4.1 | Functionality - Background and explanation |

# 1 General

This chapter provides guidance for look and feel and printed output from an IETP. Where specific guidance for elements is not provided in this chapter, the guidance in Chap 6.2.2 must be applied as closely as possible allowing for differences in font and spacing.

Each project is to decide which elements of this chapter are to be mandated or be developed for the specific equipment and end-user requirements. The functionality matrix in Chap 6.4.1 is to be used in conjunction with this chapter to build the project requirement.

# 2 Layout and styles

## 2.1 Screen sizes

Proper planning for the size and resolutions of various devices up front in the planning stages is important as the presentation technology is always undergoing change (eg terminals, desktops, laptops, personal digital assistance devices).

## 2.2 Stylesheets

Stylesheets are necessary to transform the XML data modules into a format that is capable of being interpreted and presented in an IETP.

## 2.3 Screen layout

The screen can have an outer shell, title bar and an inner shell as described in this section. Refer to Fig 1.

### 2.3.1 Outer shell

The outer shell is the application/browser window and is the portion of the screen that surrounds the title bar and inner shell.

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*Fig 1 Application screen layout*

### 2.3.2 Title bar

A horizontal title bar must appear at the top of the outer shell. The title bar can include the name of the application and can also include security classification markings, the data module code and the title of the data module currently being viewed.

### 2.3.3 Inner shell

The inner shell is the portion of the IETP that provides the primary display area.

#### 2.3.3.1 Inner shell layout

The inner shell must contain, as a minimum, the Table of Contents (TOC) panel, Navigation panel and the Main content area as illustrated in Fig 2. Optionally it can include a Reset area.

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*Fig 2 Inner shell components*

### 2.3.4 Table of contents panel

The table of contents panel, located to the left of the main content area, is where the navigation interactions must appear. Refer to Fig 2. This panel can include:

- A table or list of all key entry points, eg publication and data modules, must be made available for user access. This can be provided by a hierarchical breakdown of
  - the publication set to publications
  - the publications to data modules by eg the SNS structure
- The Highlights data modules must be included here to give the user information about the status and reason for change of the updated publications and data modules.
- Other navigation, eg
  - List Of Tables
  - List Of Figures

These can be implemented by graphical interfaces.

This panel must be resizable and can be toggled on and off.

### 2.3.5 Reset area

The reset area allows a user to return the IETP view back to its default settings. The reset area also provides a special mechanism for navigation and preferences. Items in this area are provided using a function menu. For example, the reset area can provide a menu allowing the user to navigate the IETP in different ways, such as, by part number, list of graphics, revision summary, etc. The reset area can be toggled on and off but must always be accessible. If toggled off, the reset area must be easy to find by the user. This could be achieved via an icon such as a compass rose or by a right click menu. Clicking on this area can provide a function menu.

The reset area also provides a means for selecting your preferences. The reset area menu could include selections allowing the user to toggle screen areas on and off. An example of a screen area that can be toggled on and off, is the additional information bar. It is recommended

that a menu item be grayed out if the user is not permitted to toggle that particular screen area off.

## 2.4 Navigation panel

The navigation panel is comprised of multiple bars in the following sequence:

1 Sub title bar (O)

2 Main menu bar (M)

3 Additional information bar (O)

The navigation panel can appear either above or below the main content area. The position of the navigation panel must, as far as possible, remain consistent throughout the application.

### 2.4.1 Subtitle bar

The subtitle bar can be used for additional information, from the identification and status sections such as modification state or classification, when it has not been presented in the title bar.

### 2.4.2 Main menu bar

The main menu bar consists of a basic set of functions. If required by the project, these functions (or any combination of them) can be mandated. There are three ways to present the standard functions:

- Text based: The function is given a text label
- Graphic based: The function is represented by an icon
- Text and graphic: A combination of an icon and text is used

The main menu bar can contain the functions as illustrated in Fig 3.

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*Fig 3 Example navigation panel*

When used, icons must be developed to be representative of the function that they perform. Their meaning must be apparent with little confusion in the mind of the user. Icons are not mandated because the end-user and operating environment have to be considered before deciding upon the final set. These relate to the basic functions previously described in this chapter with some additional icons for further expansion of the application.

Cascading menus can appear as a child of a function when selected. In a drop-down menu, this appears next to the function selected. There can be several levels of cascading menus.

Functions that are not active during any rendering must be presented as disabled. The bar must remain accessible.

#### 2.4.2.1 Previous

This navigates the user through the data in a sequential manner backward.

2.4.2.2 Next
This navigates the user through the data in a sequential manner forward.

2.4.2.3 Table of contents
A function that toggles the TOC panel on and off. Refer to Para 2.3.4.

2.4.2.4 History
A navigational function that displays previously viewed data in a sequential manner, eg data module visited.

2.4.2.5 Search
A function that displays a search dialog box.

2.4.2.6 Print
A function that allows data to be printed, eg by use of a print dialog box. By decision, if information is classified the print function can be disabled and the print button grayed out.

2.4.2.7 Feedback
A function that allows feedback to be gained from the user either on an individual data module, publication or a complete publication set. This can be done by eg use of the Comment Schema. Refer to Chap 4.6.

2.4.2.8 Exit
A function that allows exit from the IETP, where appropriate, the following modes can be available:

- Complete, exits the application
- Suspend, suspends the session for the user

2.4.2.9 Help
A function that displays a help file. The help can contain viewer usage information.

2.4.2.10 IDSTATUS
A function that shows part or the whole of the identification and status section of the data module or publication.

2.4.2.11 Business rules decisions
Business rules decisions include, but are not limited to, the following:

- which, if any, of the basic set of main menu bar functions to mandate
- whether or not to allow the printing of classified data.

**2.4.3 Additional information bar**
The additional information bar can be used if additional functions are required, eg ordering of spares. It is presented below the main menu bar and must include the functionality to be toggled on and off.

2.4.3.1 Business rules decisions
Business rules decisions include, but are not limited to, the following:

- use of the additional information bar.

**2.4.4 Main content area**
The main content area contains the technical content, text and graphics of the IETP, this area must not be divided into more than three panes.

### 2.4.5 Screen "stacking"

Screen "stacking", that is the use of multiple windows, must be avoided to aid end-user clarity.

## 2.5 Style and format

### 2.5.1 General

Unless otherwise stated in this chapter, style and format must conform to the general principles defined in Chap 6.2.

### 2.5.2 Use of colors

Consideration must be given for capabilities of intended display devices. It is recommended to design for the least capable display device (8-bit, monochrome devices, etc). The use of color must be controlled by human factors studies or usability testing. The operational environment and equipment in use must dictate some rules regarding the colors used. There can be operational considerations such as night ops, red-light conditions and where color has special meaning. Any colors that are used must comply with the rules in Chap 3.9.2.

The recommended color scheme for standard text display must be black on a white background.

### 2.5.3 Typefaces

#### 2.5.3.1 Standard typefaces

When deciding upon typeface and size, consideration must be given to the information detailed in Chap 6.2. The use of font size must be adequate for the user to be able to read the technical content. Attention must be paid to the display device and working environment.

## 2.6 Dialog box

A dialog box is used to obtain information from the user and provide feedback to the user. When possible, it must appear in the screen center. The dialog box appearance must be consistent throughout the IETP.

A dialog box can contain controls. A user interacts with the dialog box through named controls. Typical controls are:

- Text input box
- Push button
- Checkbox
- Radio button
- Selection box

Controls can have tool tips. Tool tips display further information about the purpose of the control. A tool tip appears when the user hovers over the control with the mouse pointer. Refer to Fig 4 for an example dialog box which contains various named controls types and a tool tip.

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*Fig 4 Example dialog box*

### 2.6.1 Text input box

A text input box allows the end-user the ability to provide information to the application in the form of free text and/or numerical values.

Wherever possible, the data input field prompt must be placed on the same line as the data entry area. Formatting for prompts must be distinctive. Prompts must be placed in close proximity to their respective data entry area.

When required, an acceptable value criteria must be provided through the element <`validate`> expression on the element <`userEntry`> expression. The acceptable values specified by the <`validate`> expression must be displayed in close proximity to the text input box, such as appended to the prompt or directly below the text input box. As a minimum, if the user enters a value outside of the acceptable values criteria <`validate`> expression, a message must be displayed to the user identifying the acceptable values. Upon acknowledging the message, the text input box must be displayed to give the user another chance to enter a valid value.

### 2.6.2 Push button

The push button executes a function. Examples of push buttons are "OK", "Calculator" (executes a calculator program), "Figure" (displays associated graphic), and "IDSTATUS" shows identification and status information. A dialog box has four pre-defined push button functions and must be displayed in the following order centered along the dialog box bottom.

- Submit (M)
- Cancel/Abort (M)
- Reset (O)
- Help (O)
- Generic (O)

2.6.2.1 Submit
The submit push button is used to submit the data in the dialog box to the IETP, closes the dialog box, and performs the next action. Submit push buttons can have several different text labels. Examples of submit push buttons are "OK" (where the user enters the prompted data before submitting to the logic engine), "Search" (where the user enters search criteria before submitting to the search engine), and "Comment" (where the user enters comments on the dialog box before submitting to the comments service).

2.6.2.2 Cancel
The cancel push button is used to void information entered, to void executing the function, or to close the dialog box, and return control to the prescribed action as identified for the function.

2.6.2.3 Reset
The reset push button, when activated, is used to reset controls on the dialog box to there default values. An example of a reset push button is to "Clear" the contents of a search dialog box ready for a new search.

2.6.2.4 Help
The help push button, when activated, is used to provide further information about the dialog box.

2.6.2.5 Generic
A generic push button(s), when activated, executes a defined function. A generic push button(s) must not close the dialog box or display along the dialog box bottom. An example of a generic push button is to execute a calculator to help compute an answer for the dialog box.

### 2.6.3 Checkboxes
Checkboxes provide "On/Off" toggle switches. A switch is "On" when the box is checked. It is possible to have none or several checkboxes with the same control name thus allowing users to select several values for the same property. An example of a checkbox function in an IETP is selecting applicability values for an applicability filter.

### 2.6.4 Radio buttons
Radio buttons are similar to checkboxes except that where a group of radio buttons exist, only one of the options can be selected. At all times, exactly one radio button in a group is set to "checked".

Radio buttons can be used to implement a Yes-No dialog box. Two radio buttons are labeled with "Yes" and "No" respectively, and a submit button (eg "Submit" or "OK") is used to submit the response to the IETP.

### 2.6.5 Selection boxes
Selection boxes are used when the user is required to select a value from a scrollable list box. Selection boxes can be set so that a user can pick only various options.

## 2.7 Lists
Lists must conform to the general requirements as identified in Chap 6.2 with the exception when those specific measurements for indentation and spacing can not apply.

## 2.8 Steps
### 2.8.1 Procedural steps
It is preferred that procedural steps and their corresponding illustrations be presented together. When this is not feasible or it affects the user’s perception of the screen layout (such as a scrolling screen or "cluttering" when using a small screen) the illustration or inline an icon can be placed inline to allow the display of the illustration. Steps must be presented such that the order cannot be misunderstood.

Screen stacking (eg several open windows) to present multiple steps is not permitted.

### 2.8.2 Keep with next

Procedural, fault isolation, and crew steps with the attribute `keepWithNext` set to "1" should be presented with the next sibling step (if one exists) and therefore, all children of the step for which the attribute is set should be kept together as well (if possible). Refer to Chap 3.9.5.2.3, Chap 3.9.5.2.4, and Chap 3.9.5.2.6.

## 2.9 Tables

Tables can appear within the body (inline) of the IETP or in their own separate window (pop-up). When pop-up tables are used an icon must identify the table. The icon serves as a push button to open up a table pane.

Table titles must conform to the guidance provided in Chap 6.2.2.

Typefaces must be the same as the rest of the data module. Presentation of tables must follow the principles given in Chap 6.2.2.

### 2.9.1 Headers and footers

The header must always be visible so that it does not scroll away while rows are scrolled. Where appropriate the footer can remain visible so that it does not scroll away while rows are scrolled.

#### 2.9.1.1 Table footnotes

Table footnotes marker, presented either in superscripted format (superscripted numbers are recommended, refer to Chap 3.9.5.2.1.6), in parentheses following the item, or by any other means, must have a link to the related footnote presented in the table footer or display a pop-up when the mouse "hovers" over the footnote marker in the table cell.

The basic rules for table footnotes given in Chap 3.9.5.2.1.6 apply.

### 2.9.2 Background

It is preferred that the background be white. Where the table is long, it can be acceptable to change the background colors of alternate rows to aid readability.

### 2.9.3 Links to table cells

Only the referencing text within a table cell must be hyperlinked. Do not link the entire cell. Reference to a table cell or row must scroll directly to the referenced cell or row. This type of reference will not be presented in a printed output.

## 2.10 Hyperlinks

### 2.10.1 Hyperlink presentation

Standard web practices must be followed to indicate the presence of hyperlinks. Blue underlined text must be used to indicate unvisited links and purple underlined text must be used to indicate visited links.

### 2.10.2 Graphic links (hotspots)

The following are the four acceptable modes of visual indication of hotspots in graphics:

- Persistent visual indication that an area is hot
- Cursor changes shape or color when cursor is over the hotspot area
- Object changes shape or color when cursor is over the hotspot area
- Pop-up appears while cursor is over the hotspot area (eg IPD callout expands)

## 2.11 Warnings and cautions

Warnings and cautions must be presented inline either by the complete warning or caution or by an icon. When icons are used the warning or caution must pop-up when the icon is pushed.

The presentation of warnings and cautions must conform to the general requirements as identified in Chap 6.2. Warnings and cautions and any associated icons must be displayed prominently in the main content area. They must be treated with particular formatting requirements to ensure the user's attention. Examples of a warning and a caution are given in Fig 5 and Fig 6 together with their respective icons.

**Note**

Projects must ensure commonality of presentation utilized.

The warning and caution, and associated symbols, or icons must be visible to the user whenever the warning or caution is applicable to the information (procedure, etc) is viewed.

Any warnings or cautions that are applicable to the complete data module (ie included and presented in safety conditions within preliminary requirements) must be displayed when a data module is opened. Refer to Chap 3.9.3.

### 2.11.1 Pop-up warnings and cautions

Pop-up warnings and cautions must appear in the centre of the user viewing area, to alert the user of a specific condition. A system can display all applicable pop-ups as stacked window frames. The user must be able to again see the pop-up after they are acknowledged by clicking on an applicable icon.

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*Fig 5 Example of a warning and a caution with acknowledge buttons*

For systems which allow minimized appearance of pop-up warnings and cautions (as opposed to those that are inline), an on-screen indication will appear and display an appropriate icon, refer to Fig 6.

ICN-AE-A-060301- A-USPM1-00006-A-01

*Fig 6 Example of warning and caution icons*

### 2.11.2 Safety icons and symbols

Hazardous material icons are optional. General rules for colors and shapes, reference must be made to Chap 3.9.2. The meaning of the hazardous material icon can pop-up by "hovering" the mouse over the icon.

## 2.12 Change markings

If change markings are presented for onscreen display, the change markings must clearly identify the changed content. A link to the highlights data module can be made available and the reason for change can be displayed as a tool tip when the cursor hovers over the changed content.

The IETP can have a function to show or hide changed content.

Changed content is best displayed in the IETP by use of a different color or highlight the changed information.

Refer to Chap 3.9.5.2.1.1 for additional information about change marking.

## 2.13 Acronyms and abbreviations

Any acronyms and abbreviations that are in the displayed data module can have a function that displays the meaning as a tool tip when the cursor hovers over the acronym or abbreviation.

## 2.14 Illustrations - Figures

Illustrations can appear within the body (inline) of the IETP or in their own separate window (pop-up). When pop-up illustrations are used an icon must identify the "hidden" illustration. The icon serves as a push button to open up an illustration pane.

Illustrations can be displayed using as much screen space as is available. The IETP presentation system must provide the user with the ability to view graphic objects with pan, zoom, expand, and magnify.

Figure titles must conform to the guidance provided in Chap 6.2.2.

If required, hovering over an area of a graphic can provide some means of descriptive data. For example, if used in an IPD graphic the information displayed can be that which is contained in the element <`descrForPart`> or in a wiring data graphic it can be some information related to the cable.

Right-mouse clicking can optionally display a menu of options to include related remove/replace/repair procedures, part ordering, training, etc.

## 2.15 Printed output from IETP

### 2.15.1 General

The IETP application is designed for the purpose of displaying data electronically. It must be discouraged for use as a publishing engine. However, if there is the requirement to print any data the following guidelines must be adhered to.

Consideration could be given to the printed output of partial data modules. This would require that any applicable caveats be printed. The function to provide a complete publication output is strongly discouraged.

When printing a data module from the IETP application, a header and footer must be printed on all pages that are output. The following information can be displayed on them:

- the data module code and its issue date
- the date and time of printing
- the security classification
- a caveat to state the information is only applicable at the time of printing and will not be subjected to amendment action and that is must be "destroyed after use"
- the page number, starting with "Page 1"
- the words "End of data module" on the last page

### 2.15.2 Printing process data module elements

Printing a process data module is a particularly challenging task due to the programmatic nature of the data. The goal is to present the process data module "program" in a human readable form such that a maintainer will interpret the precondition, preset, postset, alt, if, and loop constructs sufficiently to correctly guide him through the maintenance flow.

This paragraph will define the guidelines for printing. However, to produce a usable output, much thought must be given to the structure of the authored data. If paper is to be produced, then an authoring style guide must restrict some of the more complicated constructs and combinations of constructs. The authoring style guide for a project must be developed with the ability of the end user in mind to produce a usable product.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Main menu bar functions.** The project or organization must decide which, if any, of the basic set of main menu bar functions to mandate. Refer to Para 2.4.2.

**Printing of classified data.** The project or organization must decide whether or not to allow the printing of classified data. If not allowed, the print function must be disabled when classified data is presented in the IETP viewer. Refer to Para 2.4.2.6.

**Additional information bar.** The project or organization must decide on the use of the additional information bar. Refer to Para 2.4.3.

# Chapter 6.4

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## 1 General

This chapter describes the various levels of output functionality that is facilitated by producing information in accordance with this specification.

## 2 Content

This chapter has the following content:

- Chap 6.4.1 provides the background and explanation of the functionality matrix
- Chap 6.4.2 contains the functionality matrix. The matrices for page-oriented publications and IETP can be downloaded in digital form from www.s1000d.org
- Chap 6.4.3 explains the issues surrounding acquisition management

# Chapter 6.4.1

## *Functionality - Background and explanation*

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# 1 General

This chapter provides an explanation of the functionality matrix and defines standard terminology associated with its use.

# 2 Background and use of the functionality matrix

The matrix is intended to be used by acquisition professionals as an aid to define requirements for a project or organization. The matrix provides a standard format for documenting the functional needs of a technical data project. Also provided are standard definitions for each functionality, so that vendors and customers can clearly state their needs and capabilities.

The matrix includes functionalities both within and beyond the capabilities of the Schema. Certain functionalities listed are typically capabilities of viewers or data delivery mechanisms and are not explicitly described elsewhere in the standard. Cross references are provided in those instances when functionality is a capability of the standard.

Chap 6.4.2 contains a matrix intended to indicate possible capabilities for various types of technical data implementations. The matrix is to be used by a project and vendor to help identify project and organization requirements. The matrix includes functionalities both within and beyond the capabilities of the Schema.

An (MS™) Excel version of the matrix that can be used by project teams to capture requirements is available at www.s1000d.org.

## 2.1 Functionality categories

The matrix is divided into the following categories based on functionality type.

2.1.1.1 Functionality

The functionality column lists possible technical publications functionalities. The following summarizes the functional categories at a high level.

2.1.1.2 Access

These are the functionalities that allow or restrict users to view specific data.

2.1.1.3 Annotation

These are the functionalities that have to do with the user’s ability to add notations or other marks associated with the data. Bookmarks are a type of annotation.

2.1.1.4 Delivery and distribution

Delivery is the method of moving tech data from a contracted vendor to the contracted client and distribution is the method of moving tech data from an initial point to all the end users of the tech data. Selection of the desired media and method will drive costs; however, the most significant consideration is the readiness of the infrastructure at the user level for whatever method is chosen.

2.1.1.5 Diagnostics and prognostics

Diagnostics include procedures for identification of a fault that lead to a corrective action or maintenance procedure. Diagnostics span from basic standalone troubleshooting procedures to integration with the product and other maintenance systems. Prognostics include the capability

to predict system degradation or failure based on maintenance and operational data input and real time monitoring. Diagnostics/prognostics can be a significant benefit in reducing maintenance times and total ownership costs; however, they can also be a sizable cost driver in publications development.

2.1.1.6 External processes
The digital environment has the potential to provide greater functionality by interacting with external processes to retrieve and transmit information.

2.1.1.7 Graphics
Various levels of graphics display, interactivity and navigation can be implemented. Examples of these functionalities include.

- Point and click on a locator graphic for the purpose of navigating to graphic details
- Links to textual or tabular information
- Highlighting specific connections in a circuit
- System simulation expressed graphically

The more complex graphical functionalities often come at a premium for both cost and system hardware/software requirements.

2.1.1.8 Linking
Basic linking functionality is defined as essentially link access or connections to the data within the publication such as from the table of contents to the applicable section. Additional linkage such as cross-references can require some additional effort to maintain. Linking to data items externally can also be accomplished. These links can be to resources such as material handling information or for integration with other related information.

2.1.1.9 Navigation and tracking
Different navigation methods enable linear and non-linear access thru the data. Features such as "next" and "previous", search and the use of bookmarks are considered to be relatively fundamental and consistent with most Web-based data presentation techniques. Higher complexity navigation techniques include dialog driven interaction, voice activated commands and various filtering techniques. Examples of filtering characteristics are model number, identification number (eg tail number), modification performed and user qualifications.

Tracking provides the ability to allow recording and subsequent retrieval of electronic publications activity, as in an audit log.

2.1.1.10 Printing
Some publications by their nature are intended for use in an electronic environment, with print functionality limited primarily to task oriented and screen print output. By defining a hard copy output that more closely resembles a paper technical manual, the resulting costs and complexity rise.

2.1.1.11 Special content
The inclusion of additional data types such as audio, motion video, and animations are accommodated relatively easily by most presentation systems; however, content generation often cost more. Performance issues can also occur, which can have further cost implications.

2.1.1.12 Updates
There are a number of different update methodologies that affect life cycle costs and include revisions, changes, and urgent changes [Rapid Action Changes (RACs), etc]. These can include change markings or other change indications. Updates include any data delivery after the initial delivery.

2.1.1.13 User operation mode
These functionalities have to do with infrastructure and a user's ability to connect with the source of the data.

## 2.2 References

Wherever possible references are made in the functionality definitions to indicate related material located elsewhere in S1000D. When a reference is not possible, a notation is made to indicate that the functionality is viewer, infrastructure, or external software functionality that is not enabled as a direct application of S1000D.

## 2.3 Matrix columns

The horizontal axis contains the column headings: Functionality, Complexity - Page, Complexity - IETP, Requirement, All data sets, and a list of the S1000D information sets. Refer to Chap 5.2.

### 2.3.1 Complexity

There are two columns that indicate a relative measure of difficulty and probable higher cost associated with a particular functionality (the higher the complexity factor, the more difficult implementation and a more probable higher cost). In many cases the complexity level is different depending upon a page-oriented or IETP implementation. Separate columns are provided that indicate the complexities in these two implementations. The absence of a complexity factor indicates that the functionality is generally not available or desirable.

Page-oriented publications are presented in a linear or document oriented manner. The data author largely predefines the sequence of the data presentation. Page oriented publications can be designed for traditional printing or for electronic display. Electronically displayed page oriented publications are sometimes called Electronic Technical Publications (ETP).

IETP data is displayed in a non-linear fashion. There are high levels of interactivity between the data and the user. The sequence of presentation is dictated by inputs by the user or external sources and events. IETP implementations typically require the use of the process data module and a logic engine.

The complexity factors provided are intended to provide relative complexities (and relative costs) for implementing various functionalities. The complexity factors range between one and five, with one being the least complex, to implement and five being the most complex.

### 2.3.2 Requirement

The requirement column is to be used by the project team to indicate the need for a specific functionality. If desired, the acquisition agent can also use the requirement column (in the spreadsheet version of the matrix) to capture and coordinate notes reflecting the importance of the functionality to the project (ie must have, nice to have, do not want, etc) prior to making final requirements decisions. The spreadsheet version of the matrix provides a useable format for this purpose.

### 2.3.3 All information sets

The All information sets column is used to identify those functionalities that typically apply universally across all information sets. These functionalities are identified with an "A." These are in contrast to functionalities that can be applied to specific identified information sets. Refer to Chap 5.2.

### 2.3.4 Information sets

The remaining columns represent the information sets described in Chap 5.2. These columns are to be used by the project team to indicate, which data sets should include the specified functionality. The information sets provided in the matrix are consistent with those described in Chap 5.2, a project or organization can modify the matrix to match the information sets used in their actual project or organization.

## 2.4 Functionality definitions

The following tables provide descriptions of each of the functionalities identified in the matrix as well as some considerations to be made and the range of capabilities that can be addressed therein. These tables provide identification of the category, title of the functionality, a definition of the functionality and in many cases, an example.

### 2.4.1 Functionality definitions - Access

2.4.1.1 Login

This is the capability to identify a user for tracking, authorization or other purposes. This is an IETP viewer functionality. This functionality requires the inclusion of the Exit functionality.

Consideration must be given to determine if specific profiles, user IDs, roles and permissions will be required to permit usage. A password for log on is not necessary. It should be kept in mind, that if there is a higher-level infrastructure controlling access, it should be the controlling authority. Data access based on the training and skill of the maintainer can require that the system link into the maintainer's training records. In a standalone mode, the amount of data required on the standalone device is considerable and complex. Consideration must be given to the maintenance of this data in multiple locations.

2.4.1.2 Suspend and restart

This is the capability to suspend a session and provide the user with the ability to restart at the point of suspense. This functionality requires the inclusion of the Login functionality. This capability extends beyond a user session and retains session data. This is an IETP viewer functionality.

During the performance of a maintenance session, a part is removed. The replacement part is not available in supply. The session is suspended and subsequently restarted after the part becomes available.

2.4.1.3 Exit

Function to close the session. This is an IETP viewer functionality.

If suspend is used, the current state tables and position are maintained, otherwise all information concerning state tables and position is cleared.

### 2.4.2 Functionality definitions - Annotation

2.4.2.1 Action Complete Indicator (checkbox)

The functionality used to indicate the completion of an action. Refer to Chap 3.9.5.2.10 and Chap 6.3.1. This functionality is normally associated with, but not limited to use with, checklists. Other methods can be used (eg "sign off"). The data entered via the action complete indicator can be retained for state table or audit trail purposes depending on project and organization requirements.

2.4.2.2 Global data annotation

This functionality allows the entry, storage and display of globally applicable supplemental data. This is an IETP viewer functionality.

Globally accessible annotations should be limited in scope and required to be approved by the end user's QA process and be made available to the development contractor. Globally accessible annotation is a quality maintenance supplement indicating the new type of lubricant to use. Some users of data on CD-ROM might use these global data annotations to provide updates to data by quickly revising the CD-ROM to contain the "sticky" notes.

2.4.2.3 Local data annotation

This functionality allows the entry, storage and display of locally applicable supplemental data. This is an IETP viewer functionality.

These annotations should be limited in scope and follow local approval process.

Example - The maintainer can be required to use additional filtering in a desert environment.

2.4.2.4 Personal annotation

This capability allows an individual user to add supplemental information to the data. This is an IETP viewer functionality. This functionality requires the inclusion of the Login functionality.

Personal annotation can be added or deleted at the end user's discretion and it is suggested that it is not retained at the end of the user session. It is not the intent that the personal annotation persists.

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*Fig 1 Personal annotations*

Example - "Noticed that the radome latch was bent on left side, remember to complete appropriate forms to notify radar shop."

2.4.2.5 Redlining text

Capability provided during the publication development and verification process to annotate text using markings for deletions and insertions. The capability exists to save and attribute redline markups. These are saved for feedback only for the improvement of the publication. This is an IETP viewer functionality.

2.4.2.6 Redlining graphics

Capability provided to annotate graphics using an overlay freehand-type drawing facility. This capability can be used to report errors during the publication development and verification process. The capability exists to save and attribute redline markups. These are saved for feedback only for the improvement of the publication. This is an IETP viewer functionality.

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*Fig 2 Redlining graphics*

**2.4.3 Functionality definitions - Delivery and distribution**

2.4.3.1 Printed publication

A paper publication compiled from data modules. Refer to Chap 4.9.1.

2.4.3.2 Physical media

The capability to deliver and/or distribute data on hard media such as CD-ROM, DVD, hard drive. This is an infrastructure functionality.

Such physical distribution methods typically entail issuance of a complete database thus replacing the data in use. This replacement constitutes a block change update and is generally performed on a periodic basis.

2.4.3.3 Network distribution

Distribution via the Internet (connections to the World Wide Web (www))/Intranet (internal to one network) and consists of direct transfer from one computing system to another. This is an infrastructure functionality.

Delivery could be via secure FTP, (HTTP) or other transfer protocols. Bandwidth, security and operational deployment considerations should be addressed. This could enable near real-time updates. (Ref to Para 2.4.11)

**2.4.4 Functionality definitions - Diagnostics and prognostics**

2.4.4.1 Diagnostics - User determined entry to data

Tasking for troubleshooting procedures is provided thru primarily textual references. "If statements" provide alternatives in a narrative form. This makes use of a predefined fault tree. The user determines starting point for maintenance action. Refer to Chap 3.9.5.2.4 and Chap 5.2.1.3.2, Chap 5.2.3.4 and Chap 7.7.

2.4.4.2 Diagnostics - Software driven entry to data

The appropriate maintenance action starting point is software determined thru use of an inference or logic engine. The user is provided with the appropriate starting point for fault isolation. Various inputs from personnel and system and multiple fault codes are analyzed. The analysis will determine if a relationship exists between these fault codes and information with the appropriate action as a result. This is an external software functionality. Refer to Chap 3.9.5.2.4, Chap 5.2.1.3.2, Chap 5.2.3.4 and Chap 7.7.

2.4.4.3 Dynamic diagnostics

This is diagnostic capabilities that use onboard monitoring devices (eg Built-In Test (BIT)) and/or support/test equipment to provide enhanced capability for fault detection and isolation. Dynamic diagnostics direct fault isolation and troubleshooting based on results returned from the product rather than inputs received from the maintainer. With this type of diagnostics, there are no predefined paths in the troubleshooting data and the paths are generally model-based. This is an external software functionality. Refer to Chap 3.9.5.2.4, Chap 5.2.1.3.2, Chap 5.2.3.4 and Chap 7.7.

2.4.4.4 Wire/Fluid system tracing

This is the capability to select wires, fluid, pneumatic or (HVAC) line in a diagram or schematic and have continuity highlighted thru the circuit or schematic. Refer to Chap 3.9.5.2.9 and Chap 5.2.1.4.

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*Fig 3 Wire tracing, switch up*

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*Fig 4 Wire tracing, switch down*

2.4.4.5 System simulation

This functionality includes the capability to represent the behavior or characteristics of the system function/malfunction to determine or reenact the problem. System simulation allows the user to introduce stimulus (such as pressure, valve positions, temperatures, voltages, sensor inputs, switch positions) and present the results in a manner that models the system behaviors. These capabilities can be used to model hydraulic, fuel, pneumatic and other systems. This is an external software functionality.

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*Fig 5 System simulation*

2.4.4.6 Prognostics

Prognostics are the prediction of component degradation or impending failure, which will allow maintenance personnel to replace components based on their actual condition. The goal is autonomic logistics, which uses electronic information collected from the Product system to determine, plan and perform preventive maintenance. This is an external software functionality. This functionality requires the inclusion of the retrieval, transmittal and maintenance data collection functionalities.

**2.4.5 Functionality definitions - External processes**

2.4.5.1 Transmittal

This is the ability to provide information from the data to external sources. This is an external software functionality. Refer to Chap 7.3.1.1, Chap 7.4.1.2, Chap 7.6.1 and Chap 7.7.1.

Examples -

- Parts ordering
- Maintenance management systems
- Training systems
- Dynamically update configuration data for systems
- Deficiency reporting
- Operator debriefing
- Flight performance module
- Resource scheduling

2.4.5.2 Retrieval

This is the ability to request and/or collect information from sources external to the data for purposes of enhancing the maintenance session. This is an external software functionality. Refer to Chap 7.3.1.1, Chap 7.4.1.2, Chap 7.6.1 and Chap 7.7.1.

Examples -

- Supporting technical manuals
- Supporting technical information
- Training data and media
- Engineering source data
- Parts availability
- Hazardous material handling information
- Wiring data

2.4.5.3 Parts ordering

This functionality enables parts ordering from within the IETP presentation and is integrated with the supply system. This is an external software functionality. This functionality requires inclusion of the transmittal functionality.

This functionality would not circumvent the supply system

2.4.5.4 Deficiency / improvement report transmittal

Provides a method for users to transmit errors and recommended changes to the data and/or equipment. This is an external software functionality. Refer to Chap 4.6. This functionality requires inclusion of the transmittal functionality.

The complexity of this will be determined by the level of integration with the deficiency reporting system and the type of reporting structure:

- Paper trail reporting

- Electronic reporting

2.4.5.5 Maintenance data collection

This functionality provides for the capability to capture and transmit configuration change data (ie removed and installed part number information), tasks authorized, tasks performed, results of that work, other observed problem, etc. This is an external software functionality. This functionality requires inclusion of the Transmittal functionality.

This update can feed an external data repository or maintenance application. The state table or audit trail can be used to accumulate information for maintenance data collection.

2.4.5.6 Operator debriefing

An interface with a system or the product itself, to identify and report observed behaviors of the product. This is an external software functionality. This functionality requires inclusion of the Transmittal functionality.

The actual debriefing activity can be carried out by a human operator or the product itself.

2.4.5.7 Resource scheduling

Interface with a system designed to assign tasks, personnel and materiel related to maintenance of the product. Refer to Chap 3.9.5.2.5, Chap 3.9.5.2.6 and Chap 5.2.1.6. This is an external software functionality. Refer to Chap 3.9.1, Chap 3.9.5.2.5, Chap 5.2.1.6, Chap 7.3.1.2 and Chap 7.3.1.4. This functionality requires inclusion of the transmittal and retrieval functionalities.

Resource scheduling can be coordinated among multiple human or software systems. These systems act against a set of constraints to minimize conflicts. Automatic resource scheduling is characteristic of a complex autonomic logistics system.

Example - An engine maintainer's planned maintenance activity can be modified from "test and repair" to "remove and replace" based on reliability data, mission availability requirements and spares availability data from a ship within range.

2.4.5.8 Knowledge management

This is an interface with a system that models an organization's knowledge assets and environment to enhance its ability to deliver on its mission. This is an external software functionality. This functionality requires inclusion of the transmittal and retrieval functionalities.

Knowledge management provides for information tracking, access and synthesis in coordination with organizational culture, values and guidance. Additionally, a knowledge management system can indicate changes to maintenance actions based on given conditions and lessons learned. For example: A particular system failure can be cause by one of three things, usually it is caused by an electrical failure. However, industry conditions, a clogged air filter is the most likely cause of failure. A knowledge management system will adjust the order of procedures accordingly, so that the air filter is checked first in a dusty environment.

Example - The technical maintenance data gathered thru audit logs can suggest that a restructuring of the logistics footprint is needed to maximize efficiency.

**2.4.6 Functionality definitions - Graphics functionality**

2.4.6.1 Pan, zoom, expand, rotate, magnify

Controls are provided to perform pan, zoom, expand, rotate and magnify on graphic components. This is an IETP viewer function. Additional functionality can include spyglass view, text search, graphics and window resizing. Refer to Chap 6.3.1 and Chap 7.3.2.

Consideration should be given to the quality or limitations of the source data.

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*Fig 6 Pan, zoom, expand, rotate, magnify*

Example - This depicts icons that might be used for the identified function. Refer to Chap 6.3.

2.4.6.2 Assembly/Disassembly

Graphical figures that can be used to allow virtual assembly, disassembly, removal and installation of parts of the system. These can be implemented thru linked drawings or thru manipulation of modeled vector graphics. Refer to Chap 3.8.

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*Fig 7 Assembly/Disassembly*

2.4.6.3 Locator graphics

Locator graphics show where a component is located relative to other components. Refer to Chap 5.2.2.5.

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*Fig 8 Locator graphic*

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*Fig 9 Locator graphic, detail*

2.4.6.4 3D modeling

This is a modeling of the system using 3D, solid object graphical figures. Refer to Chap 3.9.2.5.

3D models can allow virtual assembly, disassembly, removal and installation of parts of the system using animation, simulation and/or virtual reality concepts. Levels of capability can include fly thru (navigation thru a 3D model) type viewing. The degree of simulation, animation and virtual reality concepts can dramatically affect cost.

**2.4.7 Functionality definitions - Linking**

2.4.7.1 External references

External references are links to data outside the current data module or view. Refer to Chap 3.9.5.2.1.2, Chap 7.4.1.1, Chap 7.4.1.2 and Chap 7.7.4.

Consideration must be given for bidirectional links. A bi-directional link returns the user to the original referenced link after completing the action or procedure.

For example, a link from a data module to a publication module containing a related procedure is an external link. It should be noted that references to some data can require network connectivity.

2.4.7.2 Internal references

Internal references are links to another place in the same data module or view. Refer to Chap 3.9.5.2.1.2, Chap 7.4.1.1, Chap 7.4.1.2 and Chap 7.7.4.

Examples - Links to figures and tables.

2.4.7.3 Hot reference

Capability to display additional content such as acronyms, tool tips, etc. Refer to Chap 3.9.5.2.1.2, Chap 5.2.1.4 and Chap 6.3.1.

Example - A "mouse over" of the acronym IETP would generate popup text box with "IETP"

2.4.7.4 Link to separate parts data

Linkage from a maintenance task or narrative can be provided to a separate parts display (illustrated parts breakdown/catalog) in the current or separate window. Refer to Chap 3.9.5.3, Chap 3.9.5.2.1.2, Chap 3.9.5.2.7 and Chap 7.7.4.

This external link type links the user to a specific point within the parts data.

2.4.7.5 Table of contents, lists of figures, tables and photos

A categorized items list with links to the corresponding data within the technical publication.

2.4.7.6 Hot spotting

Graphics with links to other relevant information. Refer to Chap 3.9.2, Chap 3.9.5.2.1.8, Chap 7.3.2 and Chap 7.4.1.1.

Links can be to related text such as procedural information, IPD data; or to related graphics such as breakdown illustrations showing greater detail, next higher assembly, etc.

Example - The figure below shows a hot reference from a graphic to related text.

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*Fig 10 Hotspotting*

### 2.4.8 Functionality definitions - Navigation and tracking

2.4.8.1 Next and previous

"Next" is a navigational function that, when invoked, displays the subsequent data. "Previous" is a navigational function that, when invoked, displays the preceding data. This is an IETP viewer functionality.

"Next" can be a re-navigation of previously viewed data with no impact on state information (browse); or a progression to the next data in sequence. "Previous" can be a re-navigation of previously viewed data with no impact on state information (browse); or a reversal of steps where state table information is modified accordingly. "Next" and "previous" will normally not be implemented independent of each other. These functionalities, particularly when implemented without the process data module using a state table, are sometimes referred to as "forward" or "back".

2.4.8.2 Return (Chronological)

This is a navigational function that allows a user to get back to the link source from the link destination. This is an IETP viewer functionality.

This functionality could be implemented in such a way to allow a user to navigate back to the start of one of several branches or sub-branches.

2.4.8.3 History of traversed links

A navigational feature that tracks and lists each location (link) a user sees along the navigational path thru an IETP. This is an IETP viewer functionality.

In many cases, the user has the ability to bring the list up and use each location (link) in the history list, as a link back to a point in the path. It provides the user a way to move forward and backward along previously traversed links and a quick way to return to a home document. This feature is useful when flipping back and forth between several data types or components of the unit under maintenance.

Example - The user opens the IETP to the front matter

(A). Follows the link to the section on the landing gear

(B). Follows a reference link to an adjustment procedure

(C). The history of traversed links will be discretely listed as C, B, A.

2.4.8.4 User creation of bookmarks

This is a navigational feature that allows the user to flag certain locations for later access. It allows the user to build their own index of links to specific locations in the data. This is an IETP viewer functionality.

Associated advanced features include login-specific bookmarks, so different people using the same presentation device have their own unique set of bookmarks. This is a digital means of implementing the dog-eared page or the paperclip used in paper manuals.

Example - The maintenance crewmember that generally does the preventative maintenance checks and services might have the bookmarks to those tasks. Since that crewmember might also do the rotor tension adjustment, he would also have a bookmark to that task.

2.4.8.5 System/subsystem navigation

This is a navigational feature allowing the user to follow a top-down path thru the system breakdown structure. The user follows a physical or functional breakdown to the next lower assembly and then to the next lower assembly from that. This is an IETP viewer functionality.

Example - A helicopter mechanic might begin the navigation of an IETP at the helicopter level. Next step would be to go down to the airframe. From the airframe, the mechanic might pick the cockpit. Next subsystem might be the Pilots seat and the final topic might be the forward/rearward adjustment.

2.4.8.6 Restore initial navigation view

This is a function that returns all navigational and other frames to their initial view. This is an IETP viewer functionality.

In some IETP implementations, a user will have the capability to hide navigation or other frames of the display. The restore initial navigation view functionality returns all hidden frames to their default positions. The ability to initiate the restore initial navigation view function should always be available to the user.

2.4.8.7 Audit trail

This functionality provides the capability to capture all user and IETP interaction including dialog interaction entries. This is an IETP viewer functionality.

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*Fig 11 Audit trail #1*

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*Fig 12 Audit trail #2*

2.4.8.8 Graphical navigation

This is a navigation of the data thru graphical representation of the product and its components. (The use of hot spotting is a prerequisite). Refer to Chap 3.9.2.

This can be a type of system/subsystem navigation.

Example - From a graphical overview of the aircraft, the user selects a wing. A graphical overview of the wing is presented. The user then selects the flaps. A graphical overview of the flaps is presented. The user selects the actuator. Information on the actuator is presented.

2.4.8.9 Dialog-driven interaction

A navigational feature used with the process data module that allows the user to directly feed information to the IETP environment. The IETP would cue the user to input specific data. The feature implies that at some point the IETP would then respond to the information entered. Refer to Chap 3.9.5.2.10, Chap 6.3.1 and Chap 7.

Example - During a troubleshooting procedure, the IETP would open a dialog box that states "Enter the voltage reading at TP 5". If the user types in 5 (a nominal value), the IETP jumps to the next step in the procedure. Alternately, if the user enters 0 (a fault level reading for a short) the IETP might jump to a remove and replace procedure.

2.4.8.10 Voice-activated commands

A feature that enables the user to navigate thru the IETP by predetermined voice commands. This is an IETP viewer functionality.

The complexity of this feature depends upon the extent of voice tagging in the IETP and the quality of the voice recognition software.

2.4.8.11 Search - Full text

This is a navigational feature that allows the user to search an IETP for any words or phrases. This feature does not depend upon the predefinition of key words. This is an IETP viewer functionality.

Example - In searching for "IFF" the user can find "IFF", "difference", "TIFF", etc, depending on the search criteria.

2.4.8.12 Search - User defined Boolean

A search feature that permits the logical association of terms by use of the Boolean operators (such as AND, OR, etc) to narrow the results of the search. This is an IETP viewer functionality.

User defined Boolean search functionality is a possible extension of a full text search.

2.4.8.13 Search - Across multiple databases/files
A search feature that allows the user to look for words or phrases in more than one database. This is an IETP viewer functionality.

2.4.8.14 Search - Context
A feature that allows the user to search for words or phrases within predefined subsets of an IETP or data sources. This is an IETP viewer functionality.

It can be necessary to identify the predefined subsets by use of markup.

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*Fig 13 Search*

2.4.8.15 Search - Key word
A navigational feature that allows the user to search an IETP for occurrences of a specific word. System specific "key words" are predefined with links to their location in the data. This is an IETP viewer functionality.

A key word search provides benefits similar to an index in a paper document. It can also use other search functionalities such as Boolean, search across multiple data bases, etc.

Example - A user might search for the term "IFF". The Key word search would locate each pre-identified occurrence of the term in the data. This will find all occurrences of IFF that have been predefined as a key word, but will not find all occurrences of the letters IFF.

2.4.8.16 Filter content per applicability
Remove or de-emphasize content in the display based on information about the product of interest to the user."

The user has provided input that they are working on a particular aircraft ("serial number 001") with certain conditions present ("POST Service Bulletin 23- 1100"). Only content relevant to aircraft "001" with SB 23-100 implemented is displayed to the user. Alternatively content not relevant is de-emphasized in some manner (for example, is shown in a lighter colored text)."

2.4.8.17 Simultaneous display of multiple content objects
A functionality that establishes a relationship between content objects (text, tables, graphics, etc) requiring simultaneous display. Refer to Chap 6.3.1.

The text and its associated supporting graphic must be displayed concurrently to provide complete information to the user.

2.4.8.18 Tear off window
This is the capability to capture an existing pane/screen image and then allow the user to navigate forward, while retaining the captured image for later reference. This is an IETP viewer functionality.

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*Fig 14 Tear off window*

**2.4.9 Functionality definitions - Printing**

2.4.9.1 Print screen

This is the capability to print only the screen currently being viewed. This is an IETP viewer functionality.

Beyond the printed technical data, considerations should be given to time/date stamps, destruction notices, destruction dates, destruction requirements, security markings, associated warnings and cautions, etc.

2.4.9.2 Data module specific printing

This is the capability to print a single data module in its entirety. Refer to Chap 6.2.1 and Chap 6.3.1. This is an IETP viewer functionality.

Beyond the printed technical data, considerations should be given to time/date stamps, classified security marks, destruction notices, destruction dates and destruction requirements. Print linked data.

2.4.9.3 Print Linked data

This capability to print any linked data on a given task/location. Refer to Chap 6.2.1 and Chap 6.3.1. This should be limited to one level of linking. Traversing lower than one layer greatly increases the complexity. Beyond the printed technical data, considerations should be given to time/date stamps, persistent warnings and cautions, classified security marks, destruction notices, destruction dates and destruction requirements.

2.4.9.4 Fully formatted/ book version

This is the capability to print a complete manual (Publication) from individual data modules. This implies the capability to produce the output in compliance with a predefined format for printed publications Refer to Chap 4.9.1 and Chap 6.3.1.

Beyond the printed technical data, considerations should be given to time/date stamps, classified security marks, destruction notices, destruction dates and destruction requirements. When the document exists as an IETP, in addition to the cost incurred, this will sub-optimize both the IETP and the printed technical manual.

**2.4.10 Functionality definitions - Special content**

2.4.10.1 Front matter

Front matter is the information traditionally displayed in the front of paper manuals. Refer to Chap 3.9.4, Chap 5.3.1.2, Chap 6.2.3.1, Chap 8.4.1, Chap 8.4.2 and Chap 8.5.

It can include the title information, "A" page or change information, verification status, export control notice, warning, safety summary, title page, list of pages or data modules, change records or highlights, access illustration, list of abbreviations, list of terms, list of symbols,

technical standards records, table of contents, general data, function (of IETP/Manual), general warnings cautions and related safety data, numeric indexes, alphabetic and alphanumeric indexes, list of special materials, list of dangerous materials, list of related data, introduction, supplier lists, configuration, copyright, etc. The complexity, practicality and desirability of front matter content vary greatly depending on the data acquired.

2.4.10.2 Supporting technical data

These are links to data that is helpful to the user, but not part of the traditional technical publication. Refer to Chap 3.9.5.2.1.2, Chap 7.4.1.1, Chap 7.4.1.2, Chap 7.6.1 and Chap 7.7.4.

Examples - General manuals, part and process manuals, commodity books, commercial manuals, reference material, training data, engineering drawings, etc.

2.4.10.3 Warnings and cautions

This is the capability to include warnings, cautions and notes in the technical data. Refer to Chap 3.9.3, Chap 6.2.2 and Chap 6.3.1.

Warnings and cautions must be readily identified and can require specific operator acknowledgment prior to proceeding with the presented data.

2.4.10.4 Emergency procedures

A functionality that will call up and display all emergency procedures associated with a system, subsystem or sub-subsystem. Refer to Chap 5.2.1.9, Chap 5.2.1.10, Chap 5.2.1.12, Chap 5.2.2.7 and Chap 5.2.3.2.

2.4.10.5 Photos

This is the capability to include photographic images in the technical data. Refer to Chap 3.9.2, Chap 4.4, Chap 4.8 and Chap 7.3.2.

Photos can be included to show a specific visual representation of actual systems. Presentation standards (such as resolution, the use of color, file size and file format) must be addressed as well as content and context of the photo.

2.4.10.6 Audio

This is the capability to provide sound within the technical data. Refer to Chap 3.9.2.4, Chap 4.8, Chap 7.3.3 and Chap 7.5.1.

Examples - operator warnings and cautions, presentation clips or complete audio representation of the data. Presentation standards must be addressed as well as content, duration and context of the audio. Consideration must be given to the anticipated environment to determine the usability of audio.

2.4.10.7 Motion video

This is the capability to provide video within the technical data. Refer to Chap 3.9.2.4, Chap 4.8, Chap 7.3.3 and Chap 7.5.1.

Motion video should be used as a supplement to the procedural text. Presentation standards must be addressed as well as content, duration and context of the video.

2.4.10.8 Animation

This is the capability to provide animated graphics within the technical data. Refer to Chap 3.9.2.4, Chap 4.8, Chap 7.3.3 and Chap 7.5.1.

Animation should be used as a supplement to the procedural text. Animation can be included to show a variety of system functions from theory of operation (hydraulic flow) to maintenance procedures (how to access a specific part). Presentation standards must be addressed as well as content, duration and context of the animation.

2.4.10.9 Content sensitive help (Technical data help)
Help information based on the data being presented or the tasks being performed. Refer to Chap 3.9.1, Chap 6.3.1 and Chap 9.2.

Examples - Lists of acronyms, lists of abbreviations and definitions of acronyms and abbreviations. The type of help pertains to the particular subject matter of the data, such as the specific product. Content sensitive help can be delivered thru pop-ups, dedicated help screens or pull down menus.

2.4.10.10 Context sensitive help (viewer help)
Help information for the IETP operation including the features and functions of the IETP viewer. This is an IETP viewer functionality.

Example - In many systems, right-clicking via the mouse or hovering the cursor over a particular graphic or menu item will cause a "tool tip" to pop up, providing help or a description for the specified feature.

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*Fig 15 Context sensitive help*

2.4.10.11 User training
This is the capability to integrate or link maintenance and/or operational training data with the IETP. This is both a data and IETP viewer functionality.

User training complexity can range from on-line access during IETP run time by linking to a CBT database to run complete training lessons.

Access of the data can be thru a link to an external module or integrated with the IETP. Advanced capabilities can be to monitor usage and training access for the purpose of tracking user competency. Specific training courseware and or actions are not necessarily part of the data.

**2.4.11 Functionality definitions - Updates**

2.4.11.1 Passive change indications and markings
This is the capability to identify changes in the technical data thru a list of changes only and not thru visible marks within the actual technical data. Refer to Chap 5.3.1.2, Chap 8.4.1, Chap 8.4.2 and Chap 8.5.

Examples - List of Changes, Highlights Page or summary of changed data. Display and tracking of change information can drive costs.

2.4.11.2 Active change indications and markings
This is the capability to discretely identify and visibly mark each change in the data. Refer to Chap 3.9.5.2.1.1, Chap 6.2.2 and Chap 6.2.3.

Complexity can be affected by the methods of display, change identification and when they are removed or suppressed. The IETP can also include passive change markings. Display and tracking of change information can drive costs.

2.4.11.3 Full change
The capability to provide a complete replacement of the data previously distributed. Refer to Chap 3.9.5.2.1.1.

A full change can contain detailed change markings (or a change summary).

2.4.11.4 Block cycle and urgent changes
The capability to provide regularly scheduled updates to the technical data. Changes from all sources are consolidated and issued at regularly scheduled intervals. Urgent changes are interim updates between scheduled block cycle updates. Refer to Chap 3.9.5.2.1.1.

If block cycle updates are contracted, a vendor is responsible for providing both regularly scheduled updates to the data as well as urgent off-cycle updates as needed.

2.4.11.5 Near real time updates
The capability to quickly provide data updates to users rather than depending on a predetermined schedule. Refer to Chap 3.9.5.2.1.1, Chap 6.2.2 and Chap 6.2.3. This functionality requires the inclusion of the Network distribution and Network connectivity functionalities.

**2.4.12 Functionality definitions - User operation mode**

2.4.12.1 Web browser viewable
This is technical data that can primarily be viewed thru a COTS Web browser. This is an infrastructure functionality.

The functionality selected in this matrix will determine the level of complexity and cost of implementing a Web browser viewable application. This can be accomplished directly thru the Web browser (eg Internet Explorer™) or thru helper applications (eg Adobe Acrobat™) or plug-ins (eg IsoView™). Consideration will be required for a specific Web browser. Different implementations include remote access to a Web server, opening static HTML pages locally and Web server emulation on the client viewer.

2.4.12.2 Stand alone mode
This is the capability to access the IETP via the hard drive on the stand alone device after uploading data from a network or thru a transfer media such as CD-ROM or DVD.

Consideration should be given for the update capabilities of this operating method. When in stand alone mode, full update capability entails the update of the complete data after uploading from a network or thru a transfer media such as CD-ROM or DVD. This method provides the lowest cost impact. When in stand alone mode, a partial update capability entails the update of only the changed data from the previous release after uploading from a network or thru a transfer media such as CD-ROM or DVD.

2.4.12.3 Network connectivity
This is the capability to access to the IETP via a network infrastructure. The data can be downloaded to or viewed on the client device. The data changes are installed on the host server and updates are transmitted via the network. This is infrastructure functionality.

Data changes are/can be incorporated as complete or partial updates.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of the functionality matrix**. The project or organization must determine whether or not to use the functionality matrix.

**Modification of the information sets**. The project or organization must determine the information sets used and modify the horizontal axis of the functionality matrix accordingly.

**Individual functionality decisions**. Each row in the functionality matrix represents business rule decisions. The project or organization must decide whether each functionality is required by the project or organization.

# Chapter 6.4.2

## *Functionality - Functionality matrix*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 6.4.1 | Functionality - Background and explanation |

## 1 General

The functionality matrix is found in Table 2 and described in Chap 6.4.1.

## 2 The functionality matrix

The functionality matrix is found in Table 2. Use of the functionality matrix is described in Chap 6.4.1.

*Table 2 Functionality matrix*

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Access | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Login | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Suspend and restart | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Exit | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Annotation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Action complete indicator (checkbox) | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Global data annotation | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Local data annotation | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Personal annotation | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Redlining text | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Redlining graphics | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Delivery and Distribution | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Printed publication | 1 | 5 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Physical media | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Network distribution | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnostics | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnostics - User determined entry to data | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Diagnostics - Software driven entry to data | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dynamic diagnostics | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wire/Fluid system tracing | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| System simulation | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prognostics | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External Processes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Retrieval | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parts ordering | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deficiency/Improvement report transmittal | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Maintenance data collection | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operator debriefing | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resource scheduling | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Knowledge management | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Graphics | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pan, zoom, expand, magnify | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Assembly/Disassembly | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Locator graphics | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3D modeling | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Linking | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External reference | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Internal references | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Hot reference | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Link to separate parts data | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| TOC, lists of figures, tables and photos | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hot spotting | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Navigation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Next and previous | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Return (Chronological) | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| History of traversed links | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| User creation of bookmarks | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| System/Subsystem navigation | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Restore initial navigation view | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Audit trail | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Graphical navigation | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
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| Dialog-driven interaction | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Voice-Activated commands | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Search - Full text | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Search - User defined Boolean | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Search - Across multiple databases/files | 4 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Search - Context | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Search - Key word | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Filter content per applicability | 2 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Simultaneous display of multiple content objects | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |

| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
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| Tear off window | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
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| Data module specific printing | 1 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
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| Fully formatted/book version | 4 | 5 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
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| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
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| Photos | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Functionality | Complexity – Page | Complexity – (IET)P | Requirement | All information sets | Crew / operator | Description and operation | Maintenance procedures | Fault Isolation | Non-destructive testing | Corrosion control | Storage | Wiring diagrams | IPD | Maintenance planning | Mass and balance | Recovery | Equipment | Weapon loading | Cargo loading | Stores loading | Role change | BDAR | Illust'd tool & support equip. | Service bulletins | Material data | Common info. & data | Training | Applicability |
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| Full change | 1 | 1 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Block cycle and urgent changes | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| Near real time updates | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
| User Operation Mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Web browser viewable | 3 | 3 | | A | | | | | | | | | | | | | | | | | | | | | | | | |
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| Network connectivity | 2 | 2 | | A | | | | | | | | | | | | | | | | | | | | | | | | |

# Chapter 6.4.3

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## 1 General

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# Chapter 7.1

## *Information processing - Introduction*

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# 1 General

## 1.1 Scope

The chapter gives general information, directives and advice in four main aspects:

- creation and maintenance of CSDB objects
- generation of publications
- interchange of information
- technical requirements for display systems

Although some basic guidelines are provided regarding the principle characteristics of systems that support the specification, it is not suggested how such a system should be implemented, nor are any specific tools suggested for such an implementation.

## 1.2 Purpose

The purpose of this chapter is to describe and explain the technical aspects of the information processing. This chapter provides information that is sufficient for understanding and implementing the technical concepts of S1000D. However, additional resources and examples are available at www.s1000d.org.

# 2 Content

## 2.1 Related standards

The list of standards, below, are those standards specific to information processing in addition to the other relevant standards listed in Chap 2.2 and Chap 4.2.2.

| | |
|---|---|
| OASIS Technical Resolution 9401:1997 | Entity Management |
| OASIS XML Catalogs V1.1, October 2005 | XML Catalogs |
| REC-xlink-20010627 | W3C Recommendation: XML Linking Language (XLink) Version 1.0 |
| REC-xmlbase-20010627 | W3C Recommendation: XML Base |
| REC-xml-names-20060816 | W3C Recommendation: Namespaces in XML 1.0 (Second Edition) |
| REC-xptr-framework-20030325 | W3C Recommendation: XPointer Framework |
| REC-xptr-element-20030325 | W3C Recommendation: XPointer element() Scheme |
| REC-xptr-xmlns-20030325 | W3C Recommendation: XPointer xmlns() Scheme |
| REC-xpath20-20070123 | W3C Recommendation: XML Path Language (XPath) 2.0 |
| REC-xmlschema-1-20041028 | W3C Recommendation: XML Schema Part 1: Structures Second Edition |
| REC-xmlschema-2-20041028 | W3C Recommendation: XML Schema Part 2: Datatypes Second Edition |
| REC-rdf-syntax-grammar-20040210 | W3C Recommendation: RDF/XML Syntax Specification (Revised) |
| RFC-2413-September 1998 | IETF Recommendation: Dublin Core Metadata for Resource Discovery |

| | |
|---|---|
| RFC-2396-August 1998 | IETF Recommendation: Uniform Resource Identifiers (URI) Generic Syntax |
| RFC 2483-January 1999 | IETF Recommendation: URI Resolution Services Necessary for Uniform Resource Name (URN) Resolution |
| REC-xml-stylesheet-19990629 | W3C Recommendation: Associating Style Sheets with XML documents Version 1.0 |
| REC-xsl11-20061205 | W3C Recommendation: Extensible Stylesheet Language (XSL) Version 1.1 |
| REC-xslt-19991116 | W3C Recommendation: XSL Transformations (XSLT) Version 1.0 |

## 2.2 Basic concepts

An overview of the basic concepts of the S1000D technical solutions is given in Chap 7.2. This can be used as an introduction to the features that constitute the technical backbone of the specification.

## 2.3 CSDB objects

Relevant information on the technical implications of creation and maintenance of the content of a CSDB is given in Chap 7.3.

The chapter contains a useful introduction to and overview of the XML Schemas. It covers:

- descriptions of the Schemas
- definition of S1000D profiles for raster and vector graphics and technical methods for implementing graphical hotspots

## 2.4 Generation of publications

Information on the generation of publications from a CSDB is given in Chap 7.4.

From a technical point of view, the chapter covers:

- descriptions of publication related Schemas
- production of page-oriented publications
- compilation of IETP including linking mechanism specifics
- inclusion of legacy information

## 2.5 Information interchange

Details on the interchange of S1000D based information are given in Chap 7.5.

From a technical point of view, the chapter covers:

- interchange supporting resources (eg Schema)
- methods and specifics on the interchange of data modules and compiled publications

## 2.6 Software requirements

The requirements for software, in support of the process data module and resource resolution, are given in Chap 7.6. It covers the requirements for basic functional properties of the software, eg the logic engine, which is needed to execute and display process data modules.

## 2.7 Guidance and examples

In support of implementation and use of an S1000D environment, guidance and examples are given in Chap 7.7.

## 2.8 Schema availability

Electronic copies of the Schemas for all XML CSDB objects are available for download from the S1000D web site at www.s1000d.org. In addition, online HyperText Markup Language (HTML) documentation of the Schemas and a set of sample instances can be downloaded from the S1000D web site.

## 2.9 Applicability

The technical aspects of evaluating applicability annotations together with guidance on the generation of applicability display text are given in Chap 7.8.

# Chapter 7.2

## *Information processing - Basic concepts*

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# 1 General

The purpose of this chapter is to give an overview of some characteristics and technical requirements concerning information processing.

A characteristic of S1000D is that it outlines an open systems approach to the production of technical publications. The specification does not take into account any specific tool or other proprietary solution. It is important to recognize that system and tool independence (eg in addressing) is a necessity for interoperability across distributed S1000D implementations.

# 2 Concepts

## 2.1 Use of XML

The XML Schema package, provided by S1000D, covers the factual information (contained in data modules) produced within and for the Product. It also contains the documentation process related information, such as data dispatch notes included in transfer packages.

The Schemas are highly modularized into several parts where each part defines objects of a certain type (eg "complexType" Schema objects) where each Schema fragment is focused on its specific characteristics and substructures. The application Schema, representing specific types of data modules (eg descriptive, procedural) are then composed by invocation of a suitable selection of the parts. This variant of the Schema package is usually referred to as the "modularized XML Schema package" and is the master for maintenance and development of the S1000D technical base.

In addition to the modularized package there is also a package of non-modular, flattened, Schemas, where each application Schema file contains most needed objects reused from the modular form (exceptions are xlink, rdf and dc fragments, refer to Chap 7.3). This package is generated from the modular package.

A detailed method of compiling publications, based on XML, is given in Chap 7.4.

**Note**

From this issue of the specification the support for Document Type Definition (DTD) is dropped

## 2.2 Graphics and multimedia

Exchange of graphics and multimedia across information systems infrastructure (eg platforms, tools, systems) has always been an area of considerable difficulty. This also applies to S1000D, since it, by definition, adopts an open system approach.

Information about the use of graphics, multimedia, supported graphics and multimedia formats and interchange of graphics and multimedia can be found in Chap 3.9.2, Chap 4.8, Chap 7.3.2 and Chap 7.3.3.

## 2.3 Referencing and linking

The S1000D Schemas provide specific constructs for expressing cross-references within and references between data modules, including references to, from and within graphics and multimedia elements. In addition, there are supported methods of referencing other information such as legacy publications.

The reference constructs enable a strict and formal method of referring from one place in a publication package to another, and to enable automated resolution of these references into hyperlinks. Refer to Chap 3.9.5.2.1.2.

The reference constructs are based on open standards. However, their main aim is to provide sufficient information to resolve them into hyperlinks, regardless of the technique used. This allows for the use of the S1000D's own "linking language" as described in Chap 7.4.1 and Chap 7.4.2.

Linking mechanisms and resource resolution in a web environment are further described in Chap 7.6.2.

## 2.4 Processes

The specification also includes a method for preparing data in the form of processes. These processes order the sequence of data modules and/or steps within the process, where the traversal through that sequence can be influenced by user interaction and/or environment conditions (typically equipment status). This sequencing is represented by process data modules, which provide the means to increase the interactivity of IETP, including the possible integration of the information with the Product.

The process concept also introduces the use of a logic engine. This, and its relation to the process data module, is given in Chap 4.11.

More detailed information about the process data module and logic engine can be found in Chap 3.9.5.2.10, Chap 6.3.1, Chap 7.6.1 and Chap 7.7.

## 2.5 Tailoring the application of Schemas

S1000D compliant projects must use the Schemas as supplied. However, a project or an organization can configure the use of various attribute values within the Schemas as described in Chap 7.3 and Chap 3.9.6, as interpreted in their business rules.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of modularized or flattened schemas**. The project or the organization must decide whether to use the modularized form of the schemas or the flattened form. The decision must be made with regard to the tools that are applied. Refer to Para 2.1.

**Use of the configurable attributes**. The project or the organization must decide how configurable attributes will be used, including decisions regarding the use of project specific values. Refer to Para 2.5.

# Chapter 7.3

## *Information processing - CSDB objects*

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# 1 General

## 1.1 Purpose

The purpose of this chapter is to describe and explain the technical aspects of creation and maintenance of CSDB objects. It concentrates on providing information about the underlying XML technology for generating and maintaining data modules.

## 1.2 Scope

Besides the description of the modular Schema structure for data modules, this chapter also contains information and guidance on the preparation of graphics and their definition within data module text for hyper-linking and navigation through graphical hotspots, as well as providing guidance on the selection and use of multimedia.

It covers the following:

- a description of the modular XML Schemas for data modules, see Chap 7.3.1
- a description of the technical methods for implementing graphical hotspots, see Chap 7.3.2 and Chap 3.9.5.2.1.8.
- a description of the technical methods for implementing multimedia, see Chap 7.3.3

**Note**

XML Schemas for other CSDB objects such as publication modules, data module lists, comments and data dispatch notes are described in corresponding chapters, see Chap 7.4 and Chap 7.5.

# Chapter 7.3.1

## *CSDB objects - Data module Schema*

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| Chap 7.3.1.4 | Data module Schema - Backwards compatibility |

## 1 General

The purpose of this chapter is to provide technical background on S1000D data module Schema.

## 2 Data module XML Schema

The rules and guidance for data module Schema are given in the following chapters.

- Chap 7.3.1.1 provides a version summary of Schemas for data modules since Issue 2.0 of S1000D.
- Chap 7.3.1.3 provides a list of namespaces for the different types of data modules (descriptive, procedural, etc).
- Chap 7.3.1.4 provides a summary of backward incompatibilities since version 3.0 of the Schema for data modules.

Electronic copies of the Schemas for data modules are available for download from the S1000D web site at www.s1000d.org. System identifiers shown in examples point to these reference copies at:

`http://www.s1000d.org/S1000D_4-0/...`

For production use, local copies of Schema must be used.

# Chapter 7.3.1.1

## *Data module Schema - Version summary*

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| None | |

# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide technical background on S1000D data module XML Schema.

## 1.2 Scope

This chapter identifies all S1000D XML Schema versions, which have been formally released. For each version there is a summary of the reasons for change from previous releases. Details of the changes are recorded in the appropriate sections.

From S1000D Issue 4.0 onwards, Standard Generalized Markup Language (SGML) and SGML/XML DTD are no longer supported.

# 2 XML Schema for data modules

## 2.1 List of XML Schema release versions for data modules

Table 2 lists all XML Schema release versions for data modules with their related S1000D issue and change numbers.

*Table 2 List of S1000D XML Schema release versions for data modules*

| S1000D Issue, Change No. | XML Schema version No. | Production release date |
|---|---|---|
| 2.0 | 2.0 | 2003-05-31 |
| 2.1 | 2.1 | 2004-02-29 |
| 2.2 | 2.2 | 2005-05-01 |
| 2.3 | 2.3 | 2007-02-28 |
| 2.3.1 | 2.3.1 | 2008-01-22 |
| 3.0 | 3.0 | 2007-07-31 |
| 3.0.1 | 3.0.1 | 2008-01-23 |
| 4.0 | 4.0 | 2008-08-01 |

## 2.2 Update summary

### 2.2.1 Version 2.0

This was the first formal version of the S1000D XML Schema for data modules, released to coincide with Issue 2 of the specification.

### 2.2.2 Version 2.1

Summary of changes for version 2.1 of the XML Schema for data modules requested by Technical Publications Specification Maintenance Group (of ASD/AIA/ATA) (TPSMG)/EPWG:

- CPF 2003-10US, 2003-11US, 2004-11US: Implemented in accordance with the changes for the SGML DTD (refer to Para 2.2.6)
- CPF 2004-12DE: XML Schema bug fixes
  - Default value "`pf02`" removed from definition of attribute `prefix` (see project.cfg)
  - Attribute `prefix` on element <`randlist`> declared to be required (see lists.xsd)
  - Attribute `mixed` with value "`true`" removed from definition of element <`sbc`> (see status.xsd)

**Note**

The XML Schema recommendation prohibits the definition of a default value for a required attribute, which makes it impossible to implement CPF 2003-08SE for XML Schemas. The definition of mixed="true" for simple content results in Schema warnings.

### 2.2.3 Version 2.2

Summary of changes for version 2.2 of the XML Schema for data modules requested by TPSMG/EPWG:

- CPF 2002-11FR:
  - Group "`fft_inc`" removed from the content model of element <`captext`> (see capgrp.xsd)

- Move groups "WC" to new file wc.xsd, "NP" to new file paragraphs.xsd and "spcpara" to new file spcpara.xsd. Move element <graphic> and element <hotspot> to new file figure.xsd (see common.xsd)
- Group "gen_inc" removed from content models of element <indxflag>, element <change> and element <emphasis> (see common.xsd)
- New group "TEXT-NOREFS" defined, same as "text", except element <refdm>, element <reftp>, element <change> and element <ftnote> removed. Group "text" replaced by "TEXT-NOREFS" in the content model of <tabtitle>. Group "fft_inc" replaced by "FFT" in the content models of element <frc>, <descacrw>, <procd>, <challeng>, <response>, <endmattr> and group "DRLINTRO". Group "NP" replaced by new group "NPFFT" in the content models of groups "ACSTCON" and "NPAR". Group "fft_inc" removed from the content models of element <crew>, element <crewmem>, element <tabtitle>, element <if>, element <elseif>, element <case>, element <drill>, element <subdrill> and element <step> (see crew.xsd)
- Group "gen_inc" replaced by "FFTC" in the content model of element <descript>. New group "TEXT-NOREFS" defined, same as "text", except element <refdm>, element <reftp>, element <change> and element <ftnote> removed (see descript.xsd)
- Inclusion of file fig_tab.xsd replaced by inclusions of figure.xsd and table.xsd. Inclusion of file wcnp.xsd replaced by inclusions of wc.xsd and paragraphs.xsd (see crewSchema.xsd, descriptSchema.xsd, faultSchema.xsd, ipdSchema.xsd, procedSchema.xsd, processSchema.xsd, schedulSchema.xsd, wrngdataSchema.xsd and wrngfldsSchema.xsd)
- Group "fft_inc" replaced by "FFT" in the content model of element <isolatep>. Content model of group "ISOSTPA" amended by group "FFT". Group "fft_inc" removed from the content models of element <isostep>, element <isoend>, element <action>, element <question>, element <answer>, element <yesno>, element <sel-list>, element <yes>, element <no>, element <entfield> and element <choice>. New element <delruitem> based on element <lruitem> defined which does not contain element <test> and element <repair>. Element <lruitem> replaced by element <delruitem> in the content model of element <detect>. New element <desruitem> based on element <sruitem> defined which does not contain element <test> and element <repair>. New element <lrlruitem> based on element <lruitem> defined which does not contain element <test>. Element <lruitem> replaced by element <lrlruitem> in the content models of element <locandrep> and element <diagnost>. New element <lrsruitem> based on element <sruitem> defined which does not contain element <test> (see fault.xsd)
- Group "fft_inc" renamed to "FFT" and moved to separate file for alignment with the SGML DTD (see fft.xsd)
- Group "gen_inc" renamed to "FFTC" and moved to separate file for alignment with the SGML DTD (see fftc.xsd)
- Inclusion of file lists.xsd moved to ipdSchema.xsd. Inclusion of file capgrp.xsd removed (see ipd.xsd)
- Group "gen_inc" removed from the content models of element <item> and element <def> (see lists.xsd)
- New group "NPFFT" defined which references groups "NP" and "FFT" in its content model (see npar.xsd)

- Group "gen_inc" removed from content model of element <para> (see paragraphs.xsd)
- Group "text" replaced by "TEXT-NOREFS" in the content model of element <reqcond> (see prelreq.xsd)
- Group "FFT" added to the content model of element <mainfunc> (see proced.xsd)
- Group "NP" replaced by "NPFFT" in the content model of group "stepcon". Group "fft_inc" removed from the content models of element <step1> thru element <step5> (see steps.xsd)
- Inclusion of file fig_tab.xsd.xsd removed, and inclusion of file wcnp.xsd replaced by paragraphs.xsd (see wrngdataSchema.xsd and wrngfldsSchema.xsd)

– CPF 2004-02SE:
  - Content models of element <supequi>, element <supply> and element <spare> amended by optional sub element <refs> (see prelreq.xsd)

– CPF 2004-03SE:
  - Element <closeup> renamed to new element <closereqs>, and content model changed to include existing element <reqconds> only (see closereq.xsd)
  - Element <closeup> replaced by element <closereqs> in the content model of element <proced> (see proced.xsd)

– CPF 2004-06SE:
  - Element <refs> made optional and changed to contain only element <refdm> and element <reftp>. Element <techpub> removed from Schema. Content model of element <reftp> changed to contain optional element <applic>, new group "TEXT-NOREFS" and group "PUBREF" (see content.xsd and text.xsd)
  - Occurrence of sub element <refs> made single within the content models of element <describe>, element <afiref>, element <repair>, element <testdesc> and element <testproc> (see fault.xsd)
  - Element <reqdm> replaced by element <refdm>, and element <reqtp> replaced by element <reftp> (see prelreq.xsd)

– CPF 2004-21GB:
  - Value list of attribute change amended by the value "modify" within group "INSDEL" (see s1000d.xsd)

– CPF 2004-22GB:
  - Content model of element <copyright> replaced by mandatory repeatable sub element <para> (see datarest.xsd)

– CPF 2004-24GB:
  - Element <level> replaced by new element <maintlevel> to allow for the definition of generic maintenance levels (see applic.xsd)
  - New simple type "MNTLVLS" introduced which defines generic maintenance levels (see project.cfg)

– CPF 2004-25SE:
  - New data module type "BREX" created (see brexSchema.xsd and brex.xsd)
  - Content model of group "STATUS" amended by new mandatory element <brexref> which in turn contains mandatory element <refdm> (see status.xsd)

– CPF 2004-26US:
  - Documentation tags moved up directly under their respective <xs:element> tag (see interact.xsd and process.xsd)

– CPF 2004-32US:
  - Content model of element <applic> replaced by new group "APPLIC" (see applic.xsd)

- Group "APPLIC" created with optional element <expression> added to the applicability content model for interactive use (see applic_interact.xsd)
- Group "APPLIC" created with the normal applicability content model for static use (see applic_static.xsd)
- Inclusion of files applic_static.xsd and paracon_static.xsd introduced (see brexSchema.xsd, crewSchema.xsd, descriptSchema.xsd, faultSchema.xsd, ipdSchema.xsd, procedSchema.xsd, schedulSchema.xsd, wrngdataSchema.xsd and wrngfldsSchema.xsd)
- Inclusion of file paracon_capgrp.xsd introduced (see descriptSchema.xsd and procedSchema.xsd)
- Group "paracon" redefined to contain element <variable-ref> for interactive use in addition to groups "text" and "list" (see paracon_interact.xsd and paracon-static.xsd)
- Element <precond> replaced by element <applic> in the content models of element <dialog> and element <menuchoice> for interactive use (see interact.xsd)
- Group "paracon" redefined to contain group "CAPPCON" for static descriptive and procedural data modules in addition to groups "text" and "list" (see paracon_capgrp.xsd and paracon_static.xsd)
- Inclusion of file steps_static.xsd introduced (see proced.xsd)
- Inclusion of files applic_interact.xsd, paracon_interact.xsd and steps_interact.xsd introduced (see processSchema.xsd and process.xsd)
- Element <prelreqs> and element <closereqs> added to element <process>. Group "bodyatt" added to many elements instead of a single attribute id. Element <precond> replaced with element <applic> containing element <expression> for interactive use. Group "STEP1" added to the content model of element <dm-node> for interactive use (see process.xsd)
- Element <step2> replaced by group "STEP2" in the content model of element <step1>. Element <step3> replaced by group "STEP3" in the content model of element <step2>. Element <step4> replaced by group "STEP4" in the content model of element <step3>. Element <step5> replaced by group "STEP5" in the content model of element <step4> (see steps.xsd)
- New groups "STEP1" thru "STEP5" defined which contain element <step1> thru element <step5> and new element <step1-alt> thru new element <step5-alt> for interactive use. Element <step1-alt> thru element <step5-alt> created which contain mandatory repeatable sub element <step1> thru element <step5> (see steps_interact.xsd)
- New groups "STEP1" thru "STEP5" defined which contain element <step1> thru element <step5> for static use (see steps_static.xsd)

– CPF 2004-37DE:
  - Optional attribute cconnect introduced on element <contact>. Optional attribute scrlevel, optional attribute scrtype and optional attribute scrstyle introduced on element <screen> (see wrngdata.xsd)

– CPF 2004-40US:
  - Attribute visibility introduced on element <hotspot> to enable the reuse of graphical objects (see figure.xsd)

– CPF 2004-45US:
  - New element <ftnote> and new element <ftnref> defined and used in the content model of group "text" to allow for markup of footnotes in running text and tables (see common.xsd, crew.xsd and text.xsd)

– CPF 2004-46US:

- Optional sub element <elogic> introduced on new element <elecequip> and element <connector>. Optional sub element <nomenc> introduced on element <elecequip> (see wrngdata.xsd)
- Optional sub element <dsc.econtact> and sub element <dsc.statedes> added to the content models of element <dsc.elecequip> and element <dsc.connector>.Optional sub element <dsc.nomenc> added to the content model of element <dsc.elecequip> (see wrngflds.xsd)

– CPF 2004-58SE:
  - Content models of element <supequi>, element <supply> and element <spare> amended by optional sub element <remarks> (see prelreq.xsd)

– CPF 2004-59FR:
  - Content model of element <ipp> amended by new optional repeatable element <vas> to reflect the S2000M definition and use of SID and SNS. Element <vas> contains new element <sid> and already existing element <nsn> (see ipd.xsd)

– CPF 2004-64US:
  - Element <extapp> introduced to enable the launch of external applications from a process data module (see interact.xsd)

– CPF 2004-66US:
  - Group "gen_inc" removed from content model of element <symbol> (see common.xsd)
  - Element <applic> repositioned within content model of element <procd> (see crew.xsd)

– CPF 2005-06SE:
  - Publication module number element <pmnumber> within publication module code element <pmc> allowed to be alphanumeric instead of numeric (see pmc.xsd)

– Bug fixes:
  - Pattern definitions on attribute issno and attribute inwork of element <issno> corrected (see base.xsd)
  - Pattern definitions on attribute year, attribute month and attribute day of element <issdate> corrected (see s1000d.xsd)
  - Definition of empty element <unverif> corrected (see status.xsd)

– Consistency:
  - Type of all elements which contain only Parsed Character Data and which have no attributes has been redefined to type="xs:string"

### 2.2.4 Version 2.2.1

Summary of changes for version 2.2.1 of the XML Schema for data modules requested by TPSMG/EPWG:

– CPF 2005-97GB:
  - Type of attribute xrefid in the element <ftnref> updated to "xs:IDREF" in order to allow a reference to a footnote (see common.xsd).

– CPF 2006-01GB:
  - Occurrence indicator in the complex type definition of elements <para0> and <subpara1> to <subpara4> have been removed in order to have only one element <title> per heading level (see paras.xsd).

– Consistency: Element <notname> has to be defined as mixed in order to specify the notation name inside (see brex.xsd).

### 2.2.5 Version 2.3

Summary of changes for version 2.3 of the XML Schema for data modules requested by TPSMG/EPWG:

- CPF 2002-33SE:
  - Optional attribute `refapplic` introduced on element <`rfu`>, element <`pmd`>, element <`reqpers`>, element <`tgroup`>, element <`row`>, element <`entry`>, element <`datarest`>, element <`qa`> and element <`remarks`> (see complexTypes.xsd)
- CPF 2005-01GB:
  - OASIS XML Catalogs V1.1 is supported
- CPF 2005-02FR:
  - Transition to XML Schema from SGML DTD master
- CPF 2005-03GB:
  - In order to make specification data modules and construction of Business Rules easier to read and process, method of creating markup examples has been added. This should include:
    - Indented layout
    - Ability to show elements and attributes in a different font via FOSI / XSL
- CPF 2005-25US:
  - New element <`dialog`> introduced in the Process data module for the enhanced dialog functionally between the IETP, the technical editor, and the user.
    - Optional element <`applic`> contains a Boolean expression that is evaluated by the Logic Engine or model configuration applicability.
    - Optional element <`enable`> contains a Boolean expression (<`expression`> element) to determine if the dialog object is active or not.
    - Element <`prompt`> displays text for a response input from the user.
    - Element <`fillin`> creates a prompted fill-in data field. Optional element <`applic`> and optional element <`enable`> determine the fill-in visibility.
    - Element <`menu`>, within the element <`dialog`>, provides the capability to communicate to the IETP by prompting the user to select zero or more items from a list.
    - Element <`message`> provides information from the IETP to user and does not require any user response, except to continue. The message dialog can be used for returning results from a user requested calculation, intrusive test results, final corrective action, etc.
    - Element <`dialog-group`> changes the <`dialog`> element flow direction.
- CPF 2005-36US:
  - New element <`value`> with an attribute `uom` introduced in the content model to the content of the group "`paracon`" to avoid wrong interpretation of a numerical value (differences in the display format, units of measure between countries and languages).
- CPF 2005-37GB:
  - New element <`multimedia`> introduced to allow multimedia to be used as a separate object outside of the figure construct. These elements are introduced everywhere element <`figure`> is used and as the same level.
- CPF 2005-38FR:
  - Introduction of new technical conditions cross-reference table data module type (see the modular Schema file techcondcrossreftableSchema.xsd and the flat Schema file techcondcrossreftable.xsd).
  - Introduction of new products cross-reference table data module type (see the modular Schema file prdcrossreftableSchema.xsd and the flat Schema file prdcrossreftable.xsd).
- CPF 2005-40US:

- New element <cb> used to provide information about the status of a circuit breaker (open or closed) is introduced in elements <para> and <text> in order to make reference to additional circuit breaker data.

– CPF 2005-41US**:**
  - Avoid data redundancy at the data module level in the framework

– CPF 2005-64SE:
  - New element <srcdmaddres> used to provide a reference to the original data module from which a customized data module was derived from is introduced in element <idstatus>.
  - New element <dmcextension>, sub element <dmeproducer> and sub element <dmecode> used to identify the producer and unique identifier for a customized data module is introduced in element <dmaddres>.

– CPF 2005-65SE:
  - Group CAPPCON is deleted.
  - Dublin Core element names changed to all lowercase.

– CPF 2006-02DE:
  - Occurrence of element <rfu> changed from optional single to optional repeatable (see elementGroups.xsd).
  - Optional single subelement <applic> introduced on element <rfu> (see complexTypes.xsd).

– CPF 2005-49US:
  - Element <step6>, element <step7>, element <step8>, element <subpara5>, element <subpara6> and element <subpara7> introduced in order to add 3 new step levels to the procedural information content data structure and 3 new subPara levels.

– CPF 2005-60DE:
  - Element <wireconcode> has been modified with the introduction of sub elements:
    – Shielding order element <screenorder>
    – Special connections element <specconn>
    – Electric potential element <elecpotential>
    – Potential connections order element <pconnorder>

– CPF 2005-72FR:
  - Optional new functional position element <ein> introduced on complex text data and in element <status> for every data module type.
  - Optional new zone element <zone> and optional new access panel element <accpnl> introduced on paragraph of the descriptive data module.
  - Optional new circuit breaker list element <cblst> introduced in preliminary requirements, steps, and paragraph.
  - Optional new required circuit breaker list <reqcblst> introduced on element <reqconds>.

– CPF 2005-73FR:
  - Introduction of new technical repository data module type (see the modular Schema file techrepSchema.xsd and the flat Schema file techrep.xsd).

– CPF 2005-74FR:
  - Optional element <ein> introduced to allow reference to a functional item number defined in a technical data repository, added to the content model of element <status>, element <para>, element <spare>, element <supply>, element <supequi>, element <lru>, element <sru> and element <equip>.

– CPF 2005-75FR:
  - Introduction of new container data module type (see the modular Schema file containerSchema.xsd and the flat Schema file container.xsd).

- CPF 2005-76FR:
  - Sub elements of element <model> of element <applic> have been modified:
    - Confirmed and conditional values added to attribute type of element <versrank>.
    - Optional sub element <versrank> added to element <mod>.
    - New branch containing required element <sbnumber>, optional element <subtitle> and optional repeatable element <versrank>.
    - Element <config> removed and replaced by optional repeatable element <techconds> on element <model>.
    - Optional element <opconds> for operational conditions added to element <model> containing multiple operational conditions and one optional formula.
  - Optional element <applic> added to element <datarest>, element <qa>, element <rfu>, and element <remarks> in the status section of all data modules.
- CPF 2005-77FR:
  - Optional attribute contextid, optional attribute mfc and optional attribute originator added to the wire identification element <wireid>.
  - Optional attribute termpnr and optional attribute wexdir added to the contact identification element <contact>.
  - Optional element <wireseqno> and optional element <nhassy> added to the wire information element <wireinformation>.
  - Optional attribute wirelngtyp added to the wire length element <length>.
  - Optional element <feedthru> with optional attribute holeid added to the wire routing element <routing>.
  - Element <clipid> under element <routing> redefined to be optional.
  - Optional attribute contextid, optional attribute mfc and optional attribute originator added to the harness identification element <harnid>.
  - Element <nomenc> and element <emc-code> added to the harness information element <harninfo>.
  - Optional element <posnhassy> with optional attribute pos, optional attribute row, optional attribute col, optional attribute equipstate and optional element <maxposition> added to the electrical equipment element <elecequip>.
  - Optional attribute contextid, optional attribute mfc and optional attribute originator added to the electrical equipment identifier element <rfd>.
  - Optional attribute instloctyp and optional attribute uom added to the equipment install location element <instloc>.
  - Element <instloc> redefined to be optional repeatable under element <elecequip>.
  - Wire sequential number description element <dsc.wireseqno>, feed through description element <dsc.feedthru>, next higher assembly description element <dsc.nhassy>, harness nomenclature description element <dsc.nomenc>, harness separation code description element <dsc.emc-code>, position on next higher assembly description element <dsc.posnhassy> and maximum number of mounting positions description element <dsc.maxposition> added as optional elements.
  - Value lists for the type of install location attribute instloctyp and the origin of equipment/harness/wire attribute originator added.
- CPF 2005-78FR:
  - New correlated fault element <cfault> added as a choice on element <afr>.

    - Optional element <applic> added to isolated fault element <ifault>, detected fault element <dfault>, observed fault element <dfault> and fault isolation element <afi>.
  - CPF 2005-79FR:
    - Optional attribute taskcode and optional attribute skilltype added to element <deftask>.
    - Optional repeatable element <reqsource> and optional repeatable element <remarks> added to element <deftask>.
    - Optional element <equip> on element <deftask> is now an optional choice between the original element <equip> and new element <nomen>.
    - Optional attribute tholdtype added to element <deftask>.
  - CPF 2005-80FR:
    - Optional element <zones> introduced on element <ipc> to indicated zones at the figure level.
    - Optional functional position element <ein> and optional access panel element <accpnl> introduced on element <csn>.
    - Optional element <applics> added and optional new non-S2000M data element <n2d> introduced on element <isn>.
    - Optional new multiple cross-reference element <rtx> introduced on element <cbs>.
    - Part number data element <pas> on element <isn> changed from mandatory repeatable to optional repeatable.
  - CPF 2005-98AA:
    - New element <parasigdata> introduced on element <para> to identify a portion of free text as having a specific meaning.
    - New element <quantity> introduced on element <para> to identify a numeric value, unit of measure and tolerance. The new element contains the following:
      - Element <qtygrp> used as container for grouping multiple values and/or tolerances together.
      - Element <qtyvalue> specifying a value and optional unit of measure.
      - Element <qtytolerance> specifying a tolerance value, optional type, and optional unit of measure.
  - CPF 2005-99AA:
    - Optional element <refdm> and optional element <csnref> added to element <hotspot> to allow linking from graphic hotspots to other data modules and part information.
  - CPF 2006-02DE:
    - Optional element <applic> introduced on element <rfu>.
    - Occurrence of element <rfu> changed from optional single to optional repeatable.
  - CPF 2006-13SE:
    - Occurrence of element <datarest>, element <qa> and element <remarks> changed from optional single to optional repeatable (see elementGroups.xsd)
    - Optional single element <applic> introduced on element <datarest>, element <qa> and element <remarks> (see complexTypes.xsd)
  - CPF 2006-17DE:
    - Optional attribute check and optional attribute skill introduced on element <mainfunc>, element <dm-seq>, element <isoproc>, element <isostep>, element <isoend>, element <drill> and element <subdrill> (see complexTypes.xsd)
  - CPF 2006-18DE:

- Occurrence of element <pmd> and element <reqpers> changed from optional single to optional repeatable (see complexTypes.xsd)
- Optional single element <applic> introduced on element <pmd>, element <reqpers>, element <tgroup>, element <row> and element <entry (see complexTypes.xsd)

### 2.2.6 Version 2.3.1

Summary of changes for version 2.3.1 of the XML Schema for data modules requested by TPSMG/EPWG:

- bug corrections:
  - Restriction of type for attribute pmNumber has been changed from "xs:nonNegativeInteger" to "xs:string" to allow alphanumeric value
  - Elements <applics> and <ces> has been defined as optional in the element <isn>
  - Unit of measure "cL" and "dL" have been added to the enumeration list of potential unit

### 2.2.7 Version 3.0

Summary of changes for version 3.0 of the XML Schema for data modules requested by TPSMG/EPWG:

- CPF 2006-28DE:
  - Element <applics> removed from the wiring data content
  - Element <applic> defined as optional with single occurrence in wiring data content
- CPF 2006-47AA:
- Element <applic> modified for the new applicability content model with the removal of the following:
  - Element <type>
  - Element <model> including attribute model
  - Element <version> including attribute version and attribute id
  - Element <versrank> including attribute verstatus, attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <single>
  - Element <range> including attribute from and attribute to
  - Element <csnref> including attribute refcsn, attribute refisn, attribute refipp, attribute refrpc, attribute id, attribute level, attribute mark, attribute change, attribute rfc, attribute xlink:type, attribute xlink:href, attribute xlink:title, attribute xlink:show and attribute xlink:actuate
  - Element <nsn> including attribute nsn, attribute nsc, attribute ncb, attribute nin3to9, attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <mfc> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <pnr> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <serialno>
  - Element <batchno>
  - Element <moduleno>
  - Element <customer>

  - Element <softprog>
  - Element <maintlevel>
  - Element <mntlvl> including attribute mntlvl
  - Element <techconds> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <textual-desc> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <techcond> including attribute tccode, attribute tcno, attribute tctype, attribute mfc, attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <age>
  - Element <avee>
  - Element <issno>
  - Element <dmtitle>
  - Element <pubcode>
  - Element <pubtitle>
  - Element <pubdate>
  - Element <condtitle> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <scheduled> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <embodied> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <opconds> including attribute id, attribute level, attribute mark, attribute change and attribute rfc
  - Element <opcond> including attribute opcno, attribute opccode, attribute confirmed, attribute id, attribute level, attribute mark, attribute change and attribute rfc
- Element <applic> modified for the new applicability content model with the introduction of the following:
  - Element <displaytext> containing element <p>
  - Element <assert> including attribute actidref, attribute actreftype, attribute actvalues and attribute displayclass
  - Element <evaluate> including attribute operator and attribute displayclass
- Element <status> modified with the introduction of element <actref> containing element <refdm>
- Introduction of the new Applicability Cross-reference Table (ACT) data module type (see the modular Schema file appliccrossreftableSchema.xsd and the flat Schema file appliccrossreftable.xsd).
- The Technical conditions Cross-reference Table (TCT) data module type revised and renamed to Conditions Cross-reference Table (CCT) data module type (see the modular Schema file condcrossreftableSchema.xsd and the flat Schema file condcrossreftable.xsd).
- The Products Cross-reference Table (PCT) data module type revised (see the modular Schema file prdcrossreftableSchema.xsd and the flat Schema file prdcrossreftable.xsd).

– CPF 2006-048AA:
  - Element <expcont> content modified to capture information dealing with ITAR, EAR, and other potential government data restriction requirements.

  - Attributes expregtype and expgovauth added to element <expcont> to capture type of export regulation and government authority
  - Required element <expstatement> with enumerated attribute exprole added to content of element <expcont> containing a repeatable choice between element <p> and element <refdm>.
  - Optional element <expregcode> with attribute expregcodetype added to element <expcont>
- CPF 2006-50AA
  - Element <figure> content structure redesigned to eliminate separate branches for single and multiple illustration sheet figures
  - Element <sheet> removed from structure, along with attributes sheetno and total
  - Element <rfa> moved to content model of element <graphic>
  - Attribute group bodyatt added to element <graphic> and element <hotspot>
  - Attribute group secure added to element <graphic>
- CPF 2006-52AA:
  - New element <groupcode> added to the content model of element <contactinfo> as optional with single occurrence
  - Existing element <pnr>, existing element <circode> and existing element <secid> added to the content model of element <wireinformation> as optional with single occurrence
  - Existing element <temp>, new element <harnenv> and new element <sleeves> added to the content model of element <harninfo> as optional elements with single occurrence
  - Existing element <mint> and existing element <maxt> redefined to be optional with single occurrence under element <temp>
  - New element <harnenv> is empty with optional attribute highvibration and optional attribute hydraulic. Both attributes can have the value "0" (default) or the value "1"
  - New element <sleeve> added to the content model of element <sleeves> as mandatory with multiple occurrence. Element <sleeve> has the optional attribute sleevemat and contains the optional element <pnr>
  - Existing element <minh> and existing element <maxh> redefined to be optional with single occurrence under element <harnsize>
  - Existing element <mind> and existing element <maxd> redefined to be optional with single occurrence under element <sdia>
  - Content model of existing element <trl> under element <elecequip> redefined to contain existing optional repeatable element <eeconnection>
  - New element <instinfo> added to the content model of element <elecequip> as optional with multiple occurrence
  - Elements <instloc>, <accdopl>, <nhassy>, <posnhassy> and <sibplugid> moved from the content model of element <elecequip> down to the content model of new subordinate element <instinfo>
  - Existing element <qty> added to the content model of element <elecequip> as optional with single occurrence
  - Optional attribute instid added to elements <rfd> and <instinfo>

**Note**

Attribute instid is prohibited for use in IPD data modules

- Existing element <rfd> added to the content models of element <sibplugid> and element <nhassy> as mandatory with single occurrence
- Existing element <dsc.pnr>, new element <dsc.wicircode>, new element <dsc.wisecid> and new element <dsc.groupcode> added to the content model of element <dsc.wires> as optional elements with single occurrence
- Existing element <dsc.mint>, existing element <dsc.maxt>, new element <dsc.harnenv> and new element <dsc.sleeve> added to the content model of element <dsc.harness> as optional elements with single occurrence
- New element <dsc.qty> added to the content model of element <dsc.elecequip> as optional elements with single occurrence

– CPF 2007-001AA
  - A new attribute group cntlcontent was created with attribute authname and attribute authdoc. When used, the attribute authname is required and the attribute authdoc is optional.
  - The attribute group cntlcontent was added at the following places:
    – Element <accpnlalt>
    – Element <accpnlinfo>
    – Element <accpnl>
    – Element <acrodef>
    – Element <acronym>
    – Element <afi-proc>
    – Element <caution>
    – Element <cbalt>
    – Element <cbdata>
    – Element <cbinfo>
    – Element <cblst>
    – Element <cb>
    – Element <cfault>
    – Element <challeng>
    – Element <conitemalt>
    – Element <conitem>
    – Element <consupplyinfo>
    – Element <con>
    – Element <csnref>
    – Element <datarest>
    – Element <deftask>
    – Element <dfault>
    – Element <drill>
    – Element <einalt>
    – Element <eininfo>
    – Element <ein>
    – Element <extapp>
    – Element <figure>
    – Element <graphic>
    – Element <ifault>
    – Element <inspection>
    – Element <isoend>
    – Element <isoproc>

- Element <isostep>
- Element <msg-wmlf-desc>
- Element <multimedia>
- Element <note>
- Element <ofault>
- Element <organizationinfo>
- Element <para0>
- Element <para>
- Element <partinfo>
- Element <pmd>
- Element <procd>
- Element <p>
- Element <randlist>
- Element <refdm>
- Element <refinspec>
- Element <reftp>
- Element <reqpers>
- Element <row>
- Element <seqlist>
- Element <shippingfo>
- Element <spare>
- Element <step1-alt>
- Element <step1>
- Element <step2-alt>
- Element <step2>
- Element <step3-alt>
- Element <step3>
- Element <step4-alt>
- Element <step4>
- Element <step5-alt>
- Element <step5>
- Element <step6-alt>
- Element <step6>
- Element <step7-alt>
- Element <step7>
- Element <step8-alt>
- Element <step8>
- Element <step>
- Element <subdrill>
- Element <subpara1>
- Element <subpara2>
- Element <subpara3>
- Element <subpara4>
- Element <subpara5>
- Element <subpara6>
- Element <subpara7>
- Element <supequi>
- Element <supply>

  - Element <symbol>
  - Element <table>
  - Element <taskitem>
  - Element <term>
  - Element <toolalt>
  - Element <toolinfo>
  - Element <tool>
  - Element <warning>
  - Element <wmlfMsgDesc>
  - Element <xref>
  - Element <zonealt>
  - Element <zoneinfo>
  - Element <zone>
- CPF 2007-008GB:
  - Moved optional element <srcdmaddres> as the first child element of element <status>
- CPF 2005-80FR:
  - Three allowable values added to the attribute reftype of the element <rtx> to indicate equivalent, substitute and attaching part relationships. These three values had been omitted from the introduction of the attribute reftype in Issue 2.3.
- Bug fix
  - The attribute xlink:type, the attribute xlink:href, the attribute xlink:title, the attribute xlink:show and the attribute xlink:actuate were added to element <ctl>

### 2.2.8 Version 3.0.1

Summary of changes for version 3.0.1 of the XML Schema for data modules requested by TPSMG/EPWG:

- bug corrections:
  - Restriction of type for attribute pmNumber has been changed from "xs:nonNegativeInteger" to "xs:string" to allow alphanumeric value
  - Elements <applics> and <ces> has been defined as optional in the element <isn>
  - Unit of measure "cL" and "dL" have been added to the enumeration list of potential unit

### 2.2.9 Version 4.0

Summary of changes for version 4.0 of the XML Schema for data modules requested by TPSMG/EPWG:

- CPF 2004-051DE:
  - Content models of element <dmAddress> (old element <dmaddres>) and element <sourceDmIdent> (old element <srcdmaddres>) changed from (identExtension?, dmCode, dmTitle, issueInfo, issueDate, language?) to (identExtension?, dmCode, language?, issueInfo, issueDate, dmTitle)
  - Content model of element <dmRef> (old element <refdm>) changed from (identExtension?, dmCode, dmTitle?, issueInfo?, issueDate?, language?) to (identExtension?, dmCode, language?, issueInfo?, issueDate?, dmTitle?)
  - Content model of element <pmAddress> (old element <pmaddres>) changed from

(pmCode, pmTitle, issueInfo, issueDate, language?) to
(pmCode, language?, issueInfo, issueDate, pmTitle)

- Content model of element <pmRef> (old element <refpm> and old element <crefpm>) changed from
(pmCode, pmTitle?, issueInfo?, issueDate?, language?, …) to
(pmCode, language?, issueInfo?, issueDate?, pmTitle?, …)
- Content model of element <techPubRef> (old element <reftp>) changed from (…, pubCode, pubTitle?, pubDate?, …) to (…, pubCode, pubDate?, pubTitle?, …)
- Content model of element <externalPubRef> (old element <refextp>) changed from
(externalPubCode, pubTitle?, pubDate?, …) to
(externalPubCode, pubDate?, pubTitle?, …)
- Content model of element <commentStatusSection> (old element <cstatus>) changed from
(commentIdent, commentTitle?, issueDate, language?,...) to
(commentIdent, language?, issueDate, commentTitle?,...)

– CPF 2004-060US:
  - Step/substep structure (element <step1> thru element <step8>) replaced with a recursive element <proceduralStep>
  - Para/subPara structure (element <para0>, element <subpara1> thru element <subpara7>) replaced with a recursive element <levelledPara>

– CPF 2004-067SE:
  - New element <warningsAndCautions> added to the content models of element <content>.
  - New attribute warningRefs and attribute cautionRefs were added at the following places:
    – element <crewDrill>
    – element <crewDrillStep>
    – element <crewRefCard>
    – element <descrContactSize>
    – element <descrCrew>
    – element <description>
    – element <entry>
    – element <isolationProcedureEnd>
    – element <isolationStep>
    – element <levelledPara>
    – element <proceduralStep>
    – element <safetyRqmts>

– CPF 2005-010FR:
  - New optional element <internalRef> added to the element <catalogSeqNumberElemType> in order to allow hotspot management in IPD data module.

– CPF 2006-05US:
  - Element <dialog> has been modified to occur within the element <step> and thus within the context of the question.

– CPF 2006-016DE:
  - Element <age> and element <avee> removed from the content models of element <dmCode> (old element <dmc>) and element <dmRef> (old element <refdm>, old element <addresdm> and old element <crefdm>)

– CPF 2006-41US:

- Element <assertion> has been added as a child of element <reqcond> and element <closereq> in order to provide the ability to record in the state table that a certain <reqcond> or <closereq> has been completed.

– CPF 2006-044US:
  - The attribute inwork of element <issueInfo> is now required (old element <issno>)

– CPF 2006-045SE:
  - New optional element <snsRules> added to the element <brex> in order to enhance the brex data module to meet more of the needs.

– CPF 2006-046SE:
  - Sequences of repeated sibling elements have been wrapped in their own elements in order to enhance clarity in the schemas. The elements which structures have changed are <definitionList>, <deliveryList>, <equip>, <locationRcmdSegment>, <observedFault>, <reqPersons>, <sruItem>.
  - A number of wrapper elements have been added to make structures more easily understood
    – <definitionListItem> in <definitionList>
    – <deliveryListItem> in <deliveryList>
    – <equip> - <equipGroup> added to contain <equip>
    – <locationRcmd> in <locationRcmdSegment>
    – <contextAndIsolationInfo> in <observedFault>
    – <person> in <reqPersons> - element is restructured and a sibling <personnel> is added to be used when required individuals cannot be specified
    – <sruItem> in <lruItem> - each <sruItem> now represents one item
  - Mixed content has been eliminated in the following elements
    – <displayText>
    – <entry>
    – <listItem>
    – <listItemDefinition>
    – <reasonForUpdate>
    – <remarks>

– CPF 2006-055AA:
  - New descriptive element <enterpriseSpec > has been added in order to inform about business entities.

– CPF 2006-056SE:
  - Removed the possibility to define applicability annotations directly in line within the content. All applicability annotations must now be defined within the element <inlineApplicGroup> in the identification and status section. This caused removal of the element <applic> from the following elements:
    – Element <accessory>
    – Element <accpnlalt>
    – Element <afi-proc>
    – Element <bfe>
    – Element <button>
    – Element <capbody>
    – Element <capentry>
    – Element <capgrp>

- Element <caprow>
- Element <caption>
- Element <case>
- Element <caution>
- Element <cbalt>
- Element <cbdata>
- Element <cblst>
- Element <cbsublst>
- Element <cfault>
- Element <challeng>
- Element <conduit>
- Element <conitemalt>
- Element <connector>
- Element <crewmem>
- Element <crew>
- Element <datarest>
- Element <deflist>
- Element <deftask>
- Element <def>
- Element <dfault>
- Element <dialog>
- Element <dm-node>
- Element <einalt>
- Element <elecequip>
- Element <elseif>
- Element <endmattr>
- Element <entry>
- Element <fillin>
- Element <ftnote>
- Element <graphic>
- Element <harness>
- Element <hotspot>
- Element <ics>
- Element <ident-sleeve>
- Element <ifault>
- Element <if>
- Element <item>
- Element <menuchoice>
- Element <menu>
- Element <message>
- Element <multimediaobject>
- Element <note>

- Element <ofault>
- Element <para>
- Element <pmd>
- Element <procd>
- Element <qa>
- Element <randlist>
- Element <refdm>
- Element <reftp>
- Element <remarks>
- Element <reqcblst>
- Element <reqcondm>
- Element <reqcond>
- Element <reqcontp>
- Element <reqpers>
- Element <response>
- Element <rfa>
- Element <rfu>
- Element <row>
- Element <rplby>
- Element <seqlist>
- Element <shrink-sleeve>
- Element <solder-sleeve>
- Element <spare>
- Element <stocknbr>
- Element <supequi>
- Element <supply>
- Element <symbol>
- Element <table>
- Element <taskitem>
- Element <term>
- Element <tgroup>
- Element <timelim>
- Element <toolalt>
- Element <vpart>
- Element <warning>
- Element <wire-mat>
- Element <wireid>
- Element <wmlfMsgDesc>
- Element <xref>
- Element <zonealt>

- CPF 2006-60US:
  - New element <controlIndicatorRepository> added to technical information repository. The new element introduces the following elements:

    - Element <controlIndicatorRef>
    - Element <controlIndicatorDescr>
    - Element <controlIndicatorFunction>
    - Element <controlIndicatorGroup>
    - Element <controlIndicatorSpec> including attribute controlIndicatorNumber
    - Element <controlIndicatorKey>
    - Element <controlIndicatorName>
- CPF 2006-65US:
  - New values added for the attribute numberAction on element <numberFunction>, including:
    - Value "commonLogarithm"
    - Value "cosecant"
    - Value "cosine"
    - Value "cotangent"
    - Value "exponential"
    - Value "factorial"
    - Value "hyperbolicCosecant"
    - Value "hyperbolicCosine"
    - Value "hyperbolicCotangent"
    - Value "hyperbolicSecant"
    - Value "hyperbolicSine"
    - Value "hyperbolicTangent"
    - Value "inverseCosecant"
    - Value "inverseCosine"
    - Value "inverseCotangent"
    - Value "inverseSecant"
    - Value "inverseSine"
    - Value "inverseTangent"
    - Value "naturalLogarithm"
    - Value "secant"
    - Value "sine"
    - Value "squareRoot"
    - Value "tangent"
- CPF 2006-066US:
  - New element <warningAndCautionPara> added to restrict the schema as detailed by the specification. The new element introduces the following elements:
    - Element <attentionRandomList>
    - Element <attentionRandomListItem>
    - Element <attentionListItemPara>
    - Group "attentionText" (redefined from group "text") to comply with the specification.
- CPF 2006-068US:
  - Added security attributes to all elements which already contained an attribute id and the change attributes and did not already contain security attributes.
  - Modified the attribute groups to enable easier maintenance of the schemas. There is no noticeable affect to users of the spec.
- CPF 2006-69US:
  - New element <supersedure> added.

- CPF 2006-75US:
  - New element <reqTechInfoGroup> added, which includes the following elements:
    - Element <reqTechInfo> and the attribute reqTechInfoCategory
    - Element <dmRef>
    - Element <pmRef>
    - Element <externalPubRef>
    - Attribute reqCondCategory on element <reqCond>
    - Attribute numRequired on element <personnel>
- CPF 2006-077US:
  - New attribute PartCharacteristic added to element <itemSeqNumber> in order to identify the type of part.
- CPF 2006-079US:
  - New element <lowestAuthorizedLevelGroup> added to element <supplySpec> in order to add the maintenance level to the technical data repository model.
- CPF 2006-84US:
  - New attribute pmEntryType added to element <pmEntry>
- CPF 2006-90US:
  - The FFT group has been modified to fmftElemGroup add added to element <dmNode> in order to add choice of figure to element <proceduralStep>.
- CPF 2006-95US:
  - Element <maintAllocation> and optional elements <toolsList> and <remarksList> has been added to <maintPlanning> in order to include markup for maintenance allocation chart.
- CPF 2006-99US:
  - New element <definitionListHeader>, which includes the following elements:
    - Element <termTitle>
    - Element <definitionTitle>
- CPF 2006-100US:
  - New general information element <commonInfo> has been added to procedural, schedule and fault data module.
- CPF 2006-101US:
  - New attribute crewStepCondition added to element <crewDrill> and element <crewDrillStep>
  - New attribute itemCharacteristic added to element <proceduralStep>
  - New attribute partCharacteristic added to the element <itemSequenceNumber>
- CPF 2006-102US:
  - New attribute keepWithNext added to element <crewDrillStep>, element <isolationStep>, and element <proceduralStep>
- CPF 2007-045AA:
  - New optional element <productSafety> added to the element <dmStatus> in order to provide definition, business rules and means of identification for alert service bulletins.
- CPF 2007-047AA:
  - Replace the reference to element <failureEffectCategory> with a reference to element <reqmtSourceType> into the schedule data module in order to provide additional information of Requirement Source.

- CPF 2007-051AA:
  - New limited note paragraph element <notePara> added for use in notes with the introduction of sub elements:
  - New limited note ordered and unordered lists, element <noteOrderedList> and element <noteRandomList>, which contains sub element <noteListItem> which contains sub element <noteListItemPara>
- CPF 2007-068US:
  - Element <task> has been deleted and replaced by <taskTitle> and <taskDescr>
- CPF 2007-069AA:
  - New optional element <workArea> added to the element <productionMaintData> in order to define the area of the airplane where the majority of the task is accomplished.
- CPF 2007-073S1:
  - Identifications of various CSDB objects are changed so that true identifying items are now attributes.
- CPF 2007-077SE:
  - Change markup method has been changed. The new method provides a factorized management of change descriptions. A change is now described and stored in an element <reasonForUpdate> in the identification and status section, and then referred to from applicable context by use of the new attribute reasonForUpdateRefIds. Change marking is possible where it used to be.
- CPF 2007-78US:
  - New data module type checklist was added, which includes the following elements:
    - Element <checkList> including attributes checkListType, checkListCategory
    - Element <checkListGroup>
    - Element <checkListInfo>
    - Element <checkListItem>
    - Element <checkListInterval>
    - Element <checkListIntervals>
    - Element <checkListPara>
    - Element <checkListProcedure> including attribute safeFlight
    - Element <checkListStep>
    - Element <equipmentNotAvailable>
    - Element <itemNumber>
    - Element <workArea>
- CPF 2007-094S1:
  - All child elements of element <expression> which represent operations have been converted as follows:

| From | To |
|---|---|
| <add> | <setOperator setOperation="add"/> |
| <and> | <booleanOperator booleanOperation="and"/> |
| <concat> | <stringOperator stringOperation="concatenate"/> |
| <defined> | <booleanFunction booleanAction="defined"/> |
| <divide> | <numberOperator numberOperation="divide"/> |

| | |
|---|---|
| <disjoint> | <setOperator setOperation="disjoint"/> |
| <eq> | <booleanOperator booleanOperation="equal"/> |
| | <numberOperator numberOperation="equal"/> |
| | <stringOperator stringOperation="equal"/> |
| | <setOperator setOperation="equal"/> |
| <empty> | <stringFunction stringAction="empty"/> |
| | <setFunction setAction="empty"/> |
| <exponent> | <numberOperator numberOperation="exponent"/> |
| <float> | <numberFunction numberAction="float"/> |
| <ge> | <numberOperator numberOperation="greaterThanOrEqual"/> |
| <gt> | <numberOperator numberOperation="greaterThan"/> |
| <idivide> | <numberOperator numberOperation="integerDivide"/> |
| <index> | <subStringFunction> |
| <intersect> | <setOperator setOperation="intersection"/> |
| <le> | <numberOperator numberOperation="lessThanOrEqual"/> |
| <lt> | <numberOperator numberOperation="lessThan"/> |
| <member> | <setOperator setOperation="member"/> |
| <minus> | <numberOperator numberOperation="minus"/> |
| <modulus> | <numberOperator numberOperation="modulus"/> |
| <ne> | <booleanOperator booleanOperation="notEqual"/> |
| | <numberOperator numberOperation="notEqual"/> |
| | <stringOperator stringOperation="notEqual"/> |
| | <setOperator setOperation="notEqual"/> |
| <neg> | <numberFunction numberAction="negative"/> |
| <not> | <booleanFunction booleanAction="not"/> |
| <or> | <booleanOperator booleanOperation="or"/> |
| <plus> | <numberOperator numberOperation="plus"/> |
| <remove> | <setOperator setOperation="remove"/> |
| <set-diff> | <setOperator setOperation="setDifference"/> |
| <sizeof> | <stringFunction stringAction="sizeOf"/> |
| | <setFunction setAction="sizeOf"/> |

```
<subset>      <setOperator setOperation="subset"/>
<substring>   <stringOperator stringOperation="contains"/>
<times>       <numberOperator numberOperation="times"/>
<trunc>       <numberFunction numberAction="truncate"/>
<union>       <setOperator setOperation="union"/>
<xor>         <booleanOperator booleanOperation="exclusiveOr"/>
```

- CPF 2007-096SE:
  - Common attribute names, such as the attribute `type` which existed in more than 20 places, have been renamed to be more specific to the context in which they are used.
- CPF 2007-097SE:
  - The structure of reference mechanism has been harmonized, which affects all of Data module, Publication module, data module list and data dispatch note.
- CPF 2007-098SE:
  - The top structure and the identification of the CSDB objects have been harmonized, which affects all of Data module, Publication module, data module list, data dispatch note and Comment.
- CPF 2007-099SE:
  - The structures in preliminary requirements used to contain required support equipment, required supplies and spares have been changed to remove a confusing appearance of the <`refs`> element.
  - To harmonize with similar references pointing into the tech repository the <`catalogSeqNumberRef`> has been equipped with a <`dmRef`> element for explicit referencing when suitable.
- CPF 2007-101SE:
  - The possibility to specify allowable values of elements and/or attributes in a BREX has been extended by a "pattern" option. The way to specify a range of values has changed at the same time. Therefore element <`valueAllowed`> has been added, while element <`valueLow`> and element <`valueHigh`> have been deleted. Value set of attribute `valueForm` has been extended by value "`pattern`".
- CPF 2007-106AA:
  - New optional descriptive element <`relatedTask`> has been added to the schedule XML Schemain order to inform relationship between maintenance requirements.
- CPF 2007-108S1:
  - Harmonize the elements <`responsiblePartnerCompany`> (<`rpc`>) and <`originator`> (<`orig`>). These elements have similar content and should be modified to reuse existing elements. The attribute `enterpriseCode`, used to capture the CAGE value, was added to both elements. Each element now includes an optional element <`enterpriseName`> to capture the originator or responsible partner company. Paragraph text, business rules, and markup examples were modified to reflect these changes.
- CPF 2007-111S1:
  - The stepcon group was modified to require a title or a paragraph structure to eliminate the possibility of creating an empty step.
- CPF 2007-112S1:
  - The way to specify a range of values has changed for the element <`serialno`>. The element <`single`> and element <`range`> were removed from parent element <`serialno`> while the attribute `serialNumberForm` and attribute `serialNumberValue` have been added.
- CPF 2007-113S1:

- Boolean inconsistencies were harmonized as follows:
  - attribute `allowedNotationFlag` type changed from value "`xs:Boolean`" to value "`yesOrNoAttType`"
  - attribute `memorizeStepsFlag` and attribute `orderedStepsFlag` changed to type value "`yesOrNoAttType`"
  - attribute `connectedFlag` type changed from value "`unsignedByte`" to value "`yesOrNoAttType`"
  - elements changed to attributes with type value "`yesOrNoAttType`" are `monitoredFlag`, `collaredCircuitBreakerFlag`, `provisionedFlag`, `etopsFlag`, `hazardousFlag`, `deliveredSpecificationFlag`, `normativeComponentFlag`, `obsoleteFlag` and `specialLabelFlag`

# Chapter 7.3.1.2

## *Data module Schema - Modular structure*

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## 1 General

This chapter describes the modular Schema for data modules and gives background information on its development and maintenance procedures.

## 2 Modular structure

### 2.1 Background

#### 2.1.1 Application of XML

S1000D requires a unified and neutral way of describing technical information for the Product in any project. This chapter details the S1000D application of XML, a method for describing the structure of a technical document regardless of the final publishing process. XML is system and

platform independent data format, thus enabling interchange of technical information across software applications.

The S1000D Schemas for data modules consist of entities which are specific to a type of data module as specified in Chap 3.9.5.2. This modular design of the Schemas allows for incremental update when new types of data modules are required.

To provide a versatile support to system/tool implementers, S1000D contains definitions of the object structures (data modules, etc) in several formats. Thus, apart from the modular Schema, which is the master, all structures are also provided in the flat Schema.

### 2.1.2 Development objectives

The S1000D Schemas for data modules have been developed with the following objectives:

- modular form. The master Schemas have a modular form that provides a very good basis for simple and safe maintenance of the Schemas.
- compliance with standards. The prime structure of the Schemas reflects the S1000D specification. The Schemas comply with W3C recommendations.
- versatile implementation formats. The modular master Schemas enable simple automatic generation of the data module structures in flat Schemas.
- backward compatibility. To ensure as far as possible backward compatibility between subsequent versions and the initial Schemas.

### 2.1.3 Development phases

#### 2.1.3.1 Analysis

Schema development involved the analysis of S1000D requirements, the generation of XML content models and the evaluation of the most effective way of modularization. Structure charts produced from the analysis of different data module types were included in this phase.

#### 2.1.3.2 Testing

Schema testing is undertaken at two levels:

- component testing of the individual Schema modules
- integrated testing of the complete Schema

During construction and update, the Schemas are parsed to ensure compliance with the W3C recommendations. To ensure a wide usability of the Schemas, this activity is carried out on a number of different available parsers. The testing includes integration of graphics and multimedia objects with the XML coded text.

#### 2.1.3.3 Review and approval

Before release of a specific version reflecting the requirements of the corresponding S1000D issue and change, the Schemas are reviewed by the Electronic Publications Working Group (EPWG) and approved by the Steering Committee.

### 2.1.4 Life cycle management

To achieve the necessary control during subsequent maintenance of the Schemas a life cycle management procedure is applied. Strict version control of releases is maintained.

Fig 1 shows the development and life cycle upgrade plan.

ICN-S1000D-A-07030102-G-S3627-00058-A-03-1

*Fig 1 Schema development and life cycle upgrade plan*

### 2.1.5 Ownership and usage

The S1000D Schemas are in the public domain; however, they remain the property of the S1000D issuing authorities. There are no additional charges or royalties required. In the event that users change the Schemas, then it is not allowed to use the name or reference S1000D Schemas for the results.

## 2.2 Overview of modular structure

This section gives an overview of the structural breakdown of the Schemas for data modules.

### 2.2.1 Theory of operation

The modular Schema structure is controlled by incorporating the different Schema modules as required. The paths through the Schema are given by references to and inclusion of the corresponding Schema modules. As applicable redefinitions of reused schema objects are made.

There is one main entry for each type of data module structure. The main entry for Schemas is given in each data module XML instance by attribute `xsi:noNamespaceSchemaLocation` of the root element <`dmodule`>.

Each "main" entity:

- redefines as needed the definition of objects that are reused
- includes the various components (complexTypes)
- declares the root element <`dmodule`>

# Chapter 7.3.1.3

## *Data module Schema - Invocation*

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# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide technical information on S1000D XML Schema invocation.

## 1.2 Scope

This chapter describes how to invoke the appropriate XML Schemas which specify the structures of the various types of data modules.

For each data module type the chapter shows how to call the XML Schema for the same data module type.

For XML instances to be validated against the corresponding XML Schema, the main entry point to the XML Schema modular must be given as the content of attribute `xsi:noNamespaceSchemaLocation` of element <`dmodule`> in Uniform Resource Locator (URL) form. Examples are given below.

# 2 Applicability cross-reference information

## 2.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_master/
appliccrossreftableSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
```

```
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 2.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_flat/appliccrossreftable.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 3 Business rules exchange

### 3.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/brexSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 3.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/dm/brex.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 4 Check list

### 4.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/checklistSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 4.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/checklist.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 5 Conditions cross-reference information

### 5.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/condcrossreftableSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 5.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_flat/condcrossreftable.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 6 Container information

### 6.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/containerSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 6.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/container.xsd"
```

```
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 7 Crew/Operator information

## 7.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/crewSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 7.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/crew.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 8 Descriptive information

## 8.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/descriptSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 8.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/descript.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 9 Fault information

## 9.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/faultSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 9.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/fault.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 10 Learning

## 10.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/learningSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 10.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/learning.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 11 Maintenance planning information

## 11.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
```

```
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/schedulSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 11.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_flat/schedulSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 12 Parts information

### 12.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/ipdSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 12.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/ipd.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 13 Procedural information

### 13.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/procedSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 13.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/proced.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 14 Process module information

### 14.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/processSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 14.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
http://www.s1000d.org/S1000D_4-0/xml_schema_flat/process.xsd
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 15 Products cross-reference information

### 15.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/prdcrossreftableSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

### 15.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_flat/prdcrossreftable.xsd"
```

```
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 16 Technical repository information

## 16.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/techrepSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 16.2 XML flat schema instances

```
<!DOCTYPE dmodule [

]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/techrep.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 17 Wiring data information

## 17.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/wrngdataSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 17.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/wrngdata.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# 18 Wiring data description information

## 18.1 XML modular schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_master/wrngflds.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

## 18.2 XML flat schema instances

```
<!DOCTYPE dmodule [
]>

<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/wrngflds.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
```

# Chapter 7.3.1.4

# Data module Schema - Backwards compatibility

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| Chap No./Document No. | Title |
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| Chap 3.9.6 | Authoring - Attributes |

# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide a summary of backward incompatibilities since version 2.0 of the XML Schema for data modules. Each new version is compared to the preceding one.

# 2 Version 2.0

## 2.1 Attributes values

### 2.1.1 Security classification

Due to the expansion of the set of values on attribute `class` of element <`security`> to 99 possibilities, it has been decided to amend the values below 10 by a leading zero. Any instance conversion is required to produce two-digit values, ie value "`1`" thru value "`9`" must be converted to value "`01`" thru value "`09`", respectively.

### 2.1.2 Skill levels

The personnel skill levels given by attribute `skill` of element <`skill`>, element <`perskill`>, element <`timelim`>, element <`deftask`>, element <`taskitem`>, element <`step`>, element <`isostep`>, element <`isoend`>, element <`step1`>, element <`step2`>, element <`step3`>, element <`step4`> and element <`step5`> have been expanded and generalized. Table 2 shows the conversion requirements for the values.

*Table 2 Skill level values*

| Old value | New value |
|---|---|
| b | sk01 |
| i | sk02 |
| a | sk03 |

### 2.1.3 Emphasis

The set of emphasis values on attribute `emph` of element <`emphasis`> has been expanded and generalized. Value "`em01`" has been declared to be the default. Table 3 shows the conversion requirements for the values.

*Table 3 Emphasis type values*

| Old value | New value |
|---|---|
| bold | em01 |
| italic | em02 |
| underscr | em03 |

### 2.1.4 Prefix of random list items

The set of values on attribute `prefix` of element <`randlist`> has been expanded and generalized. In addition, value "`pf02`" has now been declared to be the default. Table 4 shows the conversion requirements for the values.

*Table 4 Prefix type values*

| Old value | New value |
|---|---|
| simple | pf01 |

| Old value | New value |
|---|---|
| unorder | pf02 |

### 2.1.5 Caption colors

The set of values on attribute `colour` of element <`caption`> has been expanded and generalized. Value "`co09`" has been declared to be the default. Table 5 shows the conversion requirements for the values.

*Table 5 Caption color values*

| Old value | New value |
|---|---|
| amber | co02 |
| clear | co09 |
| green | co01 |
| grey | co08 |
| red | co04 |
| white | co07 |
| yellow | co03 |

### 2.1.6 Crew members

The set of values on attribute `crewmem` of element <`crewmem`> has been expanded and generalized. Table 6 shows the conversion requirements for the values.

*Table 6 Crew member values*

| Old value | New value |
|---|---|
| all | cm01 |
| c | cm03 |
| cs | cm08 |
| e | cm05 |
| g | cm06 |
| lm | cm07 |
| n | cm04 |
| p | cm02 |

### 2.1.7 Drill types

The set of values on attribute `drilltyp` of element <`drill`> has been expanded and generalized. Value "`dt00`" has been declared to be the default. Table 7 shows the conversion requirements for the values.

*Table 7 Drill type values*

| Old value | New value |
|---|---|
| amber | dt02 |
| blue | dt06 |
| green | dt01 |
| none | dt00 |
| orange | dt05 |
| red | dt04 |
| yellow | dt03 |

### 2.1.8 Supervisor levels

The set of values on attribute `sup.lev` of element <`supervis`> has been expanded and generalized. Table 8 shows the conversion requirements for the values.

*Table 8 Supervisor level values*

| Old value | New value |
|---|---|
| 1 | sl01 |
| 2 | sl02 |
| 3 | sl03 |
| 4 | sl04 |

### 2.1.9 Limit types

The set of values on attribute `type` of element <`limittype`> has been expanded and generalized. Table 9 shows the conversion requirements for the values.

*Table 9 Limit type values*

| Old value | New value |
|---|---|
| cm | lt06 |
| fc | lt07 |
| ht | lt02 |
| oc | lt05 |
| otl | lt04 |

| Old value | New value |
|---|---|
| slm | lt03 |
| tbo | lt01 |

### 2.1.10 Measurement units for threshold interval

The set of values on attribute `uom` of element <`threshold`> and element <`thi`> has been expanded and generalized. Table 10 shows the conversion requirements for the values.

*Table 10 Unit of measurement values*

| Old value | New value |
|---|---|
| apuchg | th12 |
| days | th06 |
| engchg | th10 |
| engcyc | th09 |
| fltcyc | th02 |
| flthrs | th01 |
| landgchg | th13 |
| months | th03 |
| presscyc | th08 |
| shopvist | th11 |
| supercyc | th07 |
| weeks | th04 |
| wheelchg | th14 |
| years | th05 |

## 2.2 Content models

### 2.2.1 Applicability

#### 2.2.1.1 Element <`model`>

A new substructure concerning element <`csnref`>, element <`nsn`>, element <`mfc`>, element <`pnr`> and element <`serialno`> has been introduced. Fig 1 and Fig 2 illustrate the content model changes on element <`model`>.

ICN-S1000D-A-07030106-0-C0419-00081-A-01-1

*Fig 1 Content model of element <model> at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00082-A-01-1

*Fig 2 Content model of element <model> at version 2.0*

Element <pnr> and element <serialno> now occur only as right siblings of element <mfc>, ie element <mfc> must precede element <pnr> and/or element <serialno>.

If there is no element <mfc> in front of either element <pnr> or element <serialno> in 1.9 instances, then element <mfc> with empty content (<mfc></mfc>) has to be inserted to get valid 2.0 instances.

2.2.1.2 Element <config>

Element <mod> has been introduced and amended by optional new sub element <modtitle> under element <config>. This construct makes attribute premod, attribute premodtitle, attribute postmod and attribute postmodtitle of element <config> obsolete.

If used, the contents of attribute premod and attribute premodtitle have to be split and moved to attribute authno and sub element <modtitle> of repeated element <mod>, respectively. In addition, the content of attribute modtype on element <mod> has to be set to the value "pre" for every occurrence.

Similar, the contents of attribute postmod and attribute postmodtitle have to be split and moved to attribute authno and sub element <modtitle> of repeated element <mod>, respectively. In addition, the content of attribute modtype on element <mod> has to be set to the value "post" for every occurrence.

Element <presb> and element <postsb> have been replaced by the single element <sb> with attribute sbcond. The use of previous element <presb> has to be indicated by value "pre" of new element <sb>. Similar, the use of previous element <postsb> has to be indicated by value "post" of new element <sb>. Fig 3 and Fig 4 illustrate the content model changes on element <config> within the applicability structure.

ICN-S1000D-A-07030106-0-C0419-00083-A-01-1

*Fig 3 Content model of element <config> at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00084-A-01-1

*Fig 4 Content model of element <`config`> at version 2.0*

### 2.2.2 Preliminary requirements

For consistency reasons, the new substructure of element <`model`> concerning element <`csnref`>, element <`nsn`>, element <`mfc`>, element <`pnr`> and element <`serialno`> has been adopted under element <`identno`> for support equipment, supplies and spares within preliminary requirements. Fig 5 thru Fig 10 illustrate the content model changes on element <`supequi`>, element <`supply`> and element <`spare`>.

As above, element <`mfc`> must precede element <`pnr`> and/or element <`serialno`> to get valid 2.0 instances.

#### 2.2.2.1 Element <`supequi`>

ICN-S1000D-A-07030106-0-C0419-00085-A-01-1

*Fig 5 Content model of element <`supequi`> at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00086-A-01-1

*Fig 6 Content model of element <supequi> at version 2.0*

2.2.2.2 Element <supply>

ICN-S1000D-A-07030106-0-C0419-00087-A-01-1

*Fig 7 Content model of element <supply> at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00088-A-01-1

*Fig 8 Content model of element <supply> at version 2.0*

2.2.2.3 Element <spare>

ICN-S1000D-A-07030106-0-C0419-00089-A-01-1

*Fig 9 Content model of element <spare> at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00090-A-01-1

*Fig 10 Content model of element <spare> at version 2.0*

### 2.2.3 Warnings, cautions and notes

2.2.3.1 Element <specpara>

Due to the introduction of optional step titles, element <specpara> has been removed from the Document Type Definition (DTD). An instance conversion is required to remove element <specpara> and possibly move any warning, caution or note to its proper location according to the rules given in this issue of the specification.

Fig 11 and Fig 12 illustrate the content model changes on element <step1> concerning the removal of element <specpara>.

ICN-S1000D-A-07030106-0-C0419-00091-A-01-1

*Fig 11 Content model of warnings, cautions and notes at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00092-A-01-1

*Fig 12 Content model of warnings, cautions and notes at version 2.0*

2.2.3.2 Warning, caution and note symbols

As shown in Fig 11 and Fig 12 above, symbols used for warnings, cautions and notes have now to be marked up by element <symbol> instead of element <graphic>.

### 2.2.4 Crew challenge and response

Due to the introduction of step titles and to consistency reasons concerning XML Schemas for data modules, the content model of element <step> for crew/operator procedural steps has been changed as shown in Fig 13 and Fig 14.

In order to get valid instances, new parent element <challrsp> of element <challeng> and element <response> have been introduced in crew type data modules.

ICN-S1000D-A-07030106-0-C0419-00093-A-01-1

*Fig 13 Content model of crew/operator steps at version 1.9*

ICN-S1000D-A-07030106-0-C0419-00094-A-01-1

*Fig 14 Content model of crew/operator steps at version 2.0*

# 3 Version 2.1

## 3.1 Process data module

### 3.1.1 Renamed elements

Element <`choice`> has been renamed to element <`menuchoice`>, and element <`nil`> has been renamed to element <`novalue`>.

### 3.1.2 Content model changes

The content model of element <`menuchoice`> has been simplified by removing the functionality to cascade dialogs. Instead, element <`noassertions`> has been introduced. Fig 15 and Fig 16 illustrate this content model change.

ICN-S1000D-A-07030106-0-C0419-00120-A-01-1

*Fig 15 Content model of dialogs at version 2.0*

ICN-S1000D-A-07030106-0-C0419-00121-A-01-1

*Fig 16 Content model of dialogs at version 2.1*

### 3.1.3 Removed attribute values

Value "`nil`" has been removed from attribute `valuetype` of element <`variable`>.

## 3.2 Prefix of random list items for XML Schemas

Attribute `prefix` on element <`randlist`> has been declared to be required in XML Schemas with no default value in accordance with the XML Schema recommendation.

# 4 Version 2.2

## 4.1 Common constructs

### 4.1.1 Applicability

Sub element <`level`> has been replaced by element <`maintlevel`> which contains new sub element <`mntlvl`> to allow for the markup of generic maintenance levels.

Fig 17 and Fig 18 illustrate the change.

ICN-S1000D-A-07030106-0-C0419-00169-A-01-1

*Fig 17 Content model of element <`model`> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00170-A-01-1

*Fig 18 Content model of element <model> at version 2.2*

The values of attribute `mntlvl` on element <`mntlvl`> allow for the encoding of 99 maintenance levels which includes combinations. They are named "`ml01`" thru "`ml99`".

The allocation and meaning of the values is given in Chap 3.9.6. There is no automated conversion of the values of previous attribute `olevel`, attribute `dlevel` and attribute `ilevel` on replaced element <`level`> possible.

### 4.1.2 References

4.1.2.1 Element <`refs`>

The content model of element <`refs`> has been revised to contain only element <`refdm`> and element <`reftp`>. Sub element <`norefs`>, sub element <`rdandrt`> and sub element <`refdms`> were removed.

4.1.2.2 Element <`reftp`>

Sub element <`techpub`> has been deleted on element <`reftp`>. The content model of previous sub element <`techpub`> has been moved up to element <`reftp`> and revised. It contains new entity %`TEXT-NOREFS`; instead of entity %`text`;. Sub element <`change`> and sub element <`emphasis`> are therefore no longer permitted under element <`reftp`>.

4.1.2.3 Content model changes

Fig 19 and Fig 20 illustrate the content model changes on element <`refs`> and element <`reftp`>.

ICN-S1000D-A-07030106-0-C0419-00171-A-01-1

*Fig 19 Content models of element <refs> and element <reftp> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00172-A-01-1

*Fig 20 Content models of element <refs> and element <reftp> at version 2.2*

## 4.2 Identification and status section

### 4.2.1 Data restrictions

The content model of element <copyright> has been revised to contain only sub element <para>. This permits now to have

- several copyright statements on a single data module and/or
- a reference to a dedicated data module containing the copyright applicable to several or all data modules

Sub element <holder>, sub element <firstyear>, sub element <lastyear>, sub element <registeredwith> and sub element <govtlicense> were deleted.

Fig 21 and Fig 22 illustrate these changes.

ICN-S1000D-A-07030106-0-C0419-00173-A-01-1

*Fig 21 Content model of element <`copyright`> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00174-A-01-1

*Fig 22 Content model of element <`copyright`> at version 2.2*

### 4.2.2 Business rules exchange reference

Due to the introduction of a dedicated data module Schema for BREX information, it has been agreed to create a new mandatory element <`brexref`> in the status section for all data module types. This new element contains element <`refdm`> which is used to refer to the applicable business rules data module.

Fig 23 and Fig 24 illustrate this change.

ICN-S1000D-A-07030106-0-C0419-00175-A-01-1

*Fig 23 Content model of element <`status`> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00176-A-01-1

*Fig 24 Content model of element <`status`> at version 2.2*

## 4.3 Content section

4.3.1.1 Figures, foldouts and tables

Element <figure>, element <foldout> and element <table> are now only allowed in the content models of

- element <frc>, element <descacrw>, element <drill>, element <subdrill>, element <step>, element <procd>, element <challeng>, element <response> and element <endmattr> for crew/operator information
- element <descript>, element <para0>, element <subpara1>, element <subpara2>, element <subpara3> and element <subpara4> for descriptive information
- element <isolatep>, element <isostep> and element <isoend> for fault information
- element <ipc> for parts information (only element <figure> is permitted)
- element <mainfunc>, element <step1>, element <step2>, element <step3>, element <step4> and element <step5> for procedural and process module information

**Note**

Element <figure>, element <foldout> and element <table> are no longer permitted within running text, ie under element <para>.

4.3.1.2 Fault information

Due to the removal of exclusions from the Standard Generalized Markup Language (SGML) DTD, the following had to be changed for fault type data modules:

- New element <delruitem> based on element <lruitem> has been defined which does not contain element <test> and element <repair>
- Element <lruitem> has been replaced by element <delruitem> in the content model of element <detect>
- New element <desruitem> based on element <sruitem> has been defined which does not contain element <test> and element <repair>
- New element <lrlruitem> based on element <lruitem> has been defined which does not contain element <test>
- Element <lruitem> has been replaced by element <lrlruitem> in the content model of element <locandrep>
- New element <lrsruitem> based on element <sruitem> has been defined which does not contain element <test>
- Element <lruitem> has been replaced by element <lrlruitem> in the content model of element <diagnost>

Fig 25 and Fig 26 illustrate these changes.

ICN-S1000D-A-07030106-0-C0419-00177-A-01-1

*Fig 25 Content model of element <afr> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00178-A-01-1

*Fig 26 Content model of element <afr> at version 2.2*

Due to the content model changes on element <refs>, the occurrence of it under element <describe>, element <afiref>, element <repair>, element <testdesc> and element <testproc> has been changed from multiple to single.

### 4.3.2 Preliminary requirements

Element <reqdm> has been replaced by element <refdm>, and element <reqtp> has been replaced by element <reftp> in the content models of element <reqcondm> and element <reqcontp>, respectively within the structure of required conditions.

Sub element <change> and sub element <emphasis> are no longer permitted under element <reqcond>.

### 4.3.3 Close-up requirements

Element <closeup> has been replaced by new element <closereqs> which contains only sub element <reqconds>. Sub element <noclose> has been deleted from the Schema.

Procedural steps (element <step1>), figures, foldouts and tables are no longer allowed in close-up requirements.

Fig 27 and Fig 28 illustrate the changes on close-up requirements.

ICN-S1000D-A-07030106-0-C0419-00179-A-01-1

*Fig 27 Close-up requirements at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00180-A-01-1

*Fig 28 Close-up requirements at version 2.2*

### 4.3.4 Crew/operator information

Sub element <`change`> and sub element <`emphasis`> are no longer permitted under element <`tabtitle`>.

### 4.3.5 Process module information

Element <`precond`> has been replaced by element <`applic`> for interactive use, ie the content model of <`applic`> has been amended by optional sub element <`expression`>.

### 4.3.6 Wiring data information

The sequence of element <`cdescs`> and element <`acclist`> have been swapped within the content model of element <`connector`> for standard parts.

### 4.3.7 Wiring data description information

The sequence of sub elements within the content model of element <`dsc.elecequip`> has been changed as illustrated in Fig 29 and Fig 30.

ICN-S1000D-A-07030106-0-C0419-00181-A-01-1

*Fig 29 Content model of element <`dsc.elecequip`> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00182-A-01-1

*Fig 30 Content model of element <`dsc.elecequip`> at version 2.2*

The sequence of sub elements within the content model of element <dsc.connector> has been changed as illustrated in Fig 31 and Fig 32.

ICN-S1000D-A-07030106-0-C0419-00183-A-01-1

*Fig 31 Content model of element <dsc.connector> at version 2.1*

ICN-S1000D-A-07030106-0-C0419-00184-A-01-1

*Fig 32 Content model of element <`dsc.connector`> at version 2.2*

# 5 Version 2.3

## 5.1 Common constructs

### 5.1.1 DC elements

All disassembly code elements are now defined with the first letter in lowercase, eg element <dc:Title> has been renamed to element <dc:title>.

### 5.1.2 Element <sheet>

A restriction pattern has been added to attribute sheetno and attribute total of element <sheet>, which mandates exactly two numeric characters.

### 5.1.3 Element <accpnl>

The element <accpnl> has been substructured. It can contain the optional element <nomen> and/or the optional element <refs>. The end tag </accpnl> must now always appear in data module instances, even if the optional subelements are not used.

### 5.1.4 Element <zone>

The element <zone> has been substructured. It can contain the optional element <nomen> and/or the optional element <refs>. The end tag </zone> must now always appear in data module instances, even if the optional subelements are not used.

### 5.1.5 Element <model>

The content of element <model> under element <applic> has been restructured due to civil aviation requirements. Backward incompatibility is revealed through the use of element <techconds> and element <opconds> instead of the previous element <config>.

The subelements of element <config> and the attributes can be easily mapped to corresponding subelements and attributes of element <techcond>.

Fig 33 and Fig 34 illustrate this content model change.

ICN-S1000D-A-07030104-0-C0419-00194-A-01-1

*Fig 33 Content of element <model> at version 2.2*

ICN-S1000D-A-07030104-0-C0419-00195-A-01-1

*Fig 34 Content of element <model> at version 2.3*

## 5.2 Content section

### 5.2.1 Process data module

5.2.1.1 Element <menu>

The mandatory attribute choicetype has been introduced on element <menu>. Attribute choicetype must either contain the value "select" or the value "pulldown".

5.2.1.2 Element <num-range>

The element <num-range> has been deleted. It is therefore no longer allowed as a child of element <fillin>.

5.2.1.3 Element <text>

The element <text> is no longer allowed as a direct child of element <fillin> and element <menuchoice>.

Fig 35, Fig 36, Fig 37 and Fig 38 illustrate these content model changes.

ICN-S1000D-A-07030104-0-C0419-00196-A-01-1

*Fig 35 Content model of element <menuchoice> at version 2.2*

ICN-S1000D-A-07030104-0-C0419-00197-A-01-1

*Fig 36 Content model of element <`menuchoice`> at version 2.3*

ICN-S1000D-A-07030104-0-C0419-00198-A-01-1

*Fig 37 Content model of element <`fillin`> at version 2.2*

ICN-S1000D-A-07030104-0-C0419-00199-A-01-1

*Fig 38 Content model of element <`fillin`> at version 2.3*

### 5.2.2 Illustrated parts data module

Optional element <vas> has been introduced under element <ipp>. The end tag </ipp> must now always appear in data module instances, even if sub element <vas> is not used.

### 5.2.3 Fault data module

Element <isoproc> is no longer allowed as a direct child of element <afi>. Element <afi-proc> has been introduced as parent of element <afi>.

Fig 39 and Fig 40 illustrate this content model change.

ICN-S1000D-A-07030104-0-C0419-00200-A-01-1

*Fig 39 Content model of element <afi> at version 2.2*

ICN-S1000D-A-07030104-0-C0419-00201-A-01-1

*Fig 40 Content model of element <afi> at version 2.3*

### 5.2.4 Wiring data data module

The content model of element <wireconcode> has been changed from a simple text string to a structure with sub elements. The previous implicit breakdown is now completely transparent.

Fig 41 and Fig 42 illustrate this content model change.

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*Fig 41 Content model of element <wireconcode> at version 2.2*

ICN-S1000D-A-07030104-0-C0419-00203-A-01-1

*Fig 42 Content model of element <wireconcode> at version 2.3*

# 6 Version 3.0

## 6.1 Common constructs

### 6.1.1 Applicability

The content of element <applic> has been completely revised. There is no direct correlation between the content model of element <applic> at Issue 2.3 and the new content model of

element <applic>. A white paper is provided as part of the S1000D™ suite of information explaining a possible scheme for converting applicability from Issue 2.3.

This content model change is illustrated by Fig 43 and Fig 44.

ICN-S1000D-A-07030104-0-C0419-00001-A-01-1

*Fig 43 Content model of element <applic> at version 2.3*

ICN-S1000D-A-07030104-0-C0419-00002-A-01-1

*Fig 44 Content model of element <applic> at version 3.0*

### 6.1.2 Element <expcont>

The content of element <expcont> was changed from text to one or more occurrences of element <statement> followed by an optionally zero or more occurrences of element <expregcode>.

### 6.1.3 Figure structure

#### 6.1.3.1 Element <figure>

Content of element <figure> restructured to contain one or more occurrences of element <graphic> instead of different branches for single and multiple illustration sheet figures.

#### 6.1.3.2 Element <sheet>

The element <sheet> was removed from the element <figure> structure, along with its attribute sheetno and attribute total.

#### 6.1.3.3 Element <graphic>

Element <applic> was added to the content model of element <graphic>. Element <rfa> was moved into the content model of element <graphic>. Attribute refapplic, attribute group bodyatt, and attribute group secur were added to element <graphic>.

6.1.3.4 Element <hotspot>

Attribute group bodyatt was added to element <hotspot>.

6.1.3.5 Element <rfa>

Element <rfa> was moved from the content of element <figure> to the content of element <graphic>.

### 6.1.4 Element <srcdmaddres>

The element <srcdmaddres> has been moved from element <idstatus> into element <status>, therefore, moving information about the source data module identification part into information about the status part.

## 6.2 Content section

### 6.2.1 Wiring data data module

The content models of element <sibplugid> and element <nhassy> have been changed to contain existing element <rfd> as a direct child.

Element <instloc>, element <accdopl>, element <nhassy>, element <posnhassy> and element <sibplugid> were moved from the content model of element <elecequip> down to the content model of new element <instinfo>. Element <instinfo> is a direct child of element <elecequip>. Fig 45 and Fig 46 illustrate this change.

ICN-S1000D-A-07030104-0-C0419-00208-A-01-1

*Fig 45 Content model of element <`elecequip`> at version 2.3*

ICN-S1000D-A-07030104-0-C0419-00209-A-02-1

*Fig 46 Content model of element <`elecequip`> at version 3.0*

The element <applics> has been removed from the content models of element <wire>, element <harness>, element <elecequip>, element <connector>, element <vpart>, element <accessory>, element <solder-sleeve>, element <shrink-sleeve>, element <ident-sleeve>, element <conduit> and element <wire-mat>.

Element <applic> has been redefined to be optional with single occurrence in the content models of the above mentioned wiring data elements.

These changes for the element <wire> are illustrated by Fig 47 and Fig 48.

ICN-S1000D-A-07030104-0-C0419-00204-A-01-1

*Fig 47 Content model of element <wire> at version 2.3*

ICN-S1000D-A-07030104-0-C0419-00205-A-01-1

*Fig 48 Content model of element <`wire`> at version 3.0*

### 6.2.2 Technical conditions Cross-reference Table (TCT) data module

The Issue 2.3 TCT data module has been renamed to the Conditions Cross-reference Table (CCT) data module and the content model has been heavily revised. Information that is compatible between the two issues is the element <`incorplist`> and it's content.

### 6.2.3 Products Cross-reference Table (PCT) data module

The Issue 2.3 PCT data module content model has been completely revised. The type of information contained in the two issues is similar, but the content model change does not allow an easy transition from Issue 2.3.

# 7 Version 4.0

Version 4.0 is not backwards compatible due to element and attribute renaming, other schema structural enhancements, and numerous other updates resulting from adoption of new policies for maintaining quality and consistency in the schemas. Refer to the schema cleanup white paper for a full list of changes.

# Chapter 7.3.1.5

## *Data module Schema - Configuration of attributes*

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*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 3.9.6 | Authoring - Attributes |
| Chap 4.10 | Information management - Business rules exchange |

# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide number of attributes with values and interpretations that can be adjusted to the needs of the project or the organization.

S1000D also provides a means for the tailoring of these attributes in a controlled manner. This is permissible for such attributes that are not crucial for the function of the specification.

**Note**

All tailoring must be made in such a way that maximizes interoperability.

# 2 Configuration of attributes

Chap 3.9.6 provides a listing of the attributes concerned, including their defined values sets.

## 2.1 Tailoring method

To each configurable attribute, S1000D allocates a set of values. For a subset of these values there is an S1000D interpretation of each value. In addition, for each attribute there are a number of specific values open to interpretation by the project or the organization.

Tailoring can be of these kinds:

- reduction of the set of attribute values defined in the Schemas, in order to match the project or the organization needs
- introduction of interpretations for project available values (51-99)
- translation of interpretations of S1000D reserved values to other languages (eg for styling purposes)

It is imperative that tailoring (ie sub-setting) of attribute values does not violate project or organization requirements. Furthermore, the agreed interpretations must be communicated within the project or the organization to enable all parties concerned to take the proper measures to handle the values/interpretations (eg in viewers).

### 2.1.1 S1000D configurable attributes

The attribute value sets available for tailoring are described in Chap 3.9.6. Each attribute contains assigned values by S1000D which must not be changed and a set of values available for project or organization specific definition.

### 2.1.2 Project BREX file

Project specific use of allowable attribute values are to be reflected in a project specific BREX data module. Refer to Chap 4.10.

**Note**

If, for some reason, a project BREX data module is not employed, then information of how attributes are used, like information about tailoring in general, must be communicated by some other means.

The sets of attribute values defined in Chap 3.9.6 and in the default BREX data module must not be extended by further values.

# Chapter 7.3.2

## *CSDB objects - Graphics*

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# References

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 3.9.5.2.1.8 | Common constructs - Hotspots |
| Chap 4.4 | Information management - Information control number |
| Adobe TIFF 6.0 | TIFF Revision 6.0 |
| ISO/IEC 8632:1999 | Computer Graphics Metafile |
| W3C REC-web cgm-20070130 | WebCGM 2.0 W3C Recommendation |

# 1 General

This chapter contains information and guidance on the preparation of graphics for hyper-linking and navigation through graphical hotspots. It defines in particular the S1000D profiles for Tagged Image File Format (TIFF) raster graphics and CGM vector graphics, and describes the technical methods for implementing graphical hotspots.

The concept of graphical hotspots is based on the World Wide Web Consortium (W3C) WebCGM profile which utilizes standard CGM version 4 Application Structures (APS) of International Standards Organisation (ISO)/IEC 8632:1999 CGM for grouping graphical primitives into addressable objects.

# 2 Graphic requirements

The basic S1000D principle for graphics is that they must contain only graphical information. Apart from identifiers such as callout/item numbers or generic names, all other non-graphical information associated with the building blocks of a graphic or the graphic itself must be stored and maintained externally in the XML environment. This basic principle also applies to legends and other textual information such as notes and annotations.

Embedded non-graphical information inhibits the reuse of graphics in different contexts and requires the use of a graphics editor tool to maintain them. An example for reuse is to provide the same illustration in electronic parts catalogs for different natural languages.

For illustrations containing or made up of raster images, CGM is the recommended S1000D format for interchange.

## 2.1 CGM versions

ISO/IEC 8632 defines four metafile versions. Every metafile declares its version with the METAFILE VERSION element in the metafile descriptor. All versions are nested and upwardly compatible, ie a valid version 1 metafile is automatically a valid version 2, 3, and even version 4 metafile, and so on. This means for example that a metafile version 1 can be enriched by only version 4 elements for using it in intelligent graphics applications.

### 2.1.1 Metafile version 1

Version 1 provides a basic drawing and picture interchange capability. It is relatively simple, and is suited to simple and common graphical tasks. Nevertheless, this basic drawing set also embraces more sophisticated graphical primitives than just polylines, polygons, or graphical text: Rectangles, circles, ellipses and arcs are also permitted in version 1 metafiles.

### 2.1.2 Metafile version 2

Version 2 metafiles allow all version 1 elements, and add graphical segment capabilities. Notable additions are: segmentation and the closed figure primitive.

**Note**

Segmentation is prohibited in the profile.

### 2.1.3 Metafile version 3

Version 3 metafiles permit version 1 and 2 elements, and add the capability to represent compressed tiled images, define external symbol libraries, and provide greater control of drawing aspects. Beside compound regions and paths, higher-level primitives such as hyperbolic and parabolic arcs, non-uniform B-splines, and polybeziers were introduced. The support of these higher-level primitives is essential when transforming 3D Computer Aided Design (CAD) data to 2D CGM. Version 3 provides a significant increase in CGM's capability.

### 2.1.4 Metafile version 4

Version 4 metafiles allow all previous version elements, and add application-structuring extensions. These capabilities are critical for the use of CGM in intelligent graphics applications.

## 2.2 Terminology

### 2.2.1 Application profile

An Application Profile (AP) is a set of specifications (beyond that in ISO/IEC 8632) appropriate to a particular environment. Profiles are used as a method for defining subsets of ISO/IEC 8632 by identifying the CGM elements, parameters, options, and implementation requirements necessary for the effective and unambiguous use of the standard.

### 2.2.2 Application structure

An Application Structure (APS) is a sequence of metafile elements delimited by the BEGIN APPLICATION STRUCTURE and END APPLICATION STRUCTURE elements, containing one or more optional APPLICATION STRUCTURE ATTRIBUTE elements and containing one mandatory BEGIN APPLICATION STRUCTURE BODY element. APS are used to group CGM elements for retrieval, hyperlinking, and other specific application-dependent operations.

An APS is uniquely identified within a metafile by the value of the ID parameter associated with its BEGIN APPLICATION STRUCTURE element.

**Note**

APS with different ID parameter values can be nested to any level.

### 2.2.3 CGM element

A CGM element is a functional item that can be used to construct a picture or convey information.

### 2.2.4 CGM generator

The process or equipment that produces the CGM is called a CGM generator.

### 2.2.5 CGM interpreter

The process or equipment that reads the CGM and interprets the contents is called a CGM interpreter.

### 2.2.6 Graphical hotspot

A graphical hotspot is a graphical object that participates in a link.

### 2.2.7 Graphical object

A graphical object is an addressable logical unit within a picture grouping graphical primitives and/or graphical objects. These groups are realized as standard CGM version 4 APS and allow a hierarchical structure to be imposed on a picture or to create collections of graphical objects.

### 2.2.8 Graphical primitive

A graphical primitive is a basic drawing element that defines the geometry and its presentation. Examples are:

- simple generic drawing primitives such as polylines, polygons, and sets of these
- specialized primitives such as rectangles, circles, ellipses, circular and elliptical arcs
- graphical text primitives such as restricted text and append text
- curves such as hyperbolic and parabolic arcs, non-uniform B-splines, and polybeziers
- embedded raster elements such as cell and tile arrays in uncompressed or compressed (CCITT4, Joint Photographic Experts Group (JPEG) or PNG) format

Graphical primitives have rendering details and/or properties associated with them such as line attributes (type, width, color, etc), fill attributes (color, hatch style, pattern, etc) or text attributes (color, path, alignment, font, etc), where appropriate.

### 2.2.9 Metafile

A metafile is a mechanism for the storage and transfer of graphical data and control information in a device-independent manner. A metafile consists of one or more pictures, which in turn are composed of graphical primitives and their associated attributes.

## 2.3 S1000D CGM profile

### 2.3.1 General

The S1000D CGM profile is defined as a cascading profile from the W3C Recommendation (refer to http://www.w3.org/TR/2007/REC-webcgm20-20070130/). WebCGM is a full profile based on the ISO Model Profile as defined in ISO/IEC 8632:1999.

The presentation of the cascading profile maintains the table numbering from the Model Profile, but only presents table entries where the S1000D profile differs from WebCGM. References in the functionality column of the profile usually relate to sections in the CGM standard.

### 2.3.2 CGM file structure

Fig 1 shows the structure of an S1000D CGM file that consists always of one and only one picture. The picture itself contains CGM version 1, 2 or 3 graphic elements as well as version 4 application structures.

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*Fig 1 S1000D CGM file structure*

### 2.3.3 Profile details

2.3.3.1 Delimiter elements

Table 2 lists the delimiter elements which are profiled for S1000D.

*Table 2 Delimiter elements*

| Functionality | Specifications - S1000D profile | Specifications - WebCGM profile |
|---|---|---|
| T.15.1 | Same as WebCGM profile: No | |
| BEGIN METAFILE | Element is: Required Yes | Element is: Required Yes |
| END METAFILE | The metafile identifier must follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. | The metafile identifier shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. |
| | Other: The metafile id string contains the S1000D ICN including the prefix "ICN-" without any file extension. | Other: None. |
| T.15.9 | Same as WebCGM profile: No | |
| BEGIN APPLICATION STRUCTURE | Element is: Required No, Permitted Yes, Prohibited No | Element is: Required No: Permitted Yes, Prohibited No |
| BEGIN APPLICATION STRUCTURE BODY | Limits on the maximum number of defined structures within a picture: None. | Limits on the maximum number of defined structures within a picture: None. |

| Functionality | Specifications - S1000D profile | Specifications - WebCGM profile |
|---|---|---|
| END APPLICATION STRUCTURE | To the application structure identifier parameter, state the meaning: | To the application structure identifier parameter, state the meaning: |
| | Assigned beyond being a unique identifier for the application structure: | Assigned beyond being a unique identifier for the application structure: |
| | Is the inheritance flag parameter restricted? Yes/no: Yes. The value of the inheritance flag is restricted to a value corresponding to "statelist". | Is the inheritance flag parameter restricted? Yes/no: Yes. The value of the inheritance flag is restricted to a value corresponding to "statelist". |
| | Other: The value of the structure type parameter is restricted to "grobject". Structures are sensitive to placement and are placed in the metafile according to the content model given in Chap 3.9.5.2.1.8**.** | Other: The value of the structure type parameter must be chosen from the list of valid structure types listed in the Section 3.2.1. Structures are sensitive to placement and are allowed according to the rules defined in Section 3.2.1, and placed in the metafile according to the content model defined in the XML DTD fragment in Section 3.3. |

2.3.3.2 Metafile descriptor elements

Table 3 lists the metafile descriptor elements which are profiled for S1000D.

*Table 3 Metafile descriptor elements*

| Functionality | Specifications – S1000D profile | Specifications – WebCGM profile |
|---|---|---|
| T.16.2 | Same as WebCGM profile: No | |
| METAFILE DESCRIPTION | Element is: Required Yes | Element is: Required Yes |
| | The description parameter must follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. The substring within the string fixed parameter must be of the form: "keyword:item", where the double quotes are part of the substring. | The description parameter shall follow the rules for non-graphical text, clause 9.5.4.6 and T.14.5. The substring within the SF parameter shall be of the form: "keyword:item", where the double quotes are part of the substring. |
| | Maximum number of occurrences of this element? 1 | Maximum number of occurrences of this element? 1 |
| | Profile identification (use keyword, "ProfileId:"): **"ProfileId:S1000D"**. | Profile identification (use keyword, "ProfileId:"): "ProfileId:WebCGM". |
| | Profile edition (use keyword, "ProfileEd:"):<br>Refers to the approved Issue and Change of S1000D that applies for this graphic. The item associated with the keyword ProfileEd must be n.m. Example: **"ProfileEd:2.3"** for Issue 2, Change 3. | Profile edition (use keyword, "ProfileEd:"):<br>Refers to the approved version and revision of the specification that applies for this graphic. The item associated with the keyword ProfileEd shall be n.m. For this WebCGM Edition:"ProfileEd:2.0". |

| Functionality | Specifications – S1000D profile | Specifications – WebCGM profile |
|---|---|---|
| | Additional information content: | Additional information content: |
| | Metafile colour conformance class, source, and date items must be encoded as substrings of the description parameter using the keywords: "ColourClass:", "Source:", and "Date:", respectively. | Metafile colour conformance class, source, and date items shall be encoded as substrings of the description parameter using the keywords: "ColourClass:", "Source:", and "Date:", respectively. |
| | ColourClass: Required Yes | ColourClass: Required Yes |
| | Content: One of "ColourClass:monochrome" or "ColourClass:colour". | Content: One of "ColourClass:monochrome" or "ColourClass:colour". |
| | Source? Required No, Permitted Yes | Source? Required No, Permitted Yes |
| | Content: "Source:supplier" | Content: "Source:supplier" |
| | Date? Required No, Permitted Yes | Date? Required No, Permitted Yes |
| | Content: "Date:yyyymmdd" | Content: "Date:yyyymmdd" |
| | Other: Parameter strings are considered case insensitive. | Other: Parameter strings are considered case insensitive. |

2.3.3.3 Application structure elements

Table 4 gives information about the application structure elements which are profiled for S1000D.

*Table 4 Application structure elements*

| Functionality | Specifications - S1000D profile | Specifications - WebCGM profile |
|---|---|---|
| T.24.1 | Same as WebCGM profile: No | |
| APPLICATION STRUCTURE ATTRIBUTE | Element is: Required No, Permitted Yes, Prohibited No | Element is: Required No, Permitted Yes, Prohibited No |
| | Define the set of structure elements for use within application structures, and attach complete syntactic and semantic description: | Define the set of structure elements for use within application structures, and attach complete syntactic and semantic description: |
| | The set of attributes allowed on application structure type "grobject" is listed in Para 2.3.3.4 of this chapter. | The set of attributes allowed is listed in Section 3 and are defined according to application structure type. |
| | Other: None. | Other: None. |

2.3.3.4 Application structure attributes

As opposed to the WebCGM, only one APS type named "grobject" is permitted in an S1000D version 4 CGM. The APS type is realized as a parameter of the BEGIN APPLICATION STRUCTURE element.

In accordance with S1000D requirements, the essential navigation information to reside within a graphic is the unique identifiers of graphical objects and their names. An identifier is realized as

a parameter of the BEGIN APPLICATION STRUCTURE element itself and serves as the unique address of a graphical object within a single CGM.

All other non-graphical information about graphical objects (metadata) must be, in general. be kept outside of the metafile. This approach guarantees that graphics remain neutral and can be more easily adapted to a new target environment if required.

Hence, only a subset of APS attributes defined in WebCGM is applicable to S1000D. From the WebCGM set of optional APS attributes, only `name`, `region` and `viewcontext` are permitted. Other WebCGM APS attributes such as `linkuri` and `screentip` are realized in a different manner outside of the graphical environment, ie in the XML data modules, and will be mapped to the APS attributes at runtime through the XML Companion File (XCF).

#### 2.3.3.5 APS attribute `name`

The meaning of attribute `name` is to associate a generic name with an APS of type "`grobject`". Unlike the APS ID parameter, the value of the attribute `name` need not be unique within a metafile. The object can optionally be addressed by this value in circumstances where all instances of the object should be brought into view at once.

An example would be to highlight all occurrences of a specific callout/item number in an illustration.

#### 2.3.3.6 APS attribute `region`

The meaning of attribute `region` is to associate a spatial region for picking purposes with an APS of type "`grobject`". Simple regions of type rectangle, ellipse, closed polygon and closed continuous polybezier can be defined. The APS attribute `region` can occur at a maximum of once in an APS, however complex regions, which comprise a collection of simple regions, can be built allowing the definition of disjointed subregions, regions with holes, etc.

If no region is defined, an implied region is assumed by the extents of the graphical primitives contained in the APS body.

**Note**

If a region is defined, the set of primitives making up the graphical object need not be enclosed by an APS. In this case, the given spatial region can geometrically identify the object. A practical example would be to define overlay regions to serve as hotspot areas for embedded raster images.

#### 2.3.3.7 APS attribute `viewcontext`

The attribute `viewcontext` provides specification to viewers of the initial view of an object when the viewer has been directed to navigate to the graphical object. In essence, this attribute allows a rectangular viewport for fitting the object and its graphical surroundings into the viewer's display to be defined. This can also include a zoom operation.

If attribute `viewcontext` is not given, but attribute `region` is there, the rectangular viewport is the rectangle enclosing the given region.

If neither attribute `viewcontext` nor attribute `region` are given, the rectangular viewport is the bounding box of the graphical primitives of the object.

The viewer moves the addressed graphical object into view and indicates visually that the region or the graphical primitives of the object is the target of the link. The manner in which the viewer creates the new display and highlights the graphical object is viewer dependent.

### 2.3.4 The WebCGM 2.0 architecture

Fig 2, illustrates the interaction between a WebCGM viewer, external metadata, and a user application in general.

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*Fig 2 WebCGM 2.0 viewing process*

The process involves [1] the WebCGM viewer interpreting the CGM file, [2] loading the file into a Document Object Model (DOM) tree in memory, [3] parsing external WebCGM metadata, along with S1000D specific metadata, and [4] adding that metadata to the DOM tree.

At this point an external application has an opportunity to apply additional style and behavior attributes to the DOM via an ECMAScript binding. The WebCGM viewer then [5] applies the DOM to the CGM file in memory and [6] sends the rendered image to the viewing window.

At this point the external application can control style attributes of the rendered illustration and the behavior of the WebCGM viewer.

2.3.4.1 The WebCGM 2.0 XCF

WebCGM 2.0 includes an external companion file that enables control of the behavior of the WebCGM viewer through an XML DOM interface. The XML Schema associated with this external file is extensible to include industry specific metadata.

The content model described in Chap 3.9.5.2.1.8 does not support the XCF directly. It is generated at the point of use. The S1000D companion file content is based on the context dependent information given by the S1000D element <graphic> and the S1000D element <hotspot>.

If the S1000D element <hotspot> is present in the content model of element <graphic>, an XCF must be generated to apply the information given in element <hotspot>. During the dynamic generation of the XCF instance, the decision to transform the element <hotspot> is based on its applicability. This means that applicability filtering must be applied when the XCF instance is generated.

2.3.4.2 Creating the S1000D XCF

The S1000D XCF content is made up of five major structures.

*2.3.4.2.1 The webcgm structure*

The first structure of an S1000D XCF is the webcgm structure. The element <webcgm> is the document level element in the Schema. The Schema fragment is given as follows:

```
<xs:element name="webcgm" type="webcgmType"/>
<xs:complexType name="webcgmType">
<xs:choice maxOccurs="unbounded" minOccurs="0">
<xs:element ref="grobject"/>
<xs:element ref="bindById"/>
<xs:element ref="bindByName"/>
</xs:choice>
<xs:attribute ref="id"/>
<xs:attribute ref="version"/>
<xs:attribute ref="filename"/>
<xs:attribute ref="background-color"/>
<xs:attribute ref="pictureVisibility"/>
<xs:attributeGroup ref="stylePropertiesAttGroup"/>
</xs:complexType>
<xs:attribute name="id" type="xs:ID"/>
<xs:attribute fixed="2.0" name="version" type="xs:string"/>
<xs:attribute name="filename" type="xs:string"/>
<xs:attribute name="background-color" type="xs:string"/>
<xs:attribute name="pictureVisibility"
type="pictureVisibilityAttType"/>
<xs:simpleType name="pictureVisibilityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
```

The content here is derived from the S1000D element <graphic>. Table 5 represents the mapping.

*Table 5 XCF mapping of element <graphic>*

| S1000D element <graphic> | XCF element <webcgm> |
|---|---|
| Attribute infoEntityIdent | Attribute id |
| System identifier associated with the entity given in attribute infoEntityIdent | Attribute filename |

The attribute background-color can be used by an external application to override the background color given in the CGM file at rendering time. The entity %styleProperties contains the following definitions of style attributes for dynamic rendering:

```
<xs:attributeGroup name="stylePropertiesAttGroup">
<xs:attribute ref="text-size"/>
<xs:attribute ref="fill-color"/>
<xs:attribute ref="intensity"/>
<xs:attribute ref="stroke-color"/>
<xs:attribute ref="stroke-weight"/>
<xs:attribute ref="text-color"/>
<xs:attribute ref="text-font"/>
<xs:attribute ref="raster-intensity"/>
</xs:attributeGroup>
<xs:attribute name="text-size" type="xs:string"/>
<xs:attribute name="fill-color" type="xs:string"/>
<xs:attribute name="intensity" type="xs:string"/>
<xs:attribute name="stroke-color" type="xs:string"/>
<xs:attribute name="stroke-weight" type="xs:string"/>
<xs:attribute name="text-color" type="xs:string"/>
<xs:attribute name="text-font" type="xs:string"/>
<xs:attribute name="raster-intensity" type="xs:string"/>
```

For further details refer to the WebCGM 2.0 specification.

*2.3.4.2.2 The grobject structure*

The second structure of an S1000D XCF is the grobject structure. The Schema fragment is given as follows:

```
<xs:element name="grobject" type="grobjectType"/>
<xs:complexType name="grobjectType">
<xs:sequence>
<xs:element maxOccurs="unbounded" minOccurs="0" ref="linkuri"/>
</xs:sequence>
<xs:attribute ref="apsid" use="required"/>
<xs:attribute ref="screentip"/>
<xs:attribute ref="region"/>
<xs:attribute ref="viewcontext"/>
<xs:attribute ref="visibility"/>
<xs:attribute ref="interactivity"/>
<xs:attributeGroup ref="stylePropertiesAttGroup"/>
</xs:complexType>
<xs:attribute ref="apsid" use="required"/>
<xs:attribute ref="screentip"/>
<xs:attribute ref="region"/>
<xs:attribute ref="viewcontext"/>
<xs:attribute ref="visibility"/>
<xs:attribute ref="interactivity"/>
<xs:attribute name="apsid" type="xs:ID"/>
<xs:attribute name="screentip" type="xs:string"/>
```

```
<xs:attribute name="region" type="xs:string"/>
<xs:attribute name="viewcontext" type="xs:string"/>
<xs:attribute name="visibility" type="visibilityAttType"/>
<xs:simpleType name="visibilityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
<xs:attribute name="interactivity" type="interactivityAttType"/>
<xs:simpleType name="interactivityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
```

The content here is derived from the S1000D element <hotspot>. Table 6 represents the mapping.

*Table 6 XCF mapping of element <hotspot>*

| S1000D element <hotspot> | XCF element <grobject> |
|---|---|
| Attribute applicationStructureIdent | Attribute apsid |
| Attribute hotspotTitle | Attribute screentip |
| Values of attribute visibility | Values of attribute visibility |
| "visible" | "on" |
| "hidden" | "off" |

The entity %styleProperties is described in Para 2.3.4.2.1.

*2.3.4.2.3 The linkuri content*

The third structure of an S1000D XCF is the linkuri content. The XML Schema fragment is given as follows:

```
<xs:element name="linkuri" type="linkuriType"/>
<xs:complexType name="linkuriType">
<xs:attribute ref="uri" use="required"/>
<xs:attribute ref="behavior"/>
<xs:attribute ref="desc"/>
</xs:complexType>
<xs:attribute name="uri" type="xs:string"/>
<xs:attribute name="behavior" type="xs:string"/>
<xs:attribute name="desc" type="xs:string"/>
```

The S1000D element <internalRef>, the S1000D element <dmRef> and the S1000D element <catalogSeqNumberRef> of the S1000D element <hotspot> are mapped to the XCF element <linkuri>. The required XCF attribute uri is derived from the attributes associated with the S1000D element <internalRef>, the S1000D element <dmRef> and the S1000D element <catalogSeqNumberRef>. Table 7, Table 8, and Table 9 represent these mappings.

*Table 7 XCF mapping of element <internalRef>*

| S1000D element <internalRef> | XCF element <linkuri> |
|---|---|
| Attribute internalRefId or attribute referredFragment or attribute xlink:href | Attribute uri |
| Attribute xlink:show and/or attribute xlink:actuate | Attribute behavior |
| Attribute targetTitle or attribute xlink:hotspotTitle | Attribute desc |

*Table 8 XCF mapping of element <dmRef>*

| S1000D element <dmRef> | XCF element <linkuri> |
|---|---|
| Attribute referredFragment or attribute xlink:href | Attribute uri |
| Attribute xlink:show and/or attribute xlink:actuate | Attribute behavior |
| Element <dmTitle> or attribute xlink:hotspotTitle | Attribute desc |

*Table 9 XCF mapping of element <catalogSeqNumberRef>(implicit linking)*

| S1000D element <catalogSeqNumberRef> | XCF element <linkuri> |
|---|---|
| Attribute catalogSeqNumberValue or attribute catalogSeqNumberValue and attribute itemSeqNumberValue or attribute catalogSeqNumberValue and attribute initialProvisioningProjectValue and responsiblePartnerCompanyCode or attribute xlink:href | Attribute uri |
| Attribute xlink:show and/or attribute xlink:actuate | Attribute behavior |
| Attribute xlink:hotspotTitle | Attribute desc |

**Note**

In this context, the values of attribute xlink:show are restricted to "new" or "replace" and the value of attribute xlink:actuate is restricted to "onload". The existence of the attribute xlink:show overrides any attribute xlink:actuate that can be present.

*2.3.4.2.4 The bindById and bindByName structures*

The other two structures of an S1000D XCF are bindById and bindByName. The element <bindById> of element <webcgm> is equivalent to the element <grobject> of element <webcgm>. The element <bindByName> of element <webcgm> attaches the external metadata to any grobject(s) in the CGM file that have the same attribute name.

```
<xs:element name="bindById" type="bindByIdType"/>
<xs:complexType name="bindByIdType">
<xs:sequence>
<xs:element maxOccurs="unbounded" minOccurs="0" ref="linkuri"/>
</xs:sequence>
<xs:attribute ref="apsid" use="required"/>
<xs:attribute ref="screentip"/>
<xs:attribute ref="region"/>
<xs:attribute ref="viewcontext"/>
<xs:attribute ref="visibility"/>
<xs:attribute ref="interactivity"/>
<xs:attributeGroup ref="stylePropertiesAttGroup"/>
</xs:complexType>
<xs:attribute name="apsid" type="xs:ID"/>
<xs:attribute name="screentip" type="xs:string"/>
<xs:attribute name="region" type="xs:string"/>
<xs:attribute name="viewcontext" type="xs:string"/>
<xs:attribute name="visibility" type="visibilityAttType"/>
<xs:simpleType name="visibilityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
<xs:attribute name="interactivity" type="interactivityAttType"/>
<xs:simpleType name="interactivityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
<xs:element name="bindByName" type="bindByNameType"/>
<xs:complexType name="bindByNameType">
<xs:sequence>
<xs:element maxOccurs="unbounded" minOccurs="0" ref="linkuri"/>
</xs:sequence>
<xs:attribute ref="apstargetname" use="required"/>
<xs:attribute ref="screentip"/>
<xs:attribute ref="region"/>
<xs:attribute ref="viewcontext"/>
<xs:attribute ref="visibility"/>
<xs:attribute ref="interactivity"/>
<xs:attributeGroup ref="stylePropertiesAttGroup"/>
</xs:complexType>
<xs:attribute name="apstargetname" type="xs:string"/>
<xs:attribute name="screentip" type="xs:string"/>
<xs:attribute name="region" type="xs:string"/>
<xs:attribute name="viewcontext" type="xs:string"/>
<xs:attribute name="visibility" type="visibilityAttType"/>
<xs:simpleType name="visibilityAttType">
<xs:restriction base="xs:NMTOKEN">
```

```
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
<xs:attribute name="interactivity" type="interactivityAttType"/>
<xs:simpleType name="interactivityAttType">
<xs:restriction base="xs:NMTOKEN">
<xs:enumeration value="off"/>
<xs:enumeration value="inherit"/>
<xs:enumeration value="on"/>
</xs:restriction>
</xs:simpleType>
```

The bindById content is mapped exactly the same way the grobject content is mapped.

The bindByName content is mapped the same as the grobject content is mapped, except the attribute `apstargetname` of element <`bindByName`> is derived from the S1000D attribute `applicationStructureName` of the S1000D element <`hotspot`>.

The entity `%styleProperties` is described in Para 2.3.4.2.1.

## 2.4 S1000D TIFF profile

### 2.4.1 General

Binary raster graphics interchanged in the TIFF must utilize the CCITT Group 4 compression algorithm. Colored raster graphics interchanged in TIFF must utilize the loss-less Lempel-Ziv-Welch (LZW) compression method as defined in the Adobe TIFF 6.0 specification.

S1000D prohibits multiple images in a single TIFF file. The acceptable resolutions (pixel density) are 300, 400, 600, and 1200 pixels per inch (ppi) with a minimum resolution of 300 ppi.

### 2.4.2 Profile details

The S1000D application profile for TIFF files is defined as a delta-profile based on the Adobe TIFF 6.0 specification. It is detailed in the following, but gives only information where it differs from the TIFF specification.

#### 2.4.2.1 Image file header

The offset in bytes of the first and only Image File Directory (IFD) must be 8 from the beginning of the TIFF file.

#### 2.4.2.2 Tag names and values

Table 10 lists the TIFF tags with their names and values which are profiled for S1000D.

*Table 10 S1000D profile of TIFF tags*

| Tag name | Tag value | Specifications - S1000D profile |
|---|---|---|
| NewSubfileType | 254 | permitted - value must be 0 |
| SubfileType | 255 | prohibited |
| BitsPerSample | 258 | required - values must be 1, 4 or 8 (triple 8 for RGB) |
| Compression | 259 | required - value must be 4 (bi-level: Group 4 fax) or 5 (color: LZW) |
| PhotometricInterpretation | 262 | required - value must be 0, 1, 2 or 3 |
| FillOrder | 266 | permitted - value must be 1 |

| | | |
|---|---|---|
| DocumentName | 269 | prohibited |
| ImageDescription | 270 | required - value must be the S1000D ICN in the form "ICN-icn", where "ICN-" is a static prefix and "icn" denotes the core ICN as defined in Chap 4.4. |
| Orientation | 274 | required - values must be 1 or 4 |
| SamplesPerPixel | 277 | required - values must be 1 or 3 (3 for RGB only) |
| MinSampleValue | 280 | prohibited |
| MaxSampleValue | 281 | prohibited |
| XResolution | 282 | required - values must be 300, 400, 600 or 1200 |
| YResolution | 283 | required - values must be 300, 400, 600 or 1200 |
| PlanarConfiguration | 284 | permitted - value must be 1 |
| PageName | 285 | prohibited |
| XPosition | 286 | prohibited |
| YPosition | 287 | prohibited |
| FreeOffsets | 288 | prohibited |
| FreeByteCounts | 289 | prohibited |
| GrayResponseUnit | 290 | prohibited |
| GrayResponseCurve | 291 | prohibited |
| T4Options | 292 | prohibited |
| T6Options | 293 | required for compression = 4, otherwise prohibited |
| ResolutionUnit | 296 | required - value must be 2 |
| PageNumber | 297 | prohibited |
| TransferFunction | 301 | prohibited |
| ExtraSamples | 338 | prohibited |

# Chapter 7.3.3

## *CSDB objects - Multimedia*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
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| Chap 3.9.5.2.1.2 | Common constructs - Referencing |
| Chap 3.9.5.2.1.5 | Common constructs - Titles |
| Chap 3.9.5.2.1.11 | Common constructs - Controlled content |
| Chap 3.9.5.3 | Data modules - Applicability |

| Chap No./Document No. | Title |
|---|---|
| Chap 7.7.4 | Guidance and examples - XLink |
| Chap 9.2 | Terms and data dictionary - Glossary of terms, abbreviations and acronyms |
| IEC 61834 | Recording - Helical-scan digital video cassette recording system using 6,35 mm magnetic tape for consumer use |

# 1 General

This chapter contains information and guidance on the use of multimedia, it defines recommended minimum standards, and explains the use of the multimedia elements and attributes. Multimedia is intended to be used as an enhancement to the verified data within a data module, not instead of that data and as such must be verified alongside the data it is supporting. Further guidance on the authoring of multimedia is provided in Chap 3.9.2.

# 2 Multimedia

## 2.1 Abbreviations and units of measure used in the chapter

The following abbreviations and units of measure are specific to this chapter, for all other abbreviations and units of measure refer to Chap 9.2.

| | |
|---|---|
| DV | Digital Video |
| DVD | Digital Versatile Disk |
| YCbCr | Family of color spaces used in Video systems (Y is the luma component, and Cb and Cr are the blue and red chroma components) |
| MPEG2 | Standard for generic coding of moving pictures and associated audio information (MPEG = Motion Pictures Expert Group) |

## 2.2 Project guidance

When selecting multimedia for use within a project consideration must be given to the role in which it will operate. Display background, use of colors and presentation methods must be considered along with the different working conditions in which the multimedia will be used. Hardware must be chosen on its ability to deliver the project's chosen multimedia types and a project needs to be aware that additional hardware such as headphones and amplifiers can be required. The project or the organization must also address verification, change management and production methods, as well as file naming conventions, file structure and hierarchy for multimedia production outside the CSDB.

Other items to consider are the user interface, whether the multimedia will be displayed at full screen or a predetermined size and the use of PDF for printing functionalities in support of media elements. It is recommended that a project consider capture rates and file sizes as these affect the quality and loading times, a balance between quality and file size must be achieved. The project or organization must therefore look at utilizing multimedia authoring/production tools that aid and utilize efficient compression on streaming technologies.

A project is responsible for selecting its own multimedia types, although it is recommended that the project avoid the use of proprietary formats, as these can be costly to license and maintain, which can hinder interchangeability. It is recommended to use free and open codecs, and specifications, where open specification means:

– any project can read or write data from/to a file created according to the specification

- the specification contains details on the behavior of object in a file created according to the specification
- the specification is owned/used by multiple vendors/companies
- there is no cost associated with implementing the specification

A list of multimedia types with notations included in the Schemas are given in Table 3, Table 5, Table 6 and Table 7, the list is not definitive and a project is free to add its own notations. The more complex multimedia will often come at a premium for both cost and system hardware/software requirements.

## 2.3 Multimedia

**Description:** The element <`multimedia`> is an optional, repeatable element, used for marking up all multimedia content. It is the parent element of multimedia objects

**Markup element:** <`multimedia`> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `id` (O), the identifier of the <`listItem`> element. Refer to Chap 3.9.5.2.1.2.
- `changeMark` (O), `changeType` (O), and `reasonForUpdateRefIds` (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
- `authorityName` (O) and `authorityDocument` (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
- `securityClassification` (O), `commercialClassification` (O), and `caveat` (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.

**Child elements:**

- <`title`> (O). Refer to Chap 3.9.5.2.1.5.
- <`multimediaObject`> (M). Refer to Para 2.4.

**Business rules decisions:**

- None identified

**Markup example:**

- Refer to Para 4

## 2.4 Multimedia Object

**Description:** The element <`multimediaObject`> is an optional, repeatable element, used for marking up multimedia objects.

**Markup element:** <`multimediaObject`> (O)

**Attributes:**

- `applicRefId` (O), the applicability information. Refer to Chap 3.9.5.3.
- `autoPlay` (O), defines whether the object is automatically played on load or not (ie wait for user interaction). This attribute can have the following values:
  - "`0`" No, the object will not automatically play on load
  - "`1`" Yes, the object will automatically play on load
- `fullScreen` (O), used to determine if the object will be viewed/played in full screen mode. This attribute can have the following values:
  - "`0`" No, the object will not be viewed/played in full screen mode

- "1" Yes, the object will be viewed/played in full screen mode

– id (O), the identifier of the <multimediaObject> element. Refer to Chap 3.9.5.2.1.2.
– infoEntityIdent (M), a unique control number used to declare the entity name.
– multimediaObjectHeight (O), defines the display height of the object at run time if not full screen.
– multimediaObjectWidth (O), defines the display width of the object at run time if not full screen.
– multimediaType (M), used to denote the type of multimedia (eg video, audio). This attribute can have the following values:
  - "3D" to declare the multimedia object type as 3D
  - "audio" to declare the multimedia object type as audio
  - "video" to declare the multimedia object type as video
  - "other" to declare the multimedia object type other than those defined above
– runTimeDuration (O), defines the objects run time (this can be necessary for text to sound synchronization, common in e-learning).
– showPluginControls (O), used to hide or show the third party software plug-in controls. This attribute can have the following values:
  - "hide" to hide the plug-in controls
  - "show" to show the plug-in controls
– authorityName (O) and authorityDocument (O), which are used to indicate controlled content in accordance with Chap 3.9.5.2.1.11.
– changeMark (O), changeType (O), and reasonForUpdateRefIds (O), which are used to indicate change in accordance with Chap 3.9.5.2.1.1.
– securityClassification (O), commercialClassification (O), and caveat (O), which are used for security and restrictive marking in accordance with Chap 3.9.5.2.1.
– xlink:type (O), specifies the link type, if an Xlink link is established. Refer to Chap 7.7.4. This attribute can have the following values:
  - "simple", a simple link
  - "extended", an extended, possibly multi-source, link
– xlink:href (O), specifies the link address, if an Xlink link is established. Refer to Chap 7.7.4.
– xlink:title (O), specifies the link title, if an Xlink link is established. Refer to Chap 7.7.4.
– xlink:show (O), specifies the link appearance, if an Xlink link is established. Refer to Chap 7.7.4. This attribute can have the following values:
  - "new", opens a new window to display the information
  - "replace", replaces the current window with the displayed information
  - "embed", embeds the information inline
  - "other", defined by user
  - "none", does not display the information
– xlink:actuate (O), specifies the link behavior, if an Xlink link is established. Refer to Chap 7.7.4. This attribute can have the following values:
  - "onLoad", displays the information when the page loads
  - "onRequest", displays the information on user click

**Child elements:**

– <parameter> (O). Refer to Para 2.5.
– <reasonForAmendment> (O). Refer to Chap 3.9.5.2.1.1.

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4

## 2.5 Parameter

**Description:** The element <parameter> is an optional, repeatable element, which has attributes used for passing parameters to objects within the multimedia scene.

**Markup element:** <parameter> (O)

**Attributes:**

– id (M), the identifier of the <parameter> element. Refer to Chap 3.9.5.2.1.2.
– parameterIdent (O), a unique id in the multimedia object used to call a single element/object of the multimedia object, eg "Item 1" or "Step 1"
– parameterValue (O), an assigned value used as a method of passing a value to the object
– parameterName (O), a non-unique name used as a method of identifying an object or group of objects used as a means of passing a value to objects with the same name within the multimedia scene

**Child elements:**

– None

**Business rules decisions:**

– None identified

**Markup example:**

– Refer to Para 4

## 2.6 Types of multimedia

### 2.6.1 Audio

Audio can be a sound track, audible effect or a pure narrative heard to warn, support, or clarify a procedure or diagnosis steps and actions. All of these audio elements can be embedded or linked externally with displayed media. Presentation standards must be addressed as well as content, duration and context of the audio. Consideration must be given to the anticipated environment to determine the usability of audio.

Examples of these include operator alerts, presentation clips, or complete audio representation of the data. The following list shows the recommended use of audio. Table 2 details the recommended minimum rates for audio. A list of audio types with notations included in the schemas are given at Table 3

– natural sounds to clarify the result of actions
– audio that will enhance video, adding information required in performing the displayed actions
– user controlled audio narration from verified technical documentation to enhance user understanding
– aural warnings and audible alarms heard such as, on the flight deck or procedural queue to an action

*Table 2 Audio - Recommended minimum rates*

| Type | Minimum capture | Low bandwidth output maximum | Low bandwidth output minimum | Broad bandwidth minimum | Minimum output |
|---|---|---|---|---|---|
| Master | 48kHz 16bit | - | - | - | 44kHz 16bit |
| Effects | 48kHz 16bit | - | 16kbps | 64kbps | 96kbps |
| Voice | 48kHz 16bit | 44kbps | 8.5kbps | 64kbps | 96kbps |
| Sound tracks | 48kHz 16bit | - | 32kbps | 96kbps | 128kbps |

*Table 3 Audio types*

| Encoding | File extension type |
|---|---|
| Audio AIFF Format sound | AIF, AIFC and CDDA |
| Audio MIDI | MID, MIDI and RMI |
| Audio Playlist | PLS |
| CD Audio | CDA |
| Microsoft RIFF chunk for Waveform Data | WAV |
| MIDI | KAR and SMF |
| MP3 format sound | M3U, M3URL, MP3 and SWA |
| Sun Audio | AU and SND |
| ULAW | ULW |
| Windows Media Audio | WMA |

### 2.6.2 Video

The term video in this case means real life or synthetic moving images of equipment actions, procedural steps or a captured live event. These clips can include audio narration or a sound track. Video can be linked with other media objects. Video is used primarily to show a unique procedure. Presentation standards must be addressed as well as content, duration and context of the video. The following list shows the recommended use of video. Table 4 details the recommended minimum rates for video. A list of video types with notations included in the schemas are given at Table 5.

- real images to clarify a complex or rarely required maintenance procedure
- demonstrations
- embedded training
- presentations

*Table 4 Video - Recommended minimum rates*

| Type | Minimum capture Digital Video (DV) | Minimum capture DV frames per seconds | Minimum capture DV chroma sampling | Recording media minimum compression | Minimum output |
|---|---|---|---|---|---|
| Color space | YCbCr[1] | - | - | - | - |
| Data rate | 25 Mbps | - | - | - | - |
| Resolution PAL/ SECAM | 720 px x 576 px | 25 fps | 4:2:0 | 5.1 | - |
| Resolution NTSC | 720 px x 420 px | 29.70 fps | 4:1:1 | 5.1 | - |
| Low bandwidth | 320 px x 240 px (Output) | - | - | - | 80 kbps Minimum[2] |
| Broad bandwidth | 640 px x 480 px (Output) | - | - | - | 256 kbps Maximum |
| Profile@level | - | - | - | - | MP@ML[3] |

1 Device: YCbCr – Based on IEC 61834 standard for helical scan digital recording methods
2 Acceptable, but not recommended
3 MPEG-2 Profiles at Main Level (720 x 480 pixels at 30 Hz max frame rate or 720 x 576 pixels at 25 Hz max frame rate, 4:2:0 sampling (DVD: 9,8 Mbps))

*Table 5 Video types*

| Encoding | File extension type |
|---|---|
| Autodesk Animator FLIC Format FLI | FLI |
| Digital Video | DIF and DV |
| Macromedia Flash | FLA |
| Microsoft RIFF chunk for Audio/Visual Interleaved Data | AVI |
| Motion Picture Experts Group video | MP2, MP2V, MP4, MPE, MPEG, MPEG-1, MPEG-2, MPG, MLV, and MPG4 |
| Multimedia and Hypermedia Experts Group | MHEG |
| Real Audio-Video | RA, RAM, RM and RMJ, |
| SMI Video | SMI |
| SML Video | SML |
| Streaming Movie | RTS, RTSP and SDP |
| VFW Video | VFW |
| Video RGB | RGB |

| Encoding | File extension type |
|---|---|
| Video X-FLV | FLV |
| Video X-MS-ASF | ASF |
| Video/quicktime | MOV, QT, QTR and QTX |
| Windows media | ASR and ASX |
| Windows Media audio/video | WM, WMP, WMV and WMX |

### 2.6.3 Three dimensional models

The term 3D model refers to the use of 3D objects to present technical information.

Examples of use are virtual assembly/disassembly, removal and installation of parts using animation, simulation and/or virtual reality concepts. Levels of capability can include fly thru type viewing (navigation thru a 3D scene). The degree of simulation, animation and virtual reality modeling concepts can dramatically affect cost. A list of 3D types with notations included in the schemas are given at Table 6.

*Table 6 3D types*

| Encoding | File extension type |
|---|---|
| ASME/ANSI Y14.26M-1987 Initial Graphics Exchange Specification | IGES |
| Catia 3D Models | CATDRAWING, CATPART, CATPRODUCT, CGR, CT and MODEL |
| Dassault Systems 3DXML | DS-3DXML |
| JT 3D Models | UGS, |
| Lattice 3D Models | XV0, XV2, XV and XVL |
| Pro Engineer 3D Models | ASM, DRW, ED, EDZ, FRM and PRT |
| RightHemisphere 3D Models | RH |
| SolidWorks 3D Models | SLDASM, SLDDRW and SLDPRT |
| STEP AP203 3D Models | STEP |
| Universal 3D Models | U3D |
| VND 3D Models | DWF |
| VRML 3D Models | WRL |
| Web3D 3D Models | W3D |
| X3D 3D Models | X3D |
| X-Director 3D Models | DCR |
| DS 3D-VIA | SMG, SMGXML, SMGGEOM |

### 2.6.4 Miscellaneous types

Several multimedia types such as Synchronized Multimedia Integration Language and PDF do not fall into the audio, video or 3D type classification these miscellaneous types are listed in Table 7.

*Table 7 Miscellaneous types*

| Encoding | File extension type |
|---|---|
| Microsoft Word | DOC |
| Microsoft Access | MDB |
| Microsoft Project | MPP |
| Portable Document Format | PDF |
| Microsoft PowerPoint | PPS and PPT |
| Synchronized Multimedia Integration Language | SMIL |
| Microsoft Excel | XLS |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of multimedia**. The project or the organization must determine if multimedia is suitable for the environment in which the project will operate. Refer to Para 2.

**Media player**. Multimedia objects must be developed and produced for the chosen project or organization viewer or display platforms used. ie plug-ins and viewers, must be defined in the project or the organization rules for non-textual data. Refer to Para 2.

**Capture rates**. To ensure consistency of a given type, the project or the organization must determine the capture rates to be used. Refer to Para 2.2.

**Multimedia types**. The project or the organization must determine the multimedia types used. Refer to Para 2.6.

# 4 Examples

The multimedia element can be inserted into the data module at the same locations as a figure, foldout or table. An example of the inserted markup is as follows:

```
<multimedia id="mul-0001">
<multimediaObject autoPlay="0" infoEntityIdent="ICN-S1000DBIKE-
AAA-D000000-0-SF518-00538-A-001-01" multimediaType="3D"
showPluginControls="hide" fullScreen="0"
multimediaObjectHeight="300" multimediaObjectWidth="300">
</multimediaObject>
</multimedia>
```

To refer to an object inside the multimedia object the author must use the standard cross-reference element `<internalRef>`. To enable this cross-referencing, additional values "`multimedia`", "`multimediaObject`" and "`parameter`" have been added to the attribute `type` within the element `<internalRef>`.

An example of the markup for the cross-reference is as follows:

```
<internalRef internalRefTargetType="parameter"
internalRefId="prm-0001"></internalRef>
```

The cross reference is linked by the element <multimediaObject> which lists the accessible objects in the multimedia object. An example of this markup is as follows:

```
<multimedia>
<multimediaObject autoPlay="0" infoEntityIdent="ICN-S1000DBIKE-
AAA-D000000-0-SF518-00538-A-001-01" multimediaType="3D"
showPluginControls="hide" fullScreen="0"
multimediaObjectHeight="300" multimediaObjectWidth="300">
<parameter id="prm-0001" parameterIdent="param001"
parameterName="cable"/>
</multimediaObject>
<multimediaObject autoPlay="0" infoEntityIdent="ICN-S1000DBIKE-
AAA-D000000-0-SF518-00538-A-001-01" multimediaType="3D"
showPluginControls="hide" fullScreen="0"
multimediaObjectHeight="300" multimediaObjectWidth="300">
<parameter id="prm-0002" parameterIdent="param002"
parameterName="lever"/>
</multimediaObject>
<multimediaObject autoPlay="0" infoEntityIdent="ICN-S1000DBIKE-
AAA-D000000-0-SF518-00538-A-001-01" multimediaType="3D"
showPluginControls="hide" fullScreen="0"
multimediaObjectHeight="300" multimediaObjectWidth="300">
<parameter id="prm-0003" parameterIdent="param003"
parameterName="guide"/>
</multimediaObject>
</multimedia>
```

In the example above, referencing the element <parameter> by its attribute id will highlight the object in the multimedia object that is identified thru the value "param001" of the attribute parameterIdent and the value "cable" of the attribute parameterName of the element <parameter>. The element <parameter> contains attributes as shown in Para 2.5.

# Chapter 7.4

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| Chap 7.4.3 | Generation of publications - Inclusion of legacy information |

## 1 General

The purpose of this chapter is to describe the technical aspects of the generation of publications. The content of this chapter together with the necessary additional resources, available through www.s1000d.org, is sufficient for understanding the concept of generating an S1000D IETP.

## 2 Generation of publications

General information and guidance on the IETP concept and on the supporting publication module are given in the following chapters.

- Chap 7.4.1 provides the general principles of IETP generation
  - Chap 7.4.1.1 provides information for IETP generation process
  - Chap 7.4.1.2 provides information for IETP resource resolution with the uniform resource names concept
- Chap 7.4.2 provides a description of the publication module XML
- Chap 7.4.3 provides a description of the inclusion of legacy information in the IETP concept

Although some guidelines are provided regarding the principle characteristics of systems that support the specification, it is not suggested how such a system should be implemented, nor are any specific tools suggested for such an implementation.

# Chapter 7.4.1

## *Generation of publications - IETP*

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# 1 General

## 1.1 Purpose

A wide variety of operational environments are envisioned for accessing and displaying IETP. These include:

- web or Local/Wide area network (LAN/WAN)
- temporarily disconnected
- stand-alone

Moreover, interoperability between IETP is becoming a firm requirement for many projects.

In addition to these operational requirements, S1000D acknowledges the fact that technical improvements and new possibilities are becoming available with Internet/Intranet technology. These improvements are accompanied by commercial off the shelf software, which might be used for implementing IETP.

The main objective of this chapter is to describe XML-oriented IETP and its definition through the use of the publication module concept.

In addition, as a by-product, this chapter describes the possibility to map S1000D concepts to web concepts. However, the IETP end user form (eg what it looks like on-screen) is out of the scope of this chapter.

# 2 IETP

General information on the IETP concept are given in the following chapters.

- Chap 7.4.1.1 provides information for IETP generation process.
- Chap 7.4.1.2 provides information for IETP resource resolution with the Uniform Resource Name (URN) concept.

## 2.1 Web concepts and S1000D concepts

### 2.1.1 Resources

A fundamental concept of the World Wide Web is a resource. A resource can be anything that can be accessed through an identifier. The resource identifier can be considered the resource name or the resource location. For web based applications resource identifiers are described by the Uniform Resource Identifier (URI) syntax. Both Uniform Resource Locators (URL) and URN are considered URI.

These names are persistent for a project if they are never re-assigned during Product life cycle. This means the name will never change even when the resource content is changed. Any reference to a resource using its name as the identity will stay valid forever.

In S1000D, all information objects such as data modules, publication modules, illustrations and multimedia objects are considered resources. The data module code, publication module code, catalogue sequence number and ICN are the resource identifiers that are each described by specific name syntax and format.

### 2.1.2 Metadata

A challenge for web-oriented documents is the ability to retrieve a specific resource amongst an ever increasing number of resources. A solution to this is to associate metadata to a resource.

Metadata describe additional aspects of the resource beyond its identifier such as the title, author, creation date, etc. The Resource Description Framework (RDF) and Dublin Core (DC) are methods of describing resources. A resource resolver allows the discovery of resource identifiers through the use of metadata queries.

In S1000D, all data module metadata are contained in the identification and status section.

## 2.2 IETP and publication modules

The IETP concept is supported in S1000D through the use of publication modules.

This concept is defined by using material derived from:

- Internet Engineering Task Force (IETF) URI specifications for naming and locating resources to be linked
- World Wide Web Consortium (W3C) XML Pointer Language (XPointer) specification, which specifies a language to be used as the basis for defining a fragment identifier in any URI reference that locates a resource
- W3C XML Linking Language (XLink) specification, which allows elements to be inserted into XML instances in order to create and describe links between resources
- RDF and disassembly code initiatives for encoding metadata.

A publication module is structured in a similar way to data modules with an identification and status section followed by a content section. The content section contains references to data

modules, legacy technical publications or other publication modules in the required sequence and structure of the publication delivery.

Publication modules are described in detail in Chap 4.9.1.

# Chapter 7.4.1.1

## *IETP - Generation process*

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# 1 General

The purpose of this chapter is to describe the technical aspects of the IETP generation. The content of this chapter together with the necessary additional resources, available through www.s1000d.org, is sufficient for understanding the concept of generating an S1000D IETP.

# 2 IETP generation process

Fig 1 represents the IETP generation process.

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*Fig 1 IETP generation process*

## 2.1 CSDB source data

Authored data modules and publication modules reside in the CSDB and exist in XML form. This is the repository where the source data for IETP is maintained.

## 2.2 IETP neutral repository

The IETP neutral repository contains all data modules and publication modules in XML form. This information is generated from the CSDB and acts as a standard representation to be used for display transformation. This allows an IETP to consist of data from different CSDB implementations. The neutral data is generated and not authored. It can be generated "on the fly" from the CSDB through an automated process. The translation involves the inclusion of auto-generated XLinks and metadata.

The form of the repository is not specified. It can be a file storage system, web server, database, or other virtual representation.

## 2.3 IETP display transformation

To render a data module for display to an end user the IETP process transforms the data in the XML neutral repository into a viewable "end-user" form. This transformation process applies stylesheets to the XML data and transforms the XLink references into the required form of hyperlinks (eg HTML).

## 2.4 IETP namespaces

### 2.4.1 General

XML namespaces are designed to resolve naming conflicts in XML instances that contain elements and attributes from different XML Schemas. This is accomplished by associating namespaces, identified by Uniform Resource Identifier (URI) references, with names of elements and attributes.

These names appear as qualified names, ie they contain a single colon which separates the name into a namespace prefix and a local part. The prefix, which is mapped to a URI reference, denotes a namespace. The combination of the globally managed URI namespace and the instance's own namespace allow the names of elements and attributes to be universally unique.

There is no default XML namespace. If elements or attributes are not specifically declared to belong to an XML namespace, then they are not in any namespace.

### 2.4.2 Declaration of namespaces

An XML namespace is declared by using an attribute named either `xmlns` or having `xmlns:` as a prefix followed by an XML name specifying the namespace in question. The first form of the attribute `xmlns` declares that the specified namespace is the default XML namespace, whereas the second form defines the namespace prefix to be used on elements and attributes in the XML instance.

The value of the attribute `xmlns` is the namespace name in the form of a URI reference.

An XML namespace can be declared on any element in an XML document. The namespace is in scope for that element (and its attributes) and all its descendants (and their attributes) unless it is overridden or undeclared. Namespace declaration attributes can also be provided as default attributes with fixed values in an XML Schema.

To override a namespace prefix, simply another XML namespace has to be declared with the same prefix. To override the current default XML namespace, another XML namespace has to be declared as the default. A namespace prefix cannot be "undeclared". It remains in scope until the end of the element on which it was declared unless it is overridden. To "undeclare" the

current default XML namespace, a default namespace with an empty (zero-length) URI has to be declared.

**Note**

XML namespaces do not apply to entity names, notation names, or processing instruction targets. In consequence, these names must not contain colons for conformity reasons.

XML namespaces identified to be useful for IETP include:

- optional Resource Description Framework (RDF) (namespace prefix: `rdf`) and Dublin Core (disassembly code) (namespace prefix: `dc`) namespaces for data module and publication module metadata
- XLink (namespace prefix: `xlink`) language namespace for XLink elements and attributes
- data module (namespace prefix: `dm`) and publication module (namespace prefix: `pm`) namespaces for corresponding elements and attributes

**Note**

The data module namespace is the default namespace for IETP.

Fig 2 gives an overview of these IETP XML namespaces and shows their relationships.

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*Fig 2 IETP XML namespaces*

The URI references used as the namespace names in an IETP environment are summarized in

*Table 2 IETP XML namespace definitions*

| Namespace prefix | URI reference |
|---|---|
| `pm` | http://www.s1000d.org/pm |
| `dm` | http://www.s1000d.org/dm |
| `xlink` | http:/www.w3.org/1999/xlink |

| Namespace prefix | URI reference |
|---|---|
| rdf | http://www.w3.org/1999/02/22-rdf-syntax-ns# |
| dc | http://purl.org/dc/elements/1.1/ |

Applications wishing to make use of XML namespace-aware processing for instances conforming to this specification must ensure that the namespace names are resolved to the above URI references.

## 2.5 XML building

### 2.5.1 Linking elements

S1000D linking elements, as discussed in this chapter, are restricted to outbound links, ie links that point from within a data module to or into remote resources or sub-resources. For consistency, all links within a data module, which can be expressed by XML ID/IDREF mechanisms, should also be transformed to XLink linking elements.

### 2.5.2 Basic elements

2.5.2.1 XLink attribute list

Elements which are used in links are already marked up as elements in data modules (eg element <dmRef> and element <catalogSeqNumberRef>). Link semantics (behavior, type, role, etc) are completed by adding attributes to these elements.

2.5.2.2 Resource and sub-resource

In S1000D, all information objects such as data modules, publication modules, parts information, illustrations and multimedia objects are considered resources. The data module code, ICN, publication module code and CSN are the resource identifiers that are each described by specific name syntax and format identified in Chap 4.3, Chap 4.4, Chap 4.9.2, and Chap 3.9.5.2.7, respectively. The resource identifier data module extension is described in Chap 4.12 and Chap 3.9.5.1.

2.5.2.3 Links

It is recommended to use simple links as far as possible, but extended links can be useful for multiple remote ending resources, eg this can be a link to all data modules dependant on language and/or issue number.

In HTML, a link is defined using the element <A>. However, just as XML is more flexible concerning tags, which describe elements, it is more flexible concerning tags that refer to external resources. In XML, almost any element can be defined as a link.

Elements that assert the existence of a link are called linking elements; these are all XML elements having an attribute xlink:type with value "simple" or value "extended".

## 2.6 Metadata

### 2.6.1 General

Metadata describe, through a set of attributes or elements, additional aspects of the resource beyond its identifier. Catalogue records for library material with elements such as author, title, date of publication, etc are a common example of metadata.

The association of standardized metadata with networked information objects substantially improves resource discovery, use and management capabilities by enabling field-based

searches, permitting indexing of non-textual objects, and allowing access to the surrogate content that is distinct from access to the content of the resource itself.

Although all data specified within S1000D is machine-readable, this data is currently not always machine-understandable, eg where are the data modules about landing gear removal issued during last year?, is there an on-line French translation available for this data module?, etc.

This goal can be reached by using a precise and formal metadata definition.

### 2.6.2 Resource Description Framework

The RDF is a framework for metadata providing interoperability between applications that exchange machine-understandable information on the web. RDF emphasizes facilities to enable automated processing of web resources and, as such, provides the basic building blocks for supporting the semantic web.

In general, RDF provides the basis for generic tools for authoring, manipulating, and searching machine-understandable data on the web thereby promoting the transformation of the web into a machine-processable repository of information.

### 2.6.3 Dublin Core

Disassembly code metadata is specifically intended to support resource discovery. The elements represent a broad, interdisciplinary consensus about the core set of elements that are useful to support resource discovery.

"Simple disassembly code" or "unqualified disassembly code" is disassembly code metadata that uses no qualifiers, ie the elements are expressed as attribute value pairs without any qualifiers such as encoding schemes, enumerated lists of values, or other processing clues.

"Qualified disassembly code" employs additional qualifiers to further refine the meaning of a resource. One use for such qualifiers is to indicate if a metadata value is a compound or structured value, rather than just a string. For example, a "date" is a disassembly code element that has the option of being further specified to identify it as a particular kind of date (date last modified, date published, etc).

### 2.6.4 Relationship between RDF and DC

RDF and disassembly code are distinct specifications. Neither requires the other, but their co-evolution makes them natural complements in the metadata architecture for the web.

RDF is about structure, ie the conventions for encoding the assertions about a resource that uses disassembly code metadata semantics. Disassembly code metadata is about semantics, ie what to say about resources.

XML provides the syntax for encoding assertions in RDF, and hence in RDF-encoded disassembly code metadata.

### 2.6.5 Dublin Core elements

Disassembly code builds on RDF by defining 15 named properties, the disassembly code metadata set of elements, which are considered to be sufficient for resource discovery.

S1000D metadata, contained in the identification and status section of data modules or publication modules, are mapped to the disassembly code set of elements. Any RDF/Direct Current (DC)-aware application is then able to understand these mapped elements.

The following paragraphs list the 11 disassembly code elements used by S1000D together with their definitions, followed by a summary in Table 3.

2.6.5.1 Title

Definition: A name given to the resource. Typically, a title will be a name by which the resource is formally known.

S1000D maps the data module or publication module title to this disassembly code element, ie for data modules the content of element <techName> and, if given, element <infoName> separated from <techName> by a space-surrounded hyphen as indicated below; and for publication modules the content of element <pmTitle>.

Mapping:

<dc:title> = <techName> - <infoName> (for data modules)

or

<dc:title> = <pmTitle> (for publication modules)

2.6.5.2 Creator

Definition: An entity primarily responsible for making the content of the resource. Examples of a creator include a person, an organization, or a service. Typically, the name of a creator is used to indicate the entity.

S1000D maps the content of element <originator> to this disassembly code element for data modules and the element <responsiblePartnerCompany> for publication modules.

Mapping:

<dc:creator> = <originator> (for data modules)

or

<dc:creator> = <responsiblePartnerCompany> (for publication modules)

2.6.5.3 Subject and keywords

Definition: The topic of the content of the resource. Typically, a subject will be expressed as keywords, key phrases or classification codes that describe a topic of the resource. Recommended best practice is to select a value from a controlled vocabulary or formal classification scheme.

S1000D maps the data module or publication module title to this disassembly code element.

Mapping:

<dc:subject> = <techName> - <infoName> (for data modules)

or

<dc:subject> = <pmTitle> (for publication modules)

2.6.5.4 Publisher

Definition: An entity responsible for making the resource available. Examples of a publisher include a person, an organization, or a service. Typically, the name of a publisher is used to indicate the entity.

S1000D maps the content of element <responsiblePartnerCompany> to this disassembly code element for data modules and the attribute pmIssuer for publication modules.

Mapping:

<dc:publisher> = <responsiblePartnerCompany> (for data modules)

or

<dc:publisher> = pmIssuer (for publication modules)

2.6.5.5 Contributor

Definition: An entity responsible for making contributions to the content of the resource. Examples of a contributor include a person, an organization, or a service. Typically, the name of a contributor is used to indicate the entity.

S1000D maps the data module or publication module originator to this disassembly code element.

Mapping:

<dc:contributor> = <originator>

2.6.5.6 Date

Definition: A date associated with an event in the life cycle of the resource. Typically, <dc:date> will be associated with the creation or availability of the resource. Recommended best practice for encoding the date value is defined in a profile of International Standards Organisation (ISO) 8601 and follows the YYYY-MM-DD format.

S1000D maps the data module or publication module issue date to this disassembly code element, ie values of attribute year, attribute month and attribute day of element <issueDate>, separated by hyphens as indicated below.

Mapping:

<dc:date> = values of attributes year-month-day of element <issueDate>

2.6.5.7 Resource type

Definition: The nature or genre of the content of the resource. Element <dc:type> includes terms describing general categories, functions, genres, or aggregation levels for content. Recommended best practice is to select a value from a controlled vocabulary (for example, the recommended list of disassembly code types). To describe the physical or digital manifestation of the resource, use the element <dc:format>.

S1000D assigns the fixed value "text" to this disassembly code element.

Mapping:

<dc:type> = fixed value "text"

2.6.5.8 Format

Definition: The physical or digital manifestation of the resource. Typically, element <dc:format> includes the media type or dimensions of the resource. Element <dc:format> can be used to determine the software, hardware or other equipment needed

to display or operate the resource. Examples of dimensions include size and duration. Recommended best practice is to select a value from a controlled vocabulary (for example, the list of Internet media types defining computer media formats).

S1000D assigns the fixed value "`text/xml`" to this disassembly code element.

Mapping:

<`dc:format`> = fixed value "`text/xml`"

2.6.5.9 Resource identifier

Definition: An unambiguous reference to the resource within a given context. Recommended best practice is to identify the resource by means of a string or number conforming to a formal identification system. Example formal identification systems include the URI (including the Uniform Resource Locator (URL)), the Digital Object Identifier (DOI) and the International Standard Book Number (ISBN).

S1000D maps the content of the attributes of element <`dmCode`> or element <`pmCode`> to this disassembly code element, separated by hyphens as given in Chap 4.3 and Chap 4.9.2, respectively. When used, the content of the data module extension element <`identExtension`>, as described in Chap 4.12, is included in the mapping to the Resource identifier. In addition, the attribute `issueNumber` of element <`issueInfo`> must be added, separated from the data module code or publication module code by an underscore. The attribute `inWork` should be added and separated by a hyphen.

Mapping:

<`dc:identifier`> = <dmCode>`_issueNumber-inWork` (for data modules)

or

<`dc:identifier`> = `extensionProducer_extensionCode_`<dmCode>`_issueNumber-inWork` (for data modules)

or

<`dc:identifier`> = `extensionProducer_extensionCode_`<pmCode>`_issueNumber-inWork` (for publication modules)

2.6.5.10 Language

Definition: A language of the intellectual content of the resource. Recommended best practice for the content of element <`dc:language`> is defined by RFC 1766 (see Chap 3.9.5.1 regarding acceptable language codes), optionally followed by the country code in uppercase (taken from the ISO 3166 standard). For example, "`en`" for English, "`fr`" for French, "`de`" for German, or "`en-GB`" for English used in Great Britain.

S1000D maps the data module or publication module language to this disassembly code element, ie values of attribute `languageIsoCode` and attribute `countryIsoCode` of mandatory element <`language`>, separated by a hyphen as indicated below.

Mapping:

<`dc:language`> = attributes `languageIsoCode-countryIsoCode` of element <`language`>

2.6.5.11 Rights management

Definition: Information about rights held in and over the resource. Typically, the element <dc:rights> will contain a rights management statement for the resource, or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (in process review), copyright, and various property rights. If the element <dc:rights> is absent, no assumptions can be made about the status of these and other rights with respect to the resource.

S1000D maps the data module or publication module security classification to this disassembly code element, ie the values of attribute securityClassification, optional attribute commercialClassification and optional attribute caveat of element <security>.

Mapping:

<dc:rights> = attributes securityClassification_commercialClassification_caveat of element <security> (this mapping reflects the use of all attributes)

or

<dc:rights> = attributes securityClassification_commercialClassification of element <security> (this mapping reflects the use of all attributes except the attribute caveat)

or

<dc:rights> = attributes securityClassification__caveat of element <security> (this mapping reflects the use of all attributes except the attribute commercialClassification)

or

<dc:rights> = attribute securityClassification of element <security> (this mapping reflects only the use of the attribute securityClassification)

### 2.6.6 Metadata mapping

Table 3 summarizes the mapping of S1000D elements and attributes to the disassembly code elements. It is not possible to achieve a one to one relationship as some:

- S1000D metadata elements are not within the disassembly code scope (eg element <qualityAssurance>)
- Disassembly code elements have no exact counterpart in S1000D (eg element <dc:rights>)
- S1000D metadata elements have to be merged (eg <techName> - <infoName>)

*Table 3 Metadata mapping*

| DC elements | Data module elements and/or attributes | Publication module elements and/or attributes |
|---|---|---|
| <dc:creator> | <originator> | <responsiblePartnerCompany> |
| <dc:title> | <techName> - <infoName> | <pmTitle> |

| DC elements | Data module elements and/or attributes | Publication module elements and/or attributes |
|---|---|---|
| <dc:subject> | <techName> - <infoName> | <pmTitle> |
| <dc:publisher> | <responsiblePartnerCompany> | <pmIssuer> |
| <dc:contributor> | <originator> | <originator> |
| <dc:date> | year-month-day | year-month-day |
| <dc:type> | "text" | "text" |
| <dc:format> | "text/xml" | "text/xml" |
| <dc:identifier> | <dmCode>_issueNumber-inWork<br>or<br>extensionProducer_extensionCode_<dmCode>_issueNumber-inWork | <pmCode>_issueInfo-inWork |
| <dc:language> | languageIsoCode-countryIsoCode | languageIsoCode-countryIsoCode |
| <dc:rights> | securityClassification_commercialClassification_caveat<br>or<br>securityClassification_commercialClassification<br>or<br>securityClassification_caveat<br>or<br>securityClassification | securityClassification_commercialClassification_caveat<br>or<br>securityClassification_commercialClassification<br>or<br>securityClassification__caveat<br>or<br>securityClassification |

### 2.6.7 RDF/DC example

The following example demonstrates the mapping of S1000D data module elements and/or attributes to disassembly code metadata elements within an RDF container expressed in XML:

```
<?xml version="1.0"?>
<!DOCTYPE dmodule
[
<!ENTITY % ISOEntities PUBLIC "ISO 8879-1986//ENTITIES ISO
Character Entities 20030531//EN//XML"
"http://www.s1000d.org/S1000D_4-0/ent/ISOEntities">
%ISOEntities;
]>
```

```
<dmodule xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_4-
0/xml_schema/proced.xsd"
xmlns:dm="http://www.s1000d.org/dm"
xmlns:xlink="http:/www.w3.org/1999/xlink"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/">
<rdf:Description>
<dc:title>Solenoid valve, Pump No. 1 (No. 2) -
Remove procedures</dc:title>
<dc:creator>C0419</dc:creator>
<dc:subject>Solenoid valve, Pump No. 1 (No. 2) -
Remove procedures</dc:subject>
<dc:publisher>C0419</dc:publisher>
<dc:contributor>C0419</dc:contributor>
<dc:date>2001-04-01</dc:date>
<dc:type>text</dc:type>
<dc:format>text/xml</dc:format>
<dc:identifier>1B-B-29-11-01-06A-520A-A_003_01</dc:identifier>
<dc:language>sx-GB</dc:language>
<dc:rights>01</dc:rights>
</rdf:Description>
...
...
</dmodule>
```

## 2.7 Transformation for IETP

The transformation of data modules for IETP includes as a minimum:

- The automatic generation of identifiers for elements which will be used in hyperlinks and for which identifiers have not yet been authored into the data modules. In XML terminology these identifiers will serve as the addresses of ending resources. An example would be to amend element `<catalogSeqNumber>` by an attribute `id` for referencing this CSN. Fortunately, in the S1000D schema all these attributes are named `id`, which facilitates addressing the corresponding XML elements by name using the fragment identifier "`#xpointer(//*[@id='id-value'])`". Therefore, it is strongly recommended to use this common practice also for identifiers, which are automatically generated (ie name them `id`). Furthermore, the automatic generation process should obey the validity constraint of unique identifiers, otherwise only the first occurrence of an XML element in question can be retrieved.
- The generation of `xlink:` attributes for elements which serve both as starting resources and linking elements.
- The optional, but recommended, generation of a standard RDF/DC metadata section by mapping data module and publication module identification and status section to corresponding disassembly code elements. See Para 2.6.
- The transformation from XML to HTML for the IETP (eg by using XSLT), if the viewer cannot interpret eXtensible Stylesheet Language (XSL) stylesheets or process native XLink attributes directly.

### 2.7.1 Generation of identifiers

Identifiers are only useful for ending resources, and if they can be defined properly through a semantic rule, in order to allow safe access to them.

The recommended naming conventions for identifier values for automatic generation are, for example, as follows:

- `<figure id="fignnn">`, where "nnn" is a sequential number denoting the sequence of the figure within a data module; starting with "001"
- In case of multi-sheet figures: `<graphic id="fignnn-gramm" infoEntityIdent="ICN-icn">`, where "`fignnn`" is the identifier value of the parent element <`figure`> and "mm" denotes the sequential number of this illustration sheet within a multi-sheet figure
- `<catalogSeqNumber id="csn-csnisn">`, where "csnisn" are the related CSN and ISN values within an IPD data module
- `<term id="fignnn-trmmm">`, if element <`term`> is a child of element <`legend`> of element <`figure`>, where value "fignnn" is the identifier value of the parent element <`figure`> and "mm" is a unique sequential number of this term within the figure legend.
- Within the instance, each of these generated identifier values must be unique and must not conflict with already existing identifiers. With the exception of hyphens, any nonalphanumeric character contained in the attribute `catalogSeqNumber` of the element <`catalogSeqNumber`> and the attribute `itemSeqNumberValue` of the element <`itemSeqNumber`> must be replaced by a single hyphen to obtain valid XML identifier values.

The recommended naming convention for identifier values is as follows:

1 Use the first three characters of the element name

2 Add a sequential (control) number (eventually preceded by a single hyphen), which is unique within the data module

Examples:

```
<figure id="fig001">
```

```
<graphic id="fig002-gra02" infoEntityIdent="ICN-S1000D-A-
004002-G-S7282-00151-A-01-1">
```

```
<symbol id="sym123" infoEntityIdent="ICN-S1000D-A-316200-0-
F0214-00352-A-01-1">
```

```
<catalogSeqNumber id="csn-53251001-008-00A"> (for CSN "53251001
008" and ISN "00A" within an IPD data module).
```

```
<listItemTerm id="fig001-trm03">
```

### 2.7.2 Graphics and graphical hotspots

Graphical hotspots are defined in S1000D XML data modules as sub element <`hotspot`> of the element <`graphic`>. An example of an XML Schema fragment is given below:

```
<xs:element name="graphic">
<xs:complexType>
<xs:sequence>
<xs:element ref="hotspot" minOccurs="0" maxOccurs="unbounded"/>
<xs:element ref="reasonForAmendment" minOccurs="0"
maxOccurs="unbounded"/>
</xs:sequence>
<xs:attribute name="infoEntityIdent" type="xs:ENTITY"
use="required"/>
<xs:attribute name="applicRefId" type="xs:IDREF"/>
<xs:attribute name="id" type="xs:ID"/>
<xs:attribute name="repoductionWidth" type="xs:string"/>
<xs:attribute name="repoductionHeight" type="xs:string"/>
<xs:attribute name="repoductionScale" type="xs:string"/>
```

```
<xs:attribute name="changeMark" type="xs:nonNegativeInteger"/>
<xs:attribute name="reasonForUpdateRefIds" type="xs:IDREFS"/>
<xs:attribute name="authorityName" type="xs:string"/>
<xs:attribute name="authorityDocument" type="xs:string"/>
<xs:attribute name="securityClassification"
type="securityClassificationAttType"/>
<xs:attribute name="commercialClassification"
type="commercialClassificationAttType"/>
<xs:attribute name="caveat" type="caveatAttType"/>
<xs:attribute ref="xlink:type" fixed="simple"/>
<xs:attribute ref="xlink:href"/>
<xs:attribute ref="xlink:title"/>
<xs:attribute ref="xlink:show"/>
<xs:attribute ref="xlink:actuate"/>
</xs:complexType>
</xs:element>
```

**Note**

As it only makes sense to activate graphical hotspots by referencing them through element <internalRef>, there is no need to declare element <hotspot> as a linking element.

There is a special case for the element <symbol>, which can appear at the lowest level, eg in paragraphs, lists and tables. The default viewer behavior is to present it without the need for user interaction, and to embed it in the flow of text.

An XLink instance example for the element <symbol> can be found in Chap 7.7.4.

Other markup examples for the element <figure> and the element <graphic> are given in the paragraphs below.

2.7.2.1 Single-sheet figure

Markup example of a single illustration sheet figure in an XML data module instance fragment with minimum required information:

```
<figure id="fig001">
<title>Removal of solenoid valve, Pump No. 1</title>
<graphic infoEntityIdent="ICN-1B-B-291101-M-C0419-00571-A-01-1">
</graphic>
</figure>
```

Markup example of a single illustration sheet figure in XML form with XLink attributes, assuming that the graphic file name appears as value of the attribute xlink:href, has been retrieved from the system identifier given in the corresponding graphic entity definition at the beginning of the data module (generated attributes are shown in bold):

```
<figure id="fig001">
<title>Removal of solenoid valve, Pump No. 1</title>
<graphic xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:href="URN:S1000D:ICN-1B-B-291101-M-C0419-00571-A-01-1"
xlink:title="Removal of solenoid valve, Pump No. 1"
infoEntityIdent="ICN-1B-B-291101-M-C0419-00571-A-01-1">
</graphic>
</figure>
```

**Note**

Although not required, it is recommended to amend the element <graphic> by attribute xlink:title, containing the figure title, in order to stay inline with the XLink specification. This value can be used as a screen tip in the viewing application.

Depending on end user viewing requirements, the attribute xlink:show and the attribute xlink:actuate can appear in addition in the element <graphic>. They can take the value "embed" and the value "onLoad" respectively, in cases where the graphic is to be displayed as defined in the flow of text.

Another possibility for viewing behavior is to show only an icon in the flow of text (xlink:actuate="onRequest") and display the full graphic on user request either embedded in the same window (xlink:show="embed") or in a newly created one (xlink:show="new").

2.7.2.2 Multi-sheet figure with two illustration sheets

Markup example of a multi-sheet figure with two illustration sheets in an XML data module instance fragment with minimum required information:

```
<figure id="fig002">
<title>Identification of components on complex circuit board
</title>
<graphic id="fig002-gra01" infoEntityIdent="ICN-S1000D-A-004002-
G-S7282-00150-A-01-1">
</graphic>
<graphic id="fig002-gra02" infoEntityIdent="ICN-S1000D-A-004002-
G-S7282-00151-A-01-1">
</graphic>
</figure>
```

Markup example of a multi-sheet figure with two illustration sheets in XML form with XLink attributes (generated XLink attributes and end tags for empty elements are shown in bold):

```
<figure id="fig002">
<title>Identification of components on complex circuit board
</title>
<graphic xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:href="URN:S1000D:ICN-S1000D-A-004002-G-S2782-00150-A-01-1"
xlink:title="Identification of components on complex
circuit board (Sheet 1 of 2)"
id="fig002-gra01"
infoEntityIdent="ICN-S1000D-A-004002-G-S7282-00150-A-01-1">
</graphic>
<graphic xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:href="URN:S1000D:ICN-S1000D-A-004002-G-S2782-00151-A-01-1"
xlink:title="Identification of components on complex
circuit board (Sheet 2 of 2)"
id="fig002-gra02"
infoEntityIdent="ICN-S1000D-A-004002-G-S7282-00151-A-01-1">
</graphic>
</figure>
```

### 2.7.3 Links

This includes as a minimum the generation of XLink attributes on element <dmRef>, element <internalRef>, element <pmRef>, element <externalPubRef> and element <catalogSeqNumberRef>.

Markup example of an XML instance fragment for element <pmRef>:

```
<pmRef xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:title="S1000D Publication Module - The first"
xlink:href="URN:S1000D:PMC-S1000D-F6117-00001-00">
<pmRefIdent>
<pmCode modelIdentCode="S1000D" pmIssuer="F6117"
pmNumber="00001" pmVolume="00"/>
<language languageIsoCode="sx" countryIsoCode="US"/>
<issueInfo issueNumber="001" inWork="00"/>
</pmRefIdent>
<pmRefAddressItems>
<pmTitle>S1000D publication module - The first</pmTitle>
<issueDate year="2003" month="07" day="18"/>
</pmRefAddressItems>
</pmRef>
```

The following examples demonstrate the extension of a data module instance fragment with XLink attributes for element <dmRef>:

Markup example of a data module instance fragment with minimum required information:

```
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="07" subSystemCode="0" subSubSystemCode="4"
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
```

Markup example with generated XLink attributes shown in bold:

```
<dmRef xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="URN:S1000D:DMC-S1000D-A-07-04-0101-00A-040A-A">
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="07" subSystemCode="0" subSubSystemCode="4"
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
```

Markup example of a data module instance fragment with optional issue number and optional data module title:

```
<dmRef>
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="07" subSystemCode="0" subSubSystemCode="4"
```

```
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
<issueInfo issueNumber="002" inWork="00" issueType="changed"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techname>IETP</techname>
<infoName>Generation process</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
```

Markup example with generated XLink attributes shown in bold:

```
<dmRef xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:title="IETP - Generation process"
xlink:href="URN:S1000D:DMC-S1000D-A-07-04-0101-00A-040A-A">
<dmRefIdent>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="07" subSystemCode="0" subSubSystemCode="4"
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
<issueInfo issueNumber="002" inWork="00" issueType="changed"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techname>IETP</techname>
<infoName>Generation process</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
```

Markup example of a data module instance fragment when the data module code extension is applied:

```
<dmRef>
<dmRefIdent>
<identExtension extensionProducer="SF518"
extensionCode="USER001"/>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
systemCode="07" subSystemCode="0" subSubSystemCode="4"
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
```

Markup example with generated XLink attributes shown in bold:

```
<dmRef xmlns:xlink="http://www.w3.org/1999/xlink"
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="URN:S1000D:DME-SF518-USER001-S1000D-A-07-04-0101-
00A-040A-A">
<dmRefIdent>
<identExtension extensionProducer="SF518"
extensionCode="USER001"/>
<dmCode modelIdentCode="S1000D" systemDiffCode="A"
```

```
systemCode="07" subSystemCode="0" subSubSystemCode="4"
assyCode="0101" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
</dmRef>
```

**Note**

Depending on the end user viewing requirements, the attribute `xlink:show` can take the value "`new`" instead of the value "`replace`".

# Chapter 7.4.1.2

## *IETP - Resource resolution*

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## 1 General

With the advent of the Web the use of Uniform Resource Locators (Uniform Resource Locators (URL)s) has provided a method to access resources located anywhere in the world. Unfortunately, the URL establishes resource links directly to a location, usually residing on a web server, but once the resource is moved to another location all user of the link must re-author their side of the link or the link is broken. Additionally, to establish a link using a URL the location of the resource must be known beforehand. To overcome these limitations there is a need to establish a location independent method of linking.

In a shared environment this situation becomes even more difficult as users of a resource must be notified of changes to the location of a resource to maintain a valid link. Use of relative URLs minimizes some of these issues, but this would imply that every resource exists in the same fixed file structure. Relative URLs also cause issues for resources that do not exist in actual

physical locations or file structures but are located in a database server or other virtual representation. Finally, relative URLs lack metadata capability and do not address communication between applications.

Within the S1000D concept, IETPs are expected to interact with one another, and interoperability between IETPs is becoming a firm requirement. Although some IETP can manage its own resources, interaction between IETPs can be difficult, especially if different vendor's IETP applications need to communicate. Having a location independent resource system will facilitate this communication by masking the internal resource structure of the various IETP applications and allowing resource access through named requests instead of location requests.

The main objective of this chapter is to describe a method of resource resolution that will be location independent using Uniform Resource Names (URN), XLink, and promote resource description using metadata attributes.

# 2 Resource resolution

## 2.1 Resource resolution concepts

### 2.1.1 Resources

A fundamental concept of the World Wide Web is a resource. A resource can be anything that can be accessed through an identifier. The resource identifier can be considered the resource name or the resource location. For web based applications resource identifiers are described by the Uniform Resource Identifier (URI) syntax. Both URL and URN are considered URIs.

### 2.1.2 Resource resolvers

Resource resolution involves determining the physical resource location from a resource identifier. A resource resolver accepts a resource identifier and provides access to the resource location. Using URLs, a web server provides access to the resource directly. Using URNs, an intermediate server provides indirect access to resources by providing access to a URL, which can then be used to access the resource directly.

### 2.1.3 Location independence

The use of location independence allows the physical location of a resource to change while the identifier of the resource remains constant. If a resource is resolved indirectly using a resource resolver the link location only needs to be maintained in the resolver. Resource resolvers will accept a resource identifier and return the resolved resource location. Once the location change is updated in the resource resolver, all users of the resource through the resolver can continue to access the resource without modifying their own internal links. If the identifier is made persistent then any reference to the resource using the identifier will remain valid as long as the resource resolver remains updated with the current resource location.

### 2.1.4 Uniform resource names

Since URLs contain embedded location information they cannot be made location independent. The best method to achieve resource location independence is to use the URI described as a Uniform Resource Name**.** The URN identifies a resource by name only and contains no location information. To use a URN as a link, the link location must be resolved to a URL through an intermediate resource resolution process.

### 2.1.5 XLinks

An XLink provides a powerful linking mechanism for XML documents. For the purpose of location independence all XLink references used in this specification should use the URN form of URI.

### 2.1.6 Metadata

Another important aspect of resources is metadata. Metadata describes additional aspects of the resource beyond its identifier, such as the title, author, creation date, etc. The Resource

Description Framework (RDF) and Dublin Core (DC) are methods of describing resources. A resource resolver allows discovery of resource identifiers through the use of metadata queries.

## 2.2 Use of URNs for resource resolution

To provide location independence in the XML neutral repository all links should be expressed in URN format. The IETP application will process the URN links and transform them into URL links for the rendered "end-user form". The use of URNs will standardize data access across IETP repositories allows for XML neutral repositories to be shared between IETP applications.

### 2.2.1 URN format

The URN format is described by the following:

URN:NID:NSS

Where:

URN = Required URN Prefix

NID = Namespace Identifier

NSS = Namespace Specific String

### 2.2.2 S1000D URN namespace identifiers

In S1000D, all information objects such as data modules, publication modules, and illustrations are considered resources. The data module code, Data Module Code Extended (DME), publication module code, Publication Module Code Extended (PME), SCORM Content Package Code (SMC), SCORM Content Package Code Extended (SME), CSN, ICN, Comment Code (COM), Data Dispatch Note Code (DDN), and Data Module List Code (DML) are the resource identifiers that are each described by a specific name syntax and format identified elsewhere in this specification. Since data module code, DME, publication module code, PME, SCORM module code, SME, CSN, ICN, COM, data dispatch note, and data module list codes have global name uniqueness and are controlled under the authority of the S1000D each can be considered an S1000D subnamespace.

### 2.2.3 S1000D URN namespace registration

S1000D has a registered namespace identifier to reserve a range of names for specification use. The namespace identifier "S1000D" is reserved as illustrated by the following string:

```
URN:S1000D:{NSS as DMC, DME, PMC, PME, SMC, SME, CSN, ICN, COM,
DDN, DML encodings}
```

### 2.2.4 S1000D URN namespace specific strings

The namespace specific string for URNs defined by this specification will be divided into three components: subnamespace prefix, subnamespace code, and namespace extension suffix.

#### 2.2.4.1 S1000D URN subnamespace prefix

Within the S1000D, the namespace specific string is divided into subnamespaces for each of the encodings defined by this specification through the used of a prefix at the start of the string. The following are identified subnamespaces:

- the "URN:S1000D:DMC" subnamespace must contain all DMCs
- the "URN:S1000D:DME" subnamespace must contain all DMCs with extensions
- the "URN:S1000D:PMC" subnamespace must contain all PMCs
- the "URN:S1000D:PME" subnamespace must contain all PMEs
- the "URN:S1000D:SMC" subnamespace must contain all SMCs
- the "URN:S1000D:SME" subnamespace must contain all SMEs
- the "URN:S1000D:CSN" subnamespace must contain all CSNs
- the "URN:S1000D:ICN" subnamespace must contain all ICNs

- the "URN:S1000D:COM" subnamespace must contain all COMs
- the "URN:S1000D:DDN" subnamespace must contain all DDNs
- the "URN:S1000D:DML" subnamespace must contain all DMLs

2.2.4.2 S1000D URN subnamespace codes

The subnamespacecode follows the subnamespace prefix. The subnamespace prefix will be separated from the subnamespace code using the "-" (ASCII 45) character.

```
URN:S1000D:DMC-{Code in DMC syntax}
URN:S1000D:DME-{Code in DME syntax}
URN:S1000D:PMC-{Code in PMC syntax}
URN:S1000D:PME-{Code in PME syntax}
URN:S1000D:SMC-{Code in SMC syntax}
URN:S1000D:SME-{Code in SME syntax}
URN:S1000D:CSN-{Code in CSN syntax}
URN:S1000D:ICN-{Code in ICN syntax}
URN:S1000D:COM-{Code in COM syntax}
URN:S1000D:DDN-{Code in DDN syntax}
URN:S1000D:DML-{Code in DML syntax}
```

2.2.4.3 S1000D URN subnamespace extension suffix

In addition, the code syntax must be extended within the namespace to include qualifiers that further identify the item. Each qualifier is separated from the subnamespace code by an undescrore, ie the "_" (ASCII 95) character and appended after the subnamespace code. A qualifier begins with a qualifier identifier separated from the qualifier data using the "-" (American Standard Code for Information Interchange (ASCII) 45) character.

The following qualifiers are required.

The issue of the data is identified using the "I" qualifier by appending the string "_I-{ISSUE}" to issue number where "{ISSUE}" is the issue number

The INWORK status of the data is identified using the "W" qualifier by appending the string "_W-{INWORK}" to the code where "{INWORK}" is the in-work number.

The encoded language of the data is identified using the "L" qualifier by appending the string "_L-{LANG}" where "{LANG}" is the language code.

The encoded country of the data further qualifies the language using the "C" qualifier by appending the string "_C-{COUNTRY}" to the code where "{COUNTRY}" is the country code.

**2.2.5 URN examples**

URN for the DMC "`S1000D-A-07-05-0000-00A-000A-A`":

`URN:S1000D:DMC-S1000D-A-07-05-0000-00A-000A-A_I-001_W-00_L-SX_C-US`

URN for the DMC "`S1000D-A-07-05-0000-00A-000A-A`" specifying the first issue in English:

`URN:S1000D:DMC-S1000D-A-07-05-0000-00A-000A-A_I-001_W-00_L-EN_C-US`

URN for the training DMC "`S1000D-A-07-05-0000-00A-000A-A-T80E`" specifying the first issue in English:

URN:S1000D:DMC-S1000D-A-07-05-0000-00A-000A-A-T80E_I-001_W-00_L-EN_C-US

URN for an instance of the DMC "S1000D-A-07-05-0000-00A-000A-A" applying the extension "SF518-ABC00231", and also specifying the first issue in English:

URN:S1000D:DME-SF518-ABC00231-S1000D-A-07-05-0000-00A-000A-A_I-001_W-00_L-EN_C-US

### 2.2.6 URN security considerations

There are no additional security considerations other than those normally associated with the use and resolution of URI in general. Most implementations of resolution services will likely be web services. Therefore security considerations in this case will be the same well known issues related to accessing and protecting information over the internet.

## 2.3 IETP URN to URL translation

Since current browsers do not have the capability to resolve URNs and XLinks directly, each IETP application will need to resolve link information during the transformation to the end user form to be displayed in the browser. The process to resolve URN information depends on the IETP implementation.

To convert a URN to a file name a simple method is to parse the namespace specific string of the URN and append the appropriate file extension and possibly a static directory structure to get a relative or static URL. More advanced applications could use a database to lookup the URL for a specific URN and possibly even store the data module within the database.

To achieve a common resolution interface, IETP applications must implement the URN resolution server interface proposed in this specification by providing an external interface to the internal IETP data repository, thereby allowing external applications to access the information. Using this interface for internal URN resolution is also recommended to simplify link resolution.

# Chapter 7.4.2

## *Generation of publications - Publication module and SCORM Content Package Schema*

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| Chap 4.9 | Information management - Publication and SCORM content package management |

# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide technical background on S1000D Publication Module and SCORM Content Package.

## 1.2 Scope

The publication module defines the content and the structure of a publication. It contains references to data modules, other publication modules, data modules with front matter and access illustrations, gives corresponding titles and specifies how these are structured within the publication instance.

The SCORM Content Package defines the content and the structure of a SCO. It contains references to data modules, other SCORM Content Packages, data modules with front matter and access illustrations, gives corresponding titles and specifies how these are structured within the SCO instance.

# 2 Publication module and SCORM content package Schema

The rules and guidance for publication module and SCORM Content Package are e given in the following chapters.

Chap 4.9: provides a detailed description of the concept and structure of the publication module and SCORM Content Package.

Electronic copies of the XML Schema for publication modules and SCORM Content Package are available for download from the S1000D web site at www.s1000d.org. System identifiers shown in examples point to these reference copies at:

`http://www.s1000d.org/S1000D_4-0/...`

From S1000D Issue 4.0 onwards, Standard Generalized Markup Language (SGML) and XML Document Type Definition (DTD) are no longer supported.

## 2.1 Publication module and SCORM Content Package structure

### 2.1.1 Formats

The structure of a publication module and SCORM Content Package is based on addressable items and has no reference to pages.

The publication module and SCORM Content Package instance must be a valid XML instance. This means that the publication module and SCORM Content Package instance must conform to either a publication module or SCORM Content Package XML schema.

Data modules and publication modules and SCORM Content Package can reside as XML instances within the CSDB. It is strongly advised to check that data modules, publication or SCORM Content Package modules in XML format are valid XML instances before they enter into the IETP building process, to ensure S1000D conformity and, thus, interoperability.

### 2.1.2 Schema structure

This paragraph outlines the representation of the hierarchical (tree) structure of the S1000D publication module and SCORM Content Package.

The publication module and SCORM Content Package structure is divided into three parts:

- An optional XML RDF/disassembly code metadata section (element <`rdf:Description`>) (available only for the XML format)
- A mandatory publication module identification and status section (element <`identAndStatusSection`>) derived from the data module identification and status section
- A mandatory publication module and SCORM Content Package content section (element <`content`>) which includes only references to data modules, publication modules or external publications (ie for legacy interoperability)

#### 2.1.2.1 Schema hierarchical tree structure

The following statement can be used in publication module instances to call the XML Schema for validation:

#### 2.1.2.2 XML modular schema instances

```
<pm xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-
0/xml_schema_modular/pmSchema.xsd">
```

```
<scormContentPackage
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_4-
0/xml_schema_modular/scormcontentpackageSchema.xsd">
```

2.1.2.3 XML flat schema instances

```
<pm xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation=
"http://www.s1000d.org/S1000D_4-0/xml_schema_flat/pm.xsd">
```

```
<scormContentPackage
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_4-
0/xml_schema_flat/scormcontentpackage.xsd">
```

# Chapter 7.4.2.1

## *Publication module Schema - Version summary*

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*Table 1 References*

| Chap No./Document No. | Title |
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| None | |

# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide technical background on S1000D Publication module related Schema versions, which have been formally released for productive use.

From S1000D Issue 4.0 onwards, Standard Generalized Markup Language (SGML) and SGML/XML Document Type Definition (DTD) are no longer supported.

# 2 XML Schema for publication modules

## 2.1 List of XML Schema release versions for publication modules

The following table lists all XML Schema release versions for publication modules together with their relation to S1000D issue and change numbers.

*Table 2 List of S1000D XML Schema release versions for publication module*

| S1000D Issue, Change No. | XML Schema Version No. | Production release date |
|---|---|---|
| 2,0 | 2.0 | 2003-05-31 |
| 2,1 | 2.1 | 2004-02-29 |
| 2,2 | 2.2 | 2005-05-01 |
| 2,3 | 2.3 | 2007-02-28 |
| 3,0 | 3.0 | 2007-07-31 |
| 4,0 | 4.0 | 2008-08-01 |

## 2.2 Update summary

### 2.2.1 Version 2.0

This is the first formal version of an S1000D XML Schema for publication modules that has been released to coincide with Issue 2 of the specification.

### 2.2.2 Version 2.1

Summary of changes for version 2.1 of the S1000D XML Schema for publication modules requested by Technical Publications Specification Maintenance Group (of ASD/AIA/ATA) (TPSMG)/Electronic Publications Working Group (EPWG):

- CPF 2004-12(DE):
  - Remove attribute `mixed` with value "`true`" within definition of element <`sbc`>

### 2.2.3 Version 2.2

Summary of changes for version 2.2 of the S1000D XML Schema for publication modules requested by TPSMG/EPWG:

- CPF 2004-21(GB):
  - List of values on attribute `change` within attribute group "`INSDEL`" amended by value "`modify`" (see dmaddr2.xsd)
- CPF 2004-22GB:
  - Change of element <`copyright`> content model.
- CPF 2004-24GB:
  - Simple type "`MNTLVLS`" introduced for the definition of generic maintenance levels (see project.cfg)
- CPF 2005-06SE:
  - Publication module number element <`pmnumber`> within publication module code element <`pmc`> allowed to be alphanumeric instead of numeric (see pmc.xsd)
- Bug fixes:
  - Pattern definitions on attribute `issno` and attribute `inwork` of element <`issno`> corrected (see dmaddr2.xsd)
  - Pattern definitions on attribute `year`, attribute `month` and attribute `day` of element <`issdate`> corrected (see dmaddr2.xsd)
  - Definition of empty element <`unverif`> corrected (see pmSchema.xsd)
- TPSMG request:
  - Element <`p`> amended by attributes given in group "`bodyatt`" (see pmlistcode.xsd)
- Consistency:
  - Type of all elements which contain only Parsed Character Data and which have no attributes has been redefined to `type="xs:string"`

### 2.2.4 Version 2.3

Summary of changes for version 2.3 of the S1000D XML Schema for publication modules requested by TPSMG/EPWG:

- CPF 2004-64SE:
  - Addition of element <dmcextension> to the <refdm> content model.
- CPF 2005-02FR:
  - Transition to XML Schema from SGML DTD master
- CPF 2005-65SE:
  - Dublin Core element names changed to all lowercase

### 2.2.5 Version 3.0

Summary of changes for version 3.0 of the S1000D XML Schema for publication modules requested by TPSMG/EPWG:

- CPF 2006-47AA:
  - Replacement of element <effect> with the element <applic> in the content of element <pmstatus> consisting of the following content:
    - Element <displaytext> containing element <p>
    - Element <assert> including attribute actidref, attribute actreftype, attribute actvalues and attribute displayclass
    - Element <evaluate> including attribute operator and attribute displayclass
  - This replacement causes a backward compatibility issue that can be solved by moving the content of the element <effect> into the new element <displaytext> within the element <applic>.

### 2.2.6 Version 4.0

Summary of changes for version 4.0 of the S1000D XML Schema for publication modules requested by TPSMG/EPWG:

- CPF 2004-051DE:
  - Content model of element <pmAddress> (old element <pmaddres>) changed from (pmCode,pmTitle,issueInfo,issueDate,language?) to (pmCode,language?,issueInfo,issueDate,pmTitle).
    This change causes a backward compatibility issue that can be solved by swapping element <pmTitle> and element <language> within element <pmAddress>
  - Content model of element <dmRef> (old element <refdm>) changed from (identExtension?,dmCode,dmTitle?,issueInfo?,issueDate?, language?) to (identExtension?,dmCode,language?,issueInfo?, issueDate?,dmTitle?). This change causes a backward compatibility issue that can be solved by swapping element <dmTitle> and element <language> within element <dmRef>
  - Content model of element <pmRef> (old element <refpm>) changed from (pmCode,pmTitle?,issueInfo?,issueDate?,language?,...) to (pmCode,language?,issueInfo?,issueDate?,pmTitle?,...). This change causes a backward compatibility issue that can be solved by swapping element <pmTitle> and element <language> within element <pmRef>
  - Content model of element <externalPubRef> (old element <refextp>) changed from (externalPubCode,pubTitle?,pubDate?,...) to (externalPubCode,pubDate?,pubTitle?,...). This change causes a

backward compatibility issue that can be solved by swapping element <pubDate> and element <pubTitle> within element <pmRef>

- CPF 2006-044US:
  - Within the element <pmAddress>, the attribute inwork of element <issueInfo> is now required (old element <issno>) changed.
  - The element <language> within element <pmAddress> is now required.

# Chapter 7.4.3

## *Generation of publications - Inclusion of legacy information*

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# 1 General

Operation and maintenance of a Product in a certain user environment quite frequently call for additional information apart from the Product specific publications. Typically, such information would concern general matters or local circumstances, and might include local safety regulations, support equipment or commercial off the shelf documentation, etc. This kind of information, not complying to S1000D as far as structure and/or format are concerned, is herein called legacy information/data.

S1000D appreciates the need for legacy information. Therefore, to facilitate compilation of complete packages of information to meet the comprehensive requirements from specific user groups, S1000D provides the means to include legacy data in publications.

# 2 Inclusion techniques

## 2.1 Encapsulation in data modules

One way of including legacy data in an S1000D publication is to reference the data from within a data module. The technique for this is based on use of the element <`externalPubRef`>. Refer to Chap 3.9.5.2.1.2.

The markup would be to use the element <externalPubCode> (contained in subelement <externalPubRefIdent>to store the identification of the legacy publication concerned. In addition, good practice is to use the attribute pubCodingScheme to reflect the type of identification that is applied.

S1000D does not impose or suggest any specific coding of legacy publications or any particular method for identifying such a coding system. That is a project or an organization decision.

The encapsulating data module must be a valid data module, including the required <identAndStatusSection> section, and a minor structure to encompass the reference element. In consequence, the data module must also be assigned a valid data module code.

**Note**

The format of an encapsulated legacy object must be one of the allowed data formats that apply to illustrations etc. Normally it would be a PDF file.

## 2.2 Reference by publication modules

As an alternative to encapsulating legacy data in a data module the data can be included by a reference within a publication module. In this case, the element <externalPubRef> would be used to refer to the legacy publication. Refer to Chap 7.4.2.

Markup of this reference would be similar to that described in Para 2. The element <externalPubCode>, contained in <externalPubRefIdent>, is used to contain the identification of the legacy publication concerned as text. Also in this case, good practice is to let attribute pubCodingScheme reflect the type of identification that is applied.

This method can also be used to include "S1000D legacy" data, ie publications produced to a previous version of this specification. However, the preferred method to include such data is to regenerate the publications to meet the current standards.

**Note**

To include legacy publications in an IETP, the software applied must be able to read and present the legacy information.

## 2.3 Transformation for display

To enable viewing of legacy data in an IETP, it is necessary to resolve the references made in either a data module or a publication module and transform these to a format complying with the viewer used.

Since the preconditions are not fully controlled by S1000D, the specification does not elaborate on transformation of the references for viewing and navigation purposes. This is left to the project or the organization. Nevertheless, it is recommended to apply the principles and methods for IETP link management as described in Chap 7.4.1.1 and Chap 7.7.4.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Population of the element <externalPubCode>**. The project or the organization must decide the preferred syntax applied to identify legacy data by a publication code.

**Use of the attribute pubCodingScheme**. The project or the organization must decide if the attribute will be used and, if so, the set of allowed coding schemes and the syntax used to specify those schemes.

**Method to include legacy information in an IETP**. The project or the organization must decide whether to include legacy information by encapsulating it in data modules or by referencing it as external publications using the publication module.

**IETP reference format**. The project or the organization must decide the syntax and semantic of the links established to reference legacy data.

# Chapter 7.5

## *Information processing - Information interchange*

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# 1 General

## 1.1 Purpose

The purpose of this chapter is to provide technical background on S1000D data interchange rules and procedures.

## 1.2 Scope

In addition to providing details of the file based transfer method for information interchange, this chapter also contains descriptions of interchange related Schemas.

# 2 Information interchange

The rules and guidance for information interchange are e given in the following chapters.

- Chap 7.5.1 provides a detailed description of the file based transfer method including file naming conventions.
- Chap 7.5.2 provides a descriptions of interchange related Schemas.
- Chap 7.5.3 provides a mapping of S1000D elements and attributes to RDF/DC metadata.

# Chapter 7.5.1

## *Information interchange - File based transfer*

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| Chap 7.3.2 | CSDB objects - Graphics |
| ISO/IEC 10918 | Information technology -- Digital compression and coding of continuous-tone still images: Requirements and guidelines |
| ISO/IEC 15948:2003 (E) | Portable Network Graphics (PNG): Functional |

| Chap No./Document No. | Title |
|---|---|
| | specification |
| W3C REC-png-20031110 | Portable Network Graphics (PNG) Specification |

# 1 General

The purpose of this chapter is to describe the file based transfer method to be used for S1000D compatible electronic information interchange.

# 2 File based transfer method

The file based transfer method imposes a file naming convention to allow simple CSDB data import checks to be performed without the need to investigate values inside data files.

## 2.1 File based transfer package structure

An S1000D file based transfer package consists of one data dispatch note text file, marked up with XML, and at least one file out of the data categories given in Chap 4.8.

The files can be transferred in any order, but it is recommended that the data dispatch note is the first data file in the sequence for serial media. A directory structure will not be used.

Appropriate data compression techniques (eg ZIP, GZIP, TAR or X/Open (UNIX) compress) can be applied to the data file set as a whole before transfer. This reduces transfer package sizes and transfer times but has to be mutually agreed between sender and receiver for each individual project.

## 2.2 File types

Table 2 summarizes the permitted data formats for S1000D compatible information interchange, where file name examples are shown according to the mandatory file name format with hyphens and, if applicable, underscores.

*Table 2 Permitted interchange data formats*

| Data format | File name example |
|---|---|
| XML | PMC-S1000D-I9005-1000D-00_001_02_SX-US.XML |
| CGM | ICN-A1-A-532510-D-F6117-00001-A-001-01.CGM |
| CALS Raster (CCITT Gr 4) | ICN-1B-A-270000-M-C0419-00002-A-002-03.CG4 |
| Tagged Image File Format (TIFF) | ICN-E2-A-723200-R-K0378-00003-A-003-02.TIF |
| Graphics Interchange Format (GIF) | ICN-E2-A-721060-R-K0378-00066-A-001-01.GIF |
| Portable Network Graphics (PNG) | ICN-S1000D-A-004005-0-I9005-00001-A-001-01.PNG |
| Joint Photographic Experts Group (JPEG) | ICN-1B-B-291101-M-C0419-00571-B-001-01.JPG |
| PDF | ICN-S1000D-A-07050100-0-I9005-00002-A-003-01.PDF |

| Data format | File name example |
|---|---|
| Multimedia formats | ICN-S1000D-A-005004-0-E8010-00001-A-001-01.XXX where XXX is the filename extension of the multimedia type used |

## 2.3 File naming conventions

The transfer files are named according to the following generic structure:

**TYPE-CONTROLNUMBER.FORMAT**, where:

- **TYPE** can have the following values:
  - "DDN" for data dispatch notes
  - "DMC" for data module text
  - "DME" for data module text, extended identification
  - "ICN" for illustrations and multimedia objects
  - "DML" for data module lists (data module requirement list or CSDB status list)
  - "PMC" for publication modules
  - "SMC" for SCORM content package
  - "PME" for publication module, extended identification
  - "SME" for SCORM module, extended identification
  - "COM" for comment forms
- **CONTROLNUMBER** is the unique identifier of the data file written with hyphens and underscores depending on the type of data as given below.
- **FORMAT** can have the following values:
  - "XML", denoting text marked up with XML in accordance with the corresponding Schema
  - "CGM", denoting 2D CGM graphics in accordance with the S1000D CGM profile given in Chap 7.3.2
  - "CG4", denoting binary Continuous Acquisition and Life-cycle Support (CALS) raster type 1 (untiled) graphics encoded in CCITT/4 in accordance with MIL-PRF-28002
  - "TIF", denoting Tagged Image File Format (TIFF) binary raster graphics encoded in CCITT/4 in accordance with the S1000D TIFF profile given in Chap 7.3.2, or LZW encoded colored raster graphics in accordance with the Adobe TIFF 6.0 specification
  - "JPG", denoting Joint Photographic Expert Group (JPEG) raster graphics encoded in accordance with ISO/IEC 10918
  - "PNG", denoting Portable Network Graphics (PNG) raster images encoded in accordance with W3C REC-png-20031110 and ISO/IEC 15948:2003 (E)
  - "GIF", denoting Graphic Interchange Format (GIF) raster images encoded in accordance with the CompuServe GIF 89a specification
  - "PDF", denoting documents encoded in accordance with the Adobe PDF Reference
  - "XXX", (where XXX is the filename extension) denoting the specific encoding for the multimedia type used

The file names are built of three characters followed by a hyphen, followed by the appropriate unique identifier with hyphens, followed by a period, followed by the three character file extension. All file names must be in uppercase.

The CONTROLNUMBER consists of the following sequence:

- data identifier, written with hyphens

- underscore
- issue number (content of attribute issueNumber of element <issueInfo>)
- hyphen
- inwork number (content of attribute inWork of element <issueInfo>)

For data types "DDN" (data dispatch notes) and "ICN" (illustrations and multimedia objects), the CONTROLNUMBER consists only of the data identifier.

For data modules, publication modules and comment forms, the CONTROLNUMBER is further extended by the following sequence:

- underscore
- language code (content of attribute languageIsoCode of element <language>)
- hyphen
- country code (content of attribute countryIsoCode of element <language>)

The element <language> must be used and the attributes countryIsoCode and languageIsoCode must be used.

Details on the breakdown of control numbers and more examples of file names for the different data categories are given in the following paragraphs.

### 2.3.1 Data dispatch note

CONTROLNUMBER is the data dispatch note identifier in the form:

MI-SSSSS-RRRRR-XXXX-NNNNN, where:

- MI = model identifier
- SSSSS = NATO Commercial And Government Entity (NCAGE) code of sending Agency or Partner Company (A/PC)
- RRRRR = NCAGE code of receiving A/PC
- XXXX = Year (eg 1999, 2001)
- NNNNN = Unique sequential decimal data dispatch note number per year depending on the model identifier, the sending A/PC, the receiving A/PC and the year, starting with value "00001" every new year

File name example of the third dispatch from EADS-M to BAES in 2001:

- DDN-S1000D-C0419-K0999-2001-00003.XML

File name example of the second dispatch from MoD UK to ASD in 2003:

- DDN-S1000DBIKE-U8025-I9005-2003-00002.XML

File name example of the first dispatch from EADS-M to MoD UK in 2004:

- DDN-S1000DBIKE-C0419-U8025-2004-00001.XML

The data dispatch note defines sender, receiver and content of the dispatch. A data delivery list (DDL) is optionally included in the data dispatch note which lists all file names of the dispatched data together with their control numbers and issue numbers as additional options.

Element <deliveryListItem> specifies one dispatched object in the transfer package. Element <dispatchFileName> must contain the complete dispatch file name including TYPE and FORMAT, separated by hyphens and underscores as appropriate.

Element <entityControlNumber> must contain only the CONTROLNUMBER without TYPE and FORMAT, ie without any pre- or postfix, separated by hyphens as appropriate.

Markup examples:

```
<deliveryListItem>
<dispatchFileName>
DMC-1B-A-31-16-00-00A-040A-A_003-00_SX-US.XML
</dispatchFileName><entityControlNumber>1B-A-31-16-00-00A-040A-
A_SX-US</entityControlNumber>
</deliveryListItem>

<deliveryListItem>
<dispatchFileName>PMC-1B-D9460-00001-00_002-00_EN-US.XML
</dispatchFileName><entityControlNumber>1B-D9460-00001-00_EN-
US</entityControlNumber>
</deliveryListItem>

<deliveryListItem>
<dispatchFileName>ICN-A1-A-532510-D-F6117-00001-A-001-01.CGM
</dispatchFileName>
<entityControlNumber>A1-A-532510-D-F6117-00001-A-01-
1</entityControlNumber>
</deliveryListItem>

<deliveryListItem>
<dispatchFileName>COM-AJ-I9034-2006-00365-R_SX-
US.XML</dispatchFileName>
<entityControlNumber>AJ-I9034-2006-00365-R_SX-
US</entityControlNumber>
</deliveryListItem>

<deliveryListItem>
<dispatchFileName>
ICN-S1000D-A-005004-0-E8010-00001-A-001-01.AVI
</dispatchFileName>
<entityControlNumber>S1000D-A-005004-0-E8010-00001-A-01-
1</entityControlNumber>
</deliveryListItem>
```

### 2.3.2 Data module text

CONTROLNUMBER is the data module code with hyphens between the different subelements (MI, system difference code, SNS, DC/DCV, IC/ICV, item location code, LC), followed by the sequence:

- underscore
- three-digit data module issue number
- hyphen
- two-digit inwork number

The CONTROLNUMBER is extended by _LL-CC, where:

- LL = Language code
- CC = Country code

File name examples:

- DMC-1B-A-31-16-00-00A-040A-A_003-00_SX-US.XML

– DMC-S1000DBIKE-AAA-DA5-20-00-0000-251C-A_001-01_SX-US.XML

### 2.3.3 Data module text, extended identification

– CONTROLNUMBER is the data module code with hyphens between the different subelements (MI, system difference code, SNS, DC/DCV, IC/ICV, ILC), preceded by the parameters <extensionProducer> and <extensionCode> of <identExtension> in <dmAddress>, also separated by hyphens.

File name examples:

– DME-SF518-ABC00231-1B-A-31-16-00-00A-040A-A_003-00_EN-US.XML
– DME-SF518-USER001-S1000DBIKE-AAA-DA5-20-00-0000-251C-A_001-01_EN-US.XML

### 2.3.4 Illustrations and multimedia objects

CONTROLNUMBER is the ICN (without the "ICN-" prefix) written with hyphens between the different subelements.

File name examples:

– ICN-A1-A-535210-D-F6117-00001-A-001-01.CGM
– ICN-S3627-S1000D00494-001-01.CG4
– ICN-K0378-D1B00003-003-02.TIF
– ICN-B2-A-746210-E-G9216-00001-A-001-01.MPG
– ICN-2C-A-390000-M-F0518-00003-A-002-03.AVI
– ICN-F3-A-123400-K-R0863-00005-A-003-02.MP3

**Note**

This CONTROLNUMBER format must also be used along with the prefix "ICN-" in graphic/multimedia entity definitions and for the values of attribute infoEntityIdent in the element <graphic>, the element <symbol> and the element <multimediaObject>.

### 2.3.5 Data module list

CONTROLNUMBER is the data module list identifier in the form:

MI-SSSSS-T-XXXX-NNNNN_III-WW

– MI = Model identifier
– SSSSS = CAGE code of sending A/PC
– T = Type of list. Possible values are:
  - Value "S" for CSDB status lists
  - Value "P" for partial data module requirement lists
  - Value "C" for complete data module requirement lists
– XXXX = Year (eg 2000)
– NNNNN = Unique sequential decimal data module list number per year depending on the model identifier, the sending A/PC, the list type and the year, starting with value "00001" every new year
– III = Issue number

– WW = Inwork number

File name examples:

– DML-S1000D-C0419-S-1999-00003_001-00.XML
– DML-S1000D-C0419-P-2000-00002_001-00.XML
– DML-S1000D-C0419-C-2002-00001_001-00.XML
– DML-S1000D-I9005-C-2003-00001_002-00.XML
– DML-S1000DBIKE-U8025-S-2004-00001_000-01.XML

The functionality and content of data module lists is described in Chap 4.5.

### 2.3.6 Publication module and SCORM content package

CONTROLNUMBER is the publication module and SCORM content package identifiers in the form:

MI-YYYYY-XXXXX-NN_III-WW

– MI = Model identifier
– YYYYY = NCAGE code of issuing authority
– XXXXX = Unique alphanumeric identification of the publication module depending on the model identifier and the issuing authority
– NN = Volume number of the publication, the default value "00" means there are no volumes, ie it is a single volume publication
– III = Issue number
– WW = Inwork number

The CONTROLNUMBER is extended by _LL-CC, where:

– LL = Language code
– CC = Country code

The SCORM module code is optionally extended by kxxa, where:

– k = "T" for training content and "H" for HPT content
– xx = learn code
– a = learn event code, limited to values of "A", "B", "C", "D" or "E"

File name examples:

– PMC-E2-K0378-00001-00_001-00_EN-GB.XML
– PMC-1B-D9460-00001-00_002-00_EN-GB.XML
– PMC-S1000D-I9005-1000D-00_000-02_SX-US.XML
– SMC-E2-K0378-00001-00_001-00_EN-GB-T2DC.XML
– SMC-1B-D9460-00001-00_002-00_EN-GB-T70E.XML
– SMC-S1000D-I9005-1000D-00_000-02_EN-GB-T12C.XML

The functionality and content of publication modules or SCORM content packages are described in Chap 4.9.

### 2.3.7 Publication module, extended identification

– CONTROLNUMBER is the publication module code with hyphens between the different subelements (MI, system difference code, SNS, DC/DCV, IC/ICV, ILC), preceded by the

parameters <extensionProducer> and <extensionCode> of <identExtension> in <dmAddress>, also separated by hyphens.

### 2.3.8 SCORM module, extended identification

– CONTROLNUMBER is the SCORM module code with hyphens between the different subelements (MI, system difference code, SNS, DC/DCV, IC/ICV, ILC), preceded by the parameters <extensionProducer> and <extensionCode> of <identExtension> in <dmAddress>, also separated by hyphens.

### 2.3.9 Comment

CONTROLNUMBER is the comment identifier in the form:

MI-YYYYY-XXXX-NNNNN-T, where:

– MI = Model identifier
– YYYYY = NCAGE code of authority, which raised the query/comment originally
– XXXX = Year (eg 2005)
– NNNNN = Unique sequential decimal comment number per year depending on the model identifier, the originator of the query/comment and the year, starting with value "00001" every new year
– T = Type of comment form. Possible values are:
  - Value "Q", which means query (originally raised comment)
  - Value "I", which means interim response
  - Value "R", which means final response.

The CONTROLNUMBER is extended by _LL or _LL-CC, where:

– LL = Language code
– CC = Country code

File name examples:

– COM-E2-K0378-2002-00001-Q_EN_GB.XML
– COM-E2-K0378-2002-00001-I_SX_US.XML
– COM-JA-H2433-2002-00058-Q_EN_US.XML
– COM-JA-H2433-2002-00058-R_SX_US.XML

The functionality and content of comment forms is described in Chap 4.6.

#### 2.3.9.1 Attachments to comments

CONTROLNUMBER is the comment identifier amended by the sequential number (MM) of the attachment to this comment in the form:

MI-YYYYY-XXXX-NNNNN-T-MM

– MM = Unique sequential decimal number of the attachment starting with value "01"

The data format of the attachment is not restricted to the permitted interchange formats as given in Para 2.2, but the allowed extensions must be defined by the project or the organization.

File name examples:

– COM-AJ-I9034-2006-00365-Q-01_EN_US.PDF

– COM-AJ-I9034-2006-00365-I-01_SX_US.ZIP

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of file compression techniques.** The project or the organization must decide on whether to use compression techniques on files being transferred. Refer to Para 2.1.

**Defined file formats.** The project or the organization must decide on the allowable file formats, if any, beyond those given in Para 2.3.

**Use of multimedia**. The project or the organization must decide on the use of multimedia. Refer to Para 2.3.4.

**Media options**. A variety of computer media are available and in widespread use for the interchange of technical information. The most appropriate medium, or combination of media, must be agreed at the project or the organization level. Whichever interchange medium is selected, file naming, file types and file structure must be implemented as described above. Refer to Para 2.3.4.

**Note**

The term "interchange media" includes situations where the parties involved agree on providing the information in a shared web or distributed file system environment.

**Training SCORM module code extensions**. The project or the organization must decide on whether the use of learn code and learn event code is mandatory. Refer to Para 2.3.8.

# Chapter 7.5.2

## *Information interchange - Interchange Schemas*

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| Chap 7.5.2.1 | Interchange Schema - Version summary |

## 1 General

The purpose of this chapter is to provide a description of the interchange related Schemas.

## 2 Interchange Schemas

The rules and guidance for information interchange Schemas are given in the following chapters.

– Chap 7.5.2.1 provides a version summary of Schemas for data dispatch notes, data module lists and comment forms.

Electronic copies of the Schemas for data dispatch notes, data module lists, and comment forms are available for download from the S1000D web site at www.s1000d.org.

# Chapter 7.5.2.1

## *Interchange Schema - Version summary*

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## 1 General

The purpose of this chapter is to identify all S1000D interchange related Schema versions, which have been formally released. For each version there is a summary of the reasons for change from previous releases. Details of the changes are recorded in the appropriate sections.

From S1000D Issue 4.0 onwards, Standard Generalized Markup Language (SGML) and XML Document Type Definition (DTD) are no longer supported.

## 2 Version summary

### 2.1 Data dispatch note

#### 2.1.1 List of Schema release versions for data dispatch notes

Table 2 lists all Schema release versions for data dispatch notes together with their related S1000D issue and change numbers.

*Table 2 List of Schema release versions for data dispatch notes*

| S1000D Issue, Change No. | Schema version No. | Production release date |
|---|---|---|
| 2, 0 | 2.0 | 2003-05-31 |
| 2, 1 | 2.1 | 2004-02-29 |
| 2, 2 | 2.2 | 2005-05-01 |
| 2, 3 | 2.3 | 2007-02-28 |
| 3, 0 | 3.0 | 2007-07-31 |
| 4, 0 | 4.0 | 2008-08-01 |

### 2.1.2 Update summary

2.1.2.1 Version 2.0

This was the first formal version of a Schema for data dispatch notes, released to coincide with Issue 2 of the specification. This Schema version just reflects the SGML/XML DTD.

2.1.2.2 Version 2.1

Summary of changes for version 2.1 of the S1000D Schema for data dispatch notes requested by Technical Publications Specification Maintenance Group (of ASD/AIA/ATA) (TPSMG)/Electronic Publications Working Group (EPWG):

- CPF 2003-13DE: Element <issno> removed from content model of element <ddn> (see ddnSchema.xsd and ddn.xsd). Attribute issno and attribute inwork removed from pattern of element <dc:Identifier> (see dc_ddn.xsd)

2.1.2.3 Version 2.2

Summary of changes for version 2.2 of the S1000D Schema for data dispatch notes requested by TPSMG/EPWG:

- CPF 2004-21GB: List of values on attribute change within attribute group "INSDEL" amended by value "modify" (see dmaddr2.xsd)
- CPF 2004-22GB: Element <copyright> redefined to contain only running text or simple paragraph element <p> (see datarest2.xsd). Inclusion of file datarest.xsd replaced by datarest2.xsd for data restrictions on CSDB objects other than data modules (see ddnSchema.xsd)
- CPF 2004-24GB: Simple type "MNTLVLS" introduced for the definition of generic maintenance levels (see project.cfg)
- CPF 2004-49DE: Pattern on element <seqnum> redefined to contain always a 5-digit positive integer for a uniform definition of sequential numbers in data dispatch note, data module list and COMMENT starting with 00001 (see seqnum.xsd)
- Bug fixes:
  - Content model of element <remarks> changed to allow optional repeatable sub element <p> (see listcode.xsd)
  - Pattern definitions on attribute issno and attribute inwork of element <issno> corrected (see dmaddr2.xsd)
  - Pattern definitions on attribute year, attribute month and attribute day of element <issdate> corrected (see dmaddr2.xsd)
- TPSMG request: Introduce attributeGroup "bodyatt" on element <p> (see listcode.xsd)

- TPSMG request: Introduce entity %bodyatt; on element <p> (see listcode.xsd)
- Consistency:
  - Type of all elements which contain only Parsed Character Data and which have no attributes has been redefined to type="xs:string"

2.1.2.4 Version 2.3
Summary of changes for version 2.3 of the Schema for data modules requested by TPSMG/EPWG:

- CPF 2005-65SE: Dublin Core element names changed to all lowercase

2.1.2.5 Version 3.0
There were no changes compared to the data dispatch note Schema 2.3.

2.1.2.6 Version 4.0
Summary of changes for version 4.0 of the Schema for data modules requested by TPSMG/EPWG:

- CPF 2004-051DE:
  - Elements <ddnAddress> and <ddnIdent> have been introduced in order to contain the data dispatch note code (old element <ddnc>)
  - Content model of element <dmRef> (old element <refdm>) changed from (identExtension?, dmCode, dmTitle?, issueInfo?, issueDate?, language?) to (identExtension?, dmCode, language?, issueInfo?, issueDate?, dmTitle?)
- CPF 2006-044US: the attribute inWork of element <issueInfo> is now required (old element <issno>)
- CPF 2006-046SE:
  - Sequence of repeated sibling elements has been wrapped in its own element in order to enhance clarity in the schemas. The structure of the element <deliveryList> has changed.
  - A wrapper element has been added to make structure more easily understood
    - <deliveryListItem> in <deliveryList>
  - Mixed content has been eliminated in the <remarks> element
- CPF 2007-098SE:
  - The top structure and the identification of the CSDB objects have been harmonized, which affects all of data module, publication module, data module list, data dispatch note and Comment.

## 2.2 Data module list

### 2.2.1 List of Schema release versions for data module lists

Table 3 lists all Schema release versions for data module lists with their related S1000D issue and change numbers.

*Table 3 List of Schema release versions for data module lists*

| S1000D Issue, Change No. | Schema version No. | Production release date |
|---|---|---|
| 2, 0 | 2.0 | 2003-05-31 |
| 2, 2 | 2.2 | 2005-05-01 |
| 2, 3 | 2.3 | 2007-02-28 |

| S1000D Issue, Change No. | Schema version No. | Production release date |
|---|---|---|
| 3, 0 | 3.0 | 2007-07-31 |
| 4, 0 | 4.0 | 2008-08-01 |

### 2.2.2 Update summary

2.2.2.1 Version 2.0

This was the first formal version of a Schema for data module lists, released to coincide with Issue 2 of the specification. This Schema version just reflects the SGML/XML DTD.

2.2.2.2 Version 2.2

Summary of changes for version 2.2 of the S1000D Schema for data module lists requested by TPSMG/EPWG:

- CPF 2004-21GB: List of values on attribute `change` within attribute group "`INSDEL`" amended by value "`modify`" (see dmaddr2.xsd)
- CPF 2004-22GB: Element <`copyright`> redefined to contain only running text or simple paragraph element <`p`> (see datarest2.xsd). Inclusion of file datarest.xsd replaced by datarest2.xsd for data restrictions on CSDB objects other than data modules (see dmlSchema.xsd)
- CPF 2004-24GB: Simple type "`MNTLVLS`" introduced for the definition of generic maintenance levels (see project.cfg)
- CPF 2004-49DE: Pattern on element <`seqnum`> redefined to contain always a 5-digit positive integer for a uniform definition of sequential numbers in data dispatch note, data module list and COMMENT starting with 00001 (see seqnum.xsd)
- Bug fixes:
  - Content model of element <`remarks`> changed to allow optional repeatable sub element <`p`> (see listcode.xsd)
  - Pattern definitions on attribute `issno` and attribute `inwork` of element <`issno`> corrected (see dmaddr2.xsd)
  - Pattern definitions on attribute `year`, attribute `month` and attribute `day` of element <`issdate`> corrected (see dmaddr2.xsd)
- TPSMG request: Introduce attributeGroup "`bodyatt`" on element <`p`> (see listcode.xsd)
- TPSMG request: Introduce entity %`bodyatt`; on element <`p`> (see listcode.xsd)
- Consistency:
  - Type of all elements which contain only Parsed Character Data and which have no attributes has been redefined to `type="xs:string"`

2.2.2.3 Version 2.3

Summary of changes for version 2.3 of the S1000D Schema for data module lists requested by TPSMG/EPWG:

- CPF 2004-64SE: Addition of element <`dmcextension`> to the <`addresdm`> content model.
- CPF 2005-65SE: Dublin Core element names changed to all lowercase

2.2.2.4 Version 3.0

There were no changes compared to the data module list Schema 2.3.

2.2.2.5 Version 4.0

Summary of changes for version 4.0 of the Schema for data modules requested by TPSMG/EPWG:

- CPF 2004-051DE:
  - Elements <dmlAddress> and <dmlIdent> have been introduced in order to contain the data module list code (old element <dmlc>)
  - Content model of element <dmRef> (old element <refdm>) changed from (identExtension?, dmCode, dmTitle?, issueInfo?, issueDate?, language?) to (identExtension?, dmCode, language?, issueInfo?, issueDate?, dmTitle?)
- CPF 2006-044US: the attribute inWork of element <issueInfo> is now required (old element <issno>)
- CPF 2006-046SE: Mixed content has been eliminated in the <remarks> element
- CPF 2007-098SE:
  - The top structure and the identification of the CSDB objects have been harmonized, which affects all of data module, publication module, data module list, data dispatch note and Comment.

## 2.3 Comment

### 2.3.1 List of Schema release versions for comment forms

Table 4 lists all Schema release versions for comment forms together with their related S1000D issue and change numbers.

*Table 4 List of Schema release versions for comment forms*

| S1000D Issue, Change No. | Schema version No. | Production release date |
|---|---|---|
| 2, 0 | 2.0 | 2003-05-31 |
| 2, 1 | 2.1 | 2004-02-29 |
| 2, 2 | 2.2 | 2005-05-01 |
| 2, 3 | 2.3 | 2007-02-28 |
| 3, 0 | 3.0 | 2007-07-31 |
| 4, 0 | 4.0 | 2008-08-01 |

### 2.3.2 Update summary

2.3.2.1 Version 2.0

This was the first formal version of a Schema for comment forms, released to coincide with Issue 2 of the specification. This Schema version just reflects the SGML/XML DTD.

2.3.2.2 Version 2.1

Summary of changes for version 2.1 of the S1000D Schema for comment forms requested by TPSMG/EPWG:

- CPF 2004-09DE: Element <ccode> removed from content model of element <refcattach> (see commentSchema.xsd and comment.xsd)

2.3.2.3 Version 2.2

Summary of changes for version 2.2 of the S1000D Schema for comment forms requested by TPSMG/EPWG:

- CPF 2004-21GB: List of values on attribute `change` within attribute group "`INSDEL`" amended by value "`modify`" (see dmaddr2.xsd)
- CPF 2004-22GB: Element <`copyright`> redefined to contain only running text or simple paragraph element <`p`> (see datarest2.xsd). Inclusion of file datarest.xsd replaced by datarest2.xsd for data restrictions on CSDB objects other than data modules (see commentSchema.xsd)
- CPF 2004-24GB: Simple type "`MNTLVLS`" introduced for the definition of generic maintenance levels (see project.cfg)
- CPF 2004-49DE: Inclusion of seqnum_comment.xsd replaced by seqnum.xsd to contain always a 5-digit positive integer for a uniform definition of sequential numbers in data dispatch note, data module list and COMMENT starting with 00001 (see commentSchema.xsd)
- CPF 2004-63DE: Optional sub element <`language`> introduced on element <`cstatus`> (see comment.xsd)
- CPF 2005-06SE: Publication module number <`pmnumber`> within publication module code <`pmc`> became alphanumeric (see pmc.xsd)
- Bug fixes:
  - Content model of element <`remarks`> changed to allow optional repeatable sub element <`p`> (see listcode.xsd)
  - Pattern definitions on attribute `issno` and attribute `inwork` of element <`issno`> corrected (see dmaddr2.xsd)
  - Pattern definitions on attribute `year`, attribute `month` and attribute `day` of element <`issdate`> corrected (see dmaddr2.xsd)
  - Definition of empty element <`cnorefs`> corrected (see comment.xsd)
- TPSMG request: Introduce attributeGroup "`bodyatt`" on element <`p`> (see listcode.xsd)
- Consistency:
  - Type of all elements which contain only Parsed Character Data and which have no attributes has been redefined to `type="xs:string"`

2.3.2.4 Version 2.3

Summary of changes for version 2.3 of the S1000D Schema for publication modules requested by TPSMG/EPWG:

- CPF 2004-64SE: Addition of element <`dmcextension`> to the <`crefdm`> content model in element <`crefdms`>.
- CPF 2005-02FR: Transition to XML Schema from SGML DTD master
- CPF 2005-65SE: Dublin Core element names changed to all lowercase

2.3.2.5 Version 3.0

There were no changes compared to the comment Schema 2.3.

2.3.2.6 Version 4.0

Summary of changes for version 4.0 of the Schema for data modules requested by TPSMG/EPWG:

- CPF 2004-051DE:
  - Elements <`commentAddress`> and <`commentIdent`> have been introduced in order to contain the data module list code (old element <`commentc`>)

- Content model of element <dmRef> (old element <refdm>) changed from (identExtension?, dmCode, dmTitle?, issueInfo?, issueDate?, language?) to (identExtension?, dmCode, language?, issueInfo?, issueDate?, dmTitle?)

– CPF 2006-044US: the attribute inWork of element <issueInfo> is now required (old element <issno>)

– CPF 2006-046SE: Mixed content has been eliminated in the <remarks> element

– CPF 2007-098SE:

- The top structure and the identification of the CSDB objects have been harmonized, which affects all of data module, publication module, data module list, data dispatch note and Comment.

# Chapter 7.5.3

## *Information interchange - Resource description framework/Dublin core metadata*

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## 1 General

This chapter describes the mapping of S1000D elements and attributes to the Resource Description Framework (RDF) Dublin Core (DC) subelements of element <`rdf:Description`> for data dispatch notes, data module lists and comments. The mapping follows in principle the one given for data modules and publication modules in Chap 7.4.1.1 with the exceptions detailed below.

# 2 RDF/DC metadata mapping

## 2.1 RDF/DC metadata mapping for data dispatch notes

Table 2 summarizes the mapping of S1000D elements and attributes to the disassembly code subelements of element <rdf:Description> for data dispatch notes. Exceptions to the principles given for data modules and publication modules in Chap 7.4.1.1 are:

- element <dc:title> and element <dc:subject> contain the fixed value "Data Dispatch Note"
- element <dc:identifier> contains the data dispatch note identification code (element <ddnCode>)
- element <senderIdent> is mapped to element <dc:publisher>
- element <dc:creator>, element <dc:contributor> and element <dc:language> are not used for mapping

*Table 2 Metadata mapping for data dispatch note*

| DC elements | DDN elements and/or attributes |
|---|---|
| <dc:title> | "Data Dispatch Note" |
| <dc:subject> | "Data Dispatch Note" |
| <dc:publisher> | <senderIdent> |
| <dc:date> | year-month-day |
| <dc:type> | "text" |
| <dc:format> | "text/xml" |
| <dc:identifier> | <ddnCode> |
| <dc:rights> | securityClassification_commercialClassification_caveat<br>or<br>securityClassification_commercialClassification<br>or<br>securityClassification_caveat<br>or<br>securityClassification |

## 2.2 RDF/DC metadata mapping for data module list

Table 3 summarizes the mapping of S1000D elements and attributes to the disassembly code subelements of element <rdf:Description> for data module lists. Exceptions to the principles given for data modules and publication modules in Chap 7.4.1.1 are:

- element <dc:title> and element <dc:subject> contain the fixed value "Data Module List"
- element <dc:identifier> contains the data module list code (element <dmlCode>)

- element <senderIdent> is mapped to element <dc:publisher>
- element <dc:language> contains the language (element <language>)
- element <dc:creator> and element <dc:contributor> are not used for mapping

*Table 3 Metadata mapping for data module list*

| DC elements | DML elements and/or attributes |
|---|---|
| <dc:title> | "Data Module List" |
| <dc:subject> | "Data Module List" |
| <dc:publisher> | <senderIdent> |
| <dc:date> | year-month-day |
| <dc:type> | "text" |
| <dc:format> | "text/xml" |
| <dc:identifier> | <dmlCode>_issueNumber-inWork |
| <dc:language> | <language>_languageIsoCode-countryIsoCode |
| <dc:rights> | securityClassification_commercialClassification_caveat<br>or<br>securityClassification_commercialClassification<br>or<br>securityClassification_caveat<br>or<br>securityClassification |

## 2.3 RDF/DC metadata mapping for comments

Table 4 summarizes the mapping of S1000D elements and attributes to the disassembly code subelements of element <rdf:Description> for comments. Exceptions to the principles given for data modules and publication modules in Chap 7.4.1.1 are:

- element <commentTitle> is mapped to element <dc:title> and element <dc:subject>
- element <dc:identifier> contains the COM code (element <commentCode>)
- element <senderIdent> is mapped to element <dc:publisher>
- element <dc:language> contains the language (element <language>)
- element <dc:creator> and element <dc:contributor> are not used for mapping

*Table 4 Metadata mapping for COM*

| DC elements | COM elements and/or attributes |
|---|---|
| <dc:title> | <commentTitle> |
| <dc:subject> | <commentTitle> |
| <dc:publisher> | <senderIdent> |
| <dc:date> | year-month-day |
| <dc:type> | "text" |
| <dc:format> | "text/xml" |
| <dc:identifier> | <commentCode> |
| <dc:language> | <language>_languageIsoCode-countryIsoCode |
| <dc:rights> | securityClassification_commercialClassification_caveat<br>or<br>securityClassification_commercialClassification<br>or<br>securityClassification_caveat<br>or<br>securityClassification |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Inclusion of RDF/DC metadata.** The project or the organization must decide whether to include RDF/DC metadata in data dispatch notes, data amodule lists and comments or not. It is recommended that inclusion is applied consistently across all CSDB objects, including data modules. Refer to Para 2.

# 4 Examples

## 4.1 RDF/DC metadata for data dispatch notes

The following example demonstrates the mapping of S1000D data dispatch note elements and/or attributes to disassembly code metadata elements within an RDF container expressed in XML:

```
<?xml version="1.0"?>
<ddn xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_2-
3/xml_schema_master/ddn/ddnSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/">
<rdf:Description>
<dc:title>Data Dispatch Note</dc:title>
<dc:subject>Data Dispatch Note</dc:subject>
<dc:publisher>C0419</dc:publisher>
```

```
<dc:date>1999-03-08</dc:date>
<dc:type>text</dc:type>
<dc:format>text/xml</dc:format>
<dc:identifier>URN:S1000D:DDN-AE-C0419-K0999-1999-00002
</dc:identifier>
<dc:rights>01</dc:rights>
</rdf:Description>
...
...
</ddn>
```

## 4.2 RDF/DC metadata for data module lists

The following example demonstrates the mapping of S1000D data module list elements and/or attributes to disassembly code metadata elements within an RDF container expressed in XML:

```
<?xml version="1.0"?>
<dml xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_2-
3/xml_schema_master/dml/dmlSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
<rdf:Description>
<dc:title>Data Module List</dc:title>
<dc:subject>Data Module List</dc:subject>
<dc:publisher>A0019</dc:publisher>
<dc:date>1999-04-01</dc:date>
<dc:type>text</dc:type>
<dc:format>text/xml</dc:format>
<dc:identifier>URN:S1000D:DML-1B-A0019-P-1999-00003_003-00
</dc:identifier>
<dc:language>sx-US</dc:language>
<dc:rights>01</dc:rights>
</rdf:Description>
...
...
</dml>
```

## 4.3 RDF/DC metadata for comments

The following example demonstrates the mapping of S1000D COM elements and/or attributes to disassembly code metadata elements within an RDF container expressed in XML:

```
<?xml version="1.0"?>
<comment xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://www.s1000d.org/S1000D_2-
3/xml_schema_master/comment/commentSchema.xsd"
xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:dc="http://www.purl.org/dc/elements/1.1/"
xmlns:xlink="http://www.w3.org/1999/xlink">
<rdf:Description>
<dc:title>Window, LH Front - Installation (Job Completion)
</dc:title>
<dc:subject>Window, LH Front - Installation (Job Completion)
</dc:subject>
<dc:publisher>H2433</dc:publisher>
<dc:date>2002-02-26</dc:date>
<dc:type>text</dc:type>
```

```
<dc:format>text/xml</dc:format>
<dc:identifier>URN:S1000D:COM-JA-H2433-2002-00058-Q
</dc:identifier>
<dc:language>sx-US</dc:language>
<dc:rights>01</dc:rights>
</rdf:Description>
...
...
</comment>
```

# Chapter 7.5.4

## *Information interchange - LOM metadata*

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| Advanced Distributed Learning | Downloads page |

## 1 General

This chapter describes the mapping of identification and status elements and attributes to the LOM subelements of the element <lom> for the SCORM Content Package.

### 1.1 Scope

The elements of the LOM schema are used to provide metadata about the learning event defined in the SCORM Content Package.

### 1.2 Purpose

The LOM is used in the Content Aggregation Model in SCORM to provide:

- search and discovery capability of learning objects across systems
- the learner with information about the content organization (ie course, lesson, module, etc.)
- information at run-time to help in the decision of what content model component to deliver to the learner

For these reasons, the LOM has been added to the SCORM Content Package. There is some overlap between metadata captured in the Identification and Status section of the SCORM Content Package and the LOM, but the LOM allows for additional metadata, specific for training, that the SCORM Content Package does not address.

# 2 LOM metadata

## 2.1 Metadata mapping

Table 2 summarizes the mapping of elements and attributes to the LOM element <lom> for the SCORM Content Package.

*Table 2 Metadata for the LOM in the SCORM Content Package*

| LOM elements | IDSTATUS elements and/or attributes |
|---|---|
| lom/general/identifier | DMC, PMC, ICN, SMC or SME |
| lom/general/title | <techName> |
| lom/lifecycle/version | <issueInfo issueNumber> |
| lom/lifecycle/contribute/date | <dmStatus issueDate> |
| lom/general/language | <language> |
| lom/annotation/entity | <responsiblePartnerCompany> |
| lom/annotation/entity | <originator> |
| lom/general/coverage | <applic> |
| lom/general/coverage | <systemBreakdownCode> |
| lom/general/coverage | <functionalItemCode> |
| lom/annotation/description | <reasonForUpdate> |
| lom/annotation/description | <remarks> |
| lom/technical/format | <scormContentPackageMedia scormContentPackageMediaType> |

## 2.2 Other LOM Metadata

The LOM is a SCORM requirement, therefore a full description of the LOM can be found at the ADL downloads page at http://www.adlnet.gov/downloads/DownloadsSearchResults.aspx?Category=Products. The LOM is described in detail in the Content Aggregation Model (CAM).

# 3 Examples

The following example demonstrates the mapping of identAndStatusSection elements and/or attributes to LOM metadata elements included into the ScormContentPackageSchema containers expressed in XML:

```
<lom>
<lom:lom>
<lom:general>
<lom:identifier>
<lom:entry>DM-MD-A-322310-00A-340A-A</lom:entry>
</lom:identifier>
<lom:language> en </lom:language>
<lom:title>
<lom:string> Landing gear system – Retraction and extension
```

```
function test</lom:string>
</lom:title>
<lom:description>
<lom:string>Air vehicle maintenance training - Landing gear
system</lom:string>
</lom:description>
<lom:keyword>
<lom:string>Air vehicle maintenance training</lom:string>
<lom:string> Landing gear system </lom:string>
<lom:string>Retraction and extension function test</lom:string>
</lom:keyword>
</lom:general>
<lom:annotation>
<lom:entity>AH019</lom:entity>
</lom:annotation>
<lom:lifeCycle>
<lom:version>
<lom:string>001</lom:string>
</lom:version>
<lom:status>
<lom:source>LOMv1.0</lom:source>
<lom:value>final</lom:value>
</lom:status>
</lom:lifeCycle>
<lom:metaMetadata>
<lom:identifier>
<lom:catalog>GUID</lom:catalog>
<lom:entry>3D16197F-4BA0-4F5C-BF57-CD3C8BA61148</lom:entry>
</lom:identifier>
<lom:metadataSchema>LOMv1.0</lom:metadataSchema>
<lom:metadataSchema>SCORM_CAM_v1.3</lom:metadataSchema>
</lom:metaMetadata>
<lom:technical>
<lom:format>application/x-shockwave-flash</lom:format>
<lom:format>image/gif</lom:format>
<lom:format>image/ico</lom:format>
<lom:format>image/jpg</lom:format>
<lom:format>image/bmp</lom:format>
<lom:format>image/png</lom:format>
<lom:format>image/svg</lom:format>
<lom:format>audio/wav</lom:format>
<lom:format>video/quicktime</lom:format>
<lom:format>video/x-ms-wmv</lom:format>
<lom:format>video/x-msvideo</lom:format>
<lom:format>video/mpeg</lom:format>
<lom:format>audio/mpeg</lom:format>
<lom:format>text/plain</lom:format>
<lom:format>text/html</lom:format>
<lom:format>text/xml</lom:format>
<lom:format>text/xslt</lom:format>
<lom:format>application/c3-caa</lom:format>
<lom:requirement>
<lom:orComposite>
<lom:type>
<lom:source>LOMv1.0</lom:source>
<lom:value>browser</lom:value>
</lom:type>
<lom:name>
<lom:source>LOMv1.0</lom:source>
<lom:value>ms-internet explorer</lom:value>
```

```
</lom:name>
<lom:minimumVersion>6.0</lom:minimumVersion>
</lom:orComposite>
</lom:requirement>
<lom:installationRemarks>
<lom:string language="en">This activity requires the client
browser to have a Macromedia Flash plugin
installed.</lom:string>
</lom:installationRemarks>
<lom:otherPlatformRequirements>
<lom:string language="en">Sound card, Min. RAM: 256Mb, Video
card and display: at least 1024 X 768 pixels x 16384
colors</lom:string>
</lom:otherPlatformRequirements>
</lom:technical>
<lom:rights>
<lom:cost>
<lom:source>LOMv1.0</lom:source>
<lom:value>no</lom:value>
</lom:cost>
<lom:copyrightAndOtherRestrictions>
<lom:source>LOMv1.0</lom:source>
<lom:value>yes</lom:value>
</lom:copyrightAndOtherRestrictions>
<lom:description>
<lom:string language="en">This SCO was... </lom:string>
</lom:description>
</lom:rights>
</lom>
```

# Chapter 7.6

## *Information processing - Software requirements*

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| Chap 7.6.2 | Software requirements - Resource resolution service |

## 1 General

Information processing software requirements are necessary to achieve consistency of software behavior so that the data modules will behave the same on any software implementation. This will ensure the common behavior and functionality that is required of all software implementations.

## 2 Software requirements

Chap 7.6.1 defines requirements for the software components that implement the process data module logic engine and Chap 7.6.2 defines the requirements for the Uniform Resource Name (URN) / Uniform Resource Identifier (URI) resolution engine.

Any software implementation must adhere to the requirements defined herein.

# Chapter 7.6.1

## *Software requirements - Process data module requirements*

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# 1 General

There are detailed software requirements for the logic engine component of S1000D. The logic engine is required to interpret the navigation instructions contained within the process data module content and pass the result for display. Additionally, in order to maintain standardized data modules that are interoperable (shared amongst projects and within different presentation tools), any implementation of a logic engine must conform to the requirements detailed within this chapter.

For an overview of the S1000D process data module. Refer to Chap 4.11.

For a successful implementation of the process data module, two elements are required:

- **Logic engine.** This is the runtime software component of the S1000D display package that interprets and executes a process data module.
- **State table.** The collection of variables declared within a process data module and the value currently assigned to each variable.

# 2 Requirements

## 2.1 Process data module interpretation

The logic engine is capable of interpreting process data modules and acting upon the data contained within. Although the process data module is an XML document, the data represents the information that is to be executed in a defined order with specific rules as detailed in this chapter.

The logic engine must sequentially interpret the markup contained within the process data module. Certain elements contain information to be displayed to the user in the form of a data module reference, a step, or a dialog. Other elements contain instructions that control the behavior and navigation through the process data module content as defined in this chapter.

The logic engine must determine the unit of information to be displayed (depending on the state table values) and will wait for user input. The current position within the process data module must be retained and the current state of variables will be maintained. The "Next" and "Previous" functions will cause the logic engine to continue interpreting at the saved position.

## 2.2 Navigation functions

The navigation functions provide the interface to step through procedural sequences defined in the process data module. Functions are provided to move to the next and previous nodes in the process data module. The element <dmNode> defines the set of data that should be interpreted by the logic engine and displayed to the user.

**Note**

In this paragraph, the phrase "passes applicability evaluation" means that either:

- no applicability exists, or
- applicability exists with an element <assert> or an element <evaluate> and the evaluation in accordance with Chap 7.8 returns a 'true' result, or
- applicability exists with an element <expression> and the evaluation of the expression in accordance with Para 2.3.2.1 returns a 'true' result

### 2.2.1 Main navigation functions

#### 2.2.1.1 Next

The "Next" function instructs the logic engine to proceed with interpreting the process data module from the current position. The logic engine must proceed until one of the following conditions occurs (user input or navigation function is required or no more data):

- an element <dmNode> with a child element <dmRef> is executed and passes applicability evaluation in which case the data module referenced is displayed to the user
- an element <dmNode> with one or more child element <proceduralStep> and an optional last element <dialog> is executed and at least one proceduralStep or the dialog passes applicability evaluation in which case the proceduralStep(s) and/or dialog that pass applicability evaluation are displayed to the user
- an element <dmNode> with a child element <dialog> is executed and passes applicability evaluation in which case the dialog is displayed to the user
- an element <dmNode> with a child element <externalApplication> is executed
- the end of the outermost process data module is reached in which case a message is displayed to the user indicating that the end of the procedure has been reached

#### 2.2.1.2 Previous

The "Previous" function instructs the logic engine to logically reverse through actions taken beginning at the current location until a node with displayable content is encountered. When navigating to a previous node, the logic engine must restore the state table to the condition that it was when it first encountered the node being returned to. Restoring the state table includes any variables that were assigned a new value through the following: element <dialog>, element <variablePreSet>, element <variablePostSet>, element <variableDeclarations>, element <assertion>, or element <externalApplication>. This allows the user to change his input to possibly change the forward logical path.

When executing a previous node, the entire node must be evaluated in the same manner as going forward. All child elements must be evaluated including presets and applicability.

The logic engine must proceed backwards until one of the following conditions occurs (user input or navigation function is required or no more data):

- an element <dmNode> with a child element <dmRef> is executed and passes applicability evaluation in which case the data module referenced is displayed to the user
- an element <dmNode> with one or more child element <proceduralStep> and an optional last element <dialog> is executed and at least one proceduralStep or the dialog passes applicability evaluation in which case the proceduralStep(s) and/or dialog that pass applicability evaluation are displayed to the user
- an element <dmNode> with a child element <dialog> is executed and passes applicability evaluation in which case the dialog is displayed to the user including the input originally entered by the user
- an element <dmNode> with a child element <externalApplication> is executed
- the beginning of the outermost process data module is reached in which case a message is displayed to the user indicating that the start of the procedure has been reached

If an element <dmLoop> is encountered when reversing then the processing path depends upon the forward path and number of iterations taken through the loop. If the user continues to perform the previous function, the logic engine must process the same number of iterations in reverse as was processed in the forward path.

### 2.2.2 Dialog navigation functions

When a dialog is displayed, either as the sole content of a <dmNode> or as an optional sibling of <proceduralStep> in <dmNode>, the dialog will assume responsibility for the viewer navigation function. Next and Previous navigation controls that can be present on the viewer navigation panel or equivalent will be disabled.

#### 2.2.2.1 Submit function dialog response

The submit function dialog response instructs the logic engine to process the user input, either fill-in input data or a menu selection, then perform the Next navigation function. Refer to Para 2.2.1.1.

#### 2.2.2.2 Cancel function dialog response

The cancel function dialog response instructs the logic engine to remove the dialog display, discard any user input and perform the "Previous" navigation function. Refer to Para 2.2.1.2.

**Note**

The cancel function is the method to perform a previous navigation function from a dialog.

#### 2.2.2.3 Reset function dialog response

The reset function dialog response instructs the logic engine to revert the dialog data fields to the original values (eg default settings) and remain in the dialog.

## 2.3 Data navigation processing classes

Several of the process data module elements are processed in an identical manner. These data module elements are grouped into classes; wrapper, node, node sequence, node alternative, if node, and loop node.

### 2.3.1 Wrapper class

Implemented by: element <process>

The wrapper class provides the outermost content tag for a data module that supports the interactive constructs. The order of processing is as follows:

- element <variableDeclarations> - All element <variable> within an element <variableDeclarations> are created in the state table if not already present.

– content - The content is usually an element of the sequence class.

### 2.3.2 Node class

Implemented by: element <dmNode>

The node class is the main building block within a process data module. The order of processing is as follows:

– attribute applicRefId - The applicability reference is resolved and the element <applic> is evaluated against variables in the state table by the logic engine. The evaluation result indicates whether this element <dmNode> is processed or skipped. Within the element <applic>, the element <expression>, if provided, must evaluate to 'true' to continue processing the element <dmNode>.
– element <variablePreSet> - Before processing any content, element <variablePreSet> assignments are made to the state table.
– content - Processing can suspend here if there is displayable data to present to the user. Processing remains suspended until the user selects the "Next" or "Previous" function.
– element <variablePostSet> - Before moving on in the process data module, element <variablePostSet> assignments are made to the state table.

#### 2.3.2.1 Attribute applicRefId

The node class element can contain an attribute applicRefId that identifies the element's applicability. The referenced element <applic> can contain element <displayText>, element <assert>, element <evaluate> and an element <expression>. The element <expression> is mutually exclusive to element <assert> and element <evaluate>.

The element <displayText> is used for display to the user. The element <assert> and the element <evaluate> must be processed in accordance with Chap 7.8.

The element <expression> must be evaluated against values in the state table by the logic engine using the expression evaluation rules specified in Para 2.6. If the element <expression> evaluates to 'true', the logic engine must proceed with processing this node. If no element <expression> is given then the logic engine must assume 'true' and proceed with processing this node. If the element <expression> is given and evaluates to 'false', then the remainder of the node is skipped and processing continues with the next node.

#### 2.3.2.2 Element <variablePreSet>

The node class element can contain a list of element <variablePreSet> that assigns values to variables in the state table. Each element <variablePreSet> contains an element <assertion> which will modify the value of a state table variable as specified in Para 2.5.2.

#### 2.3.2.3 Content

For element <dmRef>, the logic engine must cause the referenced data module to be accessed and processed accordingly. If the referenced data module is another process data module, then the process data module must be executed by the logic engine. If the referenced data module is not a process data module, then the referenced data module must be sent to the display software to be rendered to the user.

For element <proceduralStep>, the logic engine must process all step content including the hierarchical substep structure, build a display package, and send the display package to the

display software to be rendered to the user. The element <proceduralStep> content is modified from the procedural data module with the addition of element <variableRef> within element <para>. Upon encountering element <variableRef>, the logic engine must obtain the value associated with the referenced variable from the state table and embed that value into the para to be displayed to the user.

For element <dialog>, the logic engine must process the dialog content, build a display package, and send the display package to the display software to be rendered to the user.

For element <externalApplication>, the logic engine must process all external application content including parameters to send and expected results. Depending upon implementation, the logic engine must interface with the external application directly or send the interface information to the display software to perform the interface with the external application.

For element <dmSeq>, the logic engine must process the content of the data module sequence.

2.3.2.4 Postset

The node class element can contain a list of element <variablePostSet> that assign values to variables in the state table. Each element <variablePostSet> contains an element <assertion> which will modify the value of a state table variable as specified in Para 2.5.2.

### 2.3.3 Sequence class

Implemented by: element <dmSeq>
element <dmThenSeq>
element <dmElseSeq>

The sequence provides the mechanism to specify sequences of nodes, if nodes, loop nodes, and node alternates that create the procedure flow. The sequence simply contains a list of nodes that are processed in the order that they appear. A sequence cannot directly contain another sequence.

### 2.3.4 Alternate class

Implemented by: element <dmNodeAlt>
element <proceduralStepAlt>
element <dialogAlt>
element <messageAlt>

The node alternate provides the mechanism to group a list of alternative nodes. The grouping is to define that the nodes apply to different contextual situations. Where two or more nodes exist within a node alternate grouping, the nodes must be of the same type. For instance: an element <proceduralStepAlt> can only contain one or more element <proceduralStep>. Each node must contain the attribute applicRefId. Every contextual situation does not have to be covered by the nodes within a node alternate.

The logic engine is to evaluate the element <expression> within the referenced element <applic> on each alternative node in order using the expression evaluation rules specified in Para 2.6. The first node where the expression evaluates to ‘true’ (if any) will continue to be processed and the remaining nodes will be skipped. Nodes where the expression evaluates to ‘false’ are not to be processed. If no node passes applicability testing, then the node alternate is skipped and processing continues after the node alternate.

### 2.3.5 If node class

Implemented by: element <dmIf>

The if node provides a simple if-then-else branching mechanism. The logic engine is to evaluate the element <expression> using the expression evaluation rules specified in Para 2.6. If the element <expression> evaluates to 'true', the then branch (element <dmThenSeq>) is processed according to the node sequence rules specified in Para 2.3.3. If the expression evaluates to 'false', the else branch (element <dmElseSeq>), if present, is processed according to the node sequence rules.

### 2.3.6 Loop node class

Implemented by: element <dmLoop>

The loop node provides a looping mechanism, similar to a traditional programming language loop. The loop node supports an initial element <variablePreSet> for variable assignment, an element <expression> to loop on while 'true', an element <dmSeq> to process on each loop iteration, and an element <assertion> for variable reassignment at the end of a loop iteration prior to evaluating the element <expression> for the next iteration.

#### 2.3.6.1 Preset

The element <variablePreSet>, if present, is always processed. Each element <variablePreSet> contains an element <variableRef> to be assigned and an element <expression>. The logic engine must evaluate the element <expression> using the expression evaluation rules specified in Para 2.6 and assign the result to the referenced variable in the state table.

#### 2.3.6.2 Expression

The element <expression> is evaluated using the expression evaluation rules specified in Para 2.6. If the element <expression> evaluates to anything other than 'true' the loop is terminated.

#### 2.3.6.3 Node sequence

The element <dmSeq> is processed according to the node sequence rules listed above.

#### 2.3.6.4 Assertion

The element <assertion>, if present, is processed. Each element <assertion> contains an element <variableRef> to be assigned and an element <expression>. The logic engine must evaluate the element <expression> using the expression evaluation rules specified in Para 2.6 and assign the result to the referenced variable in the state table.

#### 2.3.6.5 Looping

The logic engine jumps up to the expression step of this process and continues looping until the element <expression> evaluates to anything other than 'true'.

## 2.4 Variables

### 2.4.1 The variableName attribute

Variables are identified by the attribute variableName. Variable names are case insensitive, unique within a single data module and must not exceed a length of 64 characters. Variable names, the variable meanings, and corresponding data types mustbe used consistently across a project.

The first character in a variable name must be a letter, [A-Z] or [a-z]. Subsequent characters can be any of the following: [A-Z], [a-z], [0-9], underscore [_], or blank space [ ]. The last character can not be a blank space. The logic engine must ignore any leading or trailing white space.

### 2.4.2 The descr and productConfigurationFlag attributes

The attribute `productConfigurationFlag` provides a flag indicating whether this variable represents a product configuration item and the attribute `descr` provides a human readable description of the variable. Using attribute `descr` and attribute `productConfigurationFlag` and values from the state table, a display can optionally be presented to the user which conveys the current state of the logic engine state table. By filtering on the attribute `productConfigurationFlag`, the display can be limited to items pertaining to product configuration. This can be helpful to verify that the state table configuration matches the actual product configuration.

### 2.4.3 The valueType attribute

The logic engine is required to support the following data types:

#### 2.4.3.1 Boolean

A Boolean variable is allowed to have the values "`true`" or "`false`".

#### 2.4.3.2 Integer

An integer variable must support, at a minimum, a 32 bits signed long integer, providing a range of -2.147.483.648 to 2.147.483.647.

#### 2.4.3.3 Real

A real variable must support, at a minimum, a 32 bits (4 bytes) real number. It must support the IEEE standard of 1 bit sign, 8 bits exponent, and 23 bits mantissa which gives a minimum precision of 6 significant digits and a minimum exponent range of -38 to 38. A range of approximately 3,4E-38 to 3,4E+38 should be supported.

#### 2.4.3.4 String

A string variable must support, at a minimum, a Unicode string up to 64 characters long.

#### 2.4.3.5 Set

A set variable is allowed to contain a collection of like values: integer, real, or string. A set variable is also allowed to have value "`noValue`". A particular value can be a member of a set only once.

### 2.4.4 The valuePrecision attribute

For variables with a valueType of real, the attribute `valuePrecision` is used to specify the number of digits after the decimal point that are relevant. The nth decimal position specified by valuePrecision is rounded up when the nth + 1 digit is greater than or equal to 5 and truncated when the nth + 1 digit is less than 5.

The attribute `valuePrecision` is used only for the purpose of formatting the display and should not be confused with the number of significant digits capable of being represented by a real number within a computer.

### 2.4.5 The scope attribute

The logic engine must support the concept of global variables. A global state table space must be maintained for variable and value pairs that are available to all process data modules. Each variable contains an attribute `variableScope` currently limited to the value of "`global`". This allows for future expansion of scope to include the concept of a local scope.

A variable with global scope is created and maintained in the state table space. If the variable already exists in the state table space, then the logic engine must examine the two variable types. If the variable types are the same then the pre-existing variable must be used while processing the process data module. If the variable types are different, an error message must be generated. Refer to error handling in Para 2.9.

### 2.4.6 Dialog

The optional element <dialog> provides a method to obtain the value of a variable from the user at runtime when that variable is not defined in the state table. The dialog should assign a value to the variable, although this is not enforced in the Schema and would be difficult to validate. Refer to Para 2.5.

### 2.4.7 Initialize

The optional element <initialize> provides the initial value to assign to the variable at the time of creation in the state table. Refer to the state table management in Para 2.5, below for more details.

## 2.5 State table management

The logic engine is required to maintain the process data module state table during execution. All variables used within a process data module are required to be declared in an element <variableDeclarations>. Variables are added to the state information as they are encountered in the element <variableDeclarations>.

The state table must provide access to variables by name. The currently assigned value, the description, the configuration flag, the data type, and the precision must be retained in the state table and made accessible by the variable name.

### 2.5.1 Variable declarations

All variables are required to be defined within an element <variableDeclarations>. When encountering an element <variable> declaration, the state table is examined for an existing variable of the same name.

If the variable already exists in the state table, then the existing variable and value is used unless initialization is provided, in which case the existing value is discarded and the variable is reinitialized.

If the variable does not exist in the state table the variable must be added according to the following rules:

- If the element <variable> contains an element <initialize>, the initialization element <expression> is to be evaluated using the expression evaluation rules specified in Para 2.6 and the result must be assigned to the variable in the state table.
- If the element <variable> does not contain an element <initialize>, the value of "noValue" must be assigned to the variable in the state table.
- The variable attributes must be retained in the state table.

### 2.5.2 Assigning a value to a variable

An element <assertion> causes the logic engine to assign the value of a variable within the state table. The element <assertion> contains an element <variableRef> and an element <expression>. These can be considered the left-hand and right-hand portions of an assignment statement, eg variable = expression.

The variableName attribute provided in the element <variableRef> is used to find the variable in the state table. The element <expression> is to be evaluated using the

expression evaluation rules specified in Para 2.6. The value of the variable in the state table is then assigned the result of the expression.

If the variable does not exist in the state table, an error message must be generated. Refer to error handling in Para 2.9.

If the variable exists in the state table, but the data type of the variable and the data type of the expression result do not match, an error message must be generated. Refer to error handling in Para 2.9.

### 2.5.3 Accessing the value of a variable

Accessing the value of a variable is done during run-time processing by the logic engine. The logic engine uses the name of the variable provided in the element <variableRef> to retrieve the value of the variable in the state table.

If a variable has the value of "noValue" and an element <dialog> is included in the element <variable> declaration, the dialog must be presented to the user according to the dialog rules specified in Para 2.7. The user's response is to be assigned into the state table. If the variable has the value of "noValue" and an element <dialog> is not included in the element <variable> declaration, an error message is to be generated. If the variable does not exist in the state table, an error message must be generated. Refer to error handling at Para 2.9.

## 2.6 Expression evaluation

The cornerstone of the process data module is the capability to branch, loop, and filter data. It is the expression evaluation that makes this possible. Expressions are defined in the content of the element <expression> and a rich set of operations are supported for the different data types.

A set of sample expressions are provided in Chap 7.7.

### 2.6.1 Supported operations

The expression element contains one of four forms: an operation between two expressions, a function on a single expression, a variable value, or a static value. Expression evaluations returning imaginary numbers, positive infinity or negative infinity are not supported, refer to error handing in Para 2.9.

#### 2.6.1.1 Operations between two expressions

The following tables (Table 2 thru Table 5) list the operations required to be supported. Operations between two expressions are always in the form of <expression><'operation'><expression>. The operation, the forms that the operation can take, the return value data type and a description are listed in the following tables. The form column defines the return value type for the expression on each side of the operator.

The binary operations are divided into four groups depending upon the type of the operands (the type of the expression on either side of the operation): boolean operations, number operations (for integer and real operands), set operations and string operations. Within each group several operations are possible.

When one side of an operation contains an expression that contains a value, data type errors will be caught by comparing the type of value with the data type of the operation they are contained within. For instance; the operation <booleanOperator booleanOperation="and"> will fail if one side of the operation has the value element <stringValue>Yes</stringValue>.

*Table 2 Boolean Operations*

| Value of attribute `booleanOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`and`" | Boolean "`and`" Boolean | Boolean | "`true`" if both Booleans are "`true`", "`false`" otherwise. |
| "`equal`" | Boolean "`equal`" Boolean | Boolean | "`true`" if the values are the same or "`false`" if they are different. |
| "`exclusiveOr`" | Boolean "`exclusiveOr`" Boolean | Boolean | "`true`" if one and only one Boolean is "`true`", "`false`" otherwise. |
| "`notEqual`" | Boolean "`notEqual`" Boolean | Boolean | "`true`" if the values are different or "`false`" if they are the same. |
| "`or`" | Boolean "`or`" Boolean | Boolean | "`true`" if either Boolean is "`true`", "`false`" otherwise. |

*Table 3 NumberOperations*

| Value of attribute `numberOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`divide`" | Integer "`divide`" Integer | Real | Return the value of the first number divided by the second number. |
| | Integer "`divide`" Real | Real | |
| | Real "`divide`" Integer | Real | |
| | Real "`divide`" Real | Real | |
| "`equal`" | Integer "`equal`" Integer | Boolean | "`true`" if the values are the same or "`false`" if they are different. |
| | Real "`equal`" Real | Boolean | |

| Value of attribute `numberOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`exponent`" | Integer "`exponent`" Integer | Integer or Real | Return the value of the first number raised to the power of the second number. The return value is a real unless the first number is an integer and the second number is a positive integer. |
| | Integer "`exponent`" Real | Real | |
| | Real "`exponent`" Integer | Real | |
| | Real "`exponent`" Real | Real | |
| "`greaterThan`" | Integer "`greaterThan`" Integer | Boolean | "`true`" if the first number is greater than the second number, "`false`" otherwise. |
| | Integer "`greaterThan`" Real | Boolean | |
| | Real "`greaterThan`" Integer | Boolean | |
| | Real "`greaterThan`" Real | Boolean | |
| "`greaterThanOrEqual`" | Integer "`greaterThanOrEqual`" Integer | Boolean | "`true`" if the first number is greater than or equal to the second number, "`false`" otherwise. |
| | Integer "`greaterThanOrEqual`" Real | Boolean | |
| | Real "`greaterThanOrEqual`" Integer | Boolean | |
| | Real "`greaterThanOrEqual`" Real | Boolean | |
| "`integerDivide`" | Integer "`integerDivide`" Integer | Integer | Return the value of the first number divided by the second number, truncated to an integer. |
| | Integer "`integerDivide`" Real | Integer | |
| | Real "`integerDivide`" Integer | Integer | |
| | Real "`integerDivide`" Real | Integer | |
| "`lessThan`" | Integer "`lessThan`" Integer | Boolean | "`true`" if the |

| Value of attribute `numberOperation` | Form | Return Value | Description |
|---|---|---|---|
| | Integer "`lessThan`" Real | Boolean | first number is less than the second number, "`false`" otherwise. |
| | Real "`lessThan`" Integer | Boolean | |
| | Real "`lessThan`" Real | Boolean | |
| "`lessThanOrEqual`" | Integer "`lessThanOrEqual`" Integer | Boolean | "`true`" if the first number is less than or equal to the second number, "`false`" otherwise. |
| | Integer "`lessThanOrEqual`" Real | Boolean | |
| | Real "`lessThanOrEqual`" Integer | Boolean | |
| | Real "`lessThanOrEqual`" Real | Boolean | |
| "`minus`" | Integer "`minus`" Integer | Integer | Return the value of the first number minus the second number. |
| | Integer "`minus`" Real | Real | |
| | Real "`minus`" Integer | Real | |
| | Real "`minus`" Real | Real | |
| "`modulus`" | Integer "`modulus`" Integer | Integer | Return the integer remainder after the first number is integer-divided by the second number. |
| "`notEqual`" | Integer "`notEqual`" Integer | Boolean | "`true`" if the values are different or "`false`" if they are the same. |
| | Real "`notEqual`" Real | Boolean | |
| "`plus`" | Integer "`plus`" Integer | Integer | Return the value of the first number plus the second number. |
| | Integer "`plus`" Real | Real | |
| | Real "`plus`" Integer | Real | |
| | Real "`plus`" Real | Real | |
| "`times`" | Integer "`times`" Integer | Integer | Return the value of the first number |
| | Integer "`times`" Real | Real | |

| Value of attribute `numberOperation` | Form | Return Value | Description |
|---|---|---|---|
| | Real "`times`" Integer<br>Real "`times`" Real | Real<br>Real | multiplied by the second number. |

*Table 4 Set Operations*

| Value of attribute `setOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`add`" | Set "`add`" Value | Set | Make a new set containing all members of the old set plus Value. |
| "`disjoint`" | Set "`disjoint`" Set | Boolean | "`true`" if the intersection of the two sets is empty, "`false`" otherwise. |
| "`equal`" | Set "`equal`" Set | Boolean | "`true`" if the values in the set are the same or "`false`" if they are different. |
| "`intersection`" | Set "`intersection`" Set | Set | Make a new set that contains only values that are members of both sets in the expression. |
| "`member`" | Value "`member`" Set | Boolean | "`true`" if Value is contained in the set, "`false`" otherwise. |
| "`notEqual`" | Set "`notEqual`" Set | Boolean | "`true`" if the values of the set are different or "`false`" if they are the same. |
| "`remove`" | Set "`remove`" Value | Set | Make a new set containing all members of the old set minus Value. |
| "`setDifference`" | Set "`setDifference`" Set | Set | Make a new set which is the difference of the two sets. |
| "`subset`" | Set "`subset`" Set | Boolean | "`true`" if all elements of the first set are contained in the second, "`false`" |

| Value of attribute `setOperation` | Form | Return Value | Description |
|---|---|---|---|
| | | | otherwise. |
| "`union`" | Set "`union`" Set | Set | Make a new set containing members of both sets in the expression. Members contained in both sets will be contained in the new set only once. |

*Table 5 String Operations*

| Value of attribute `stringOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`concatenate`" | String "`concatenate`" String | String | Make a new string which is equal to the first string with the second string concatenated to the end of it. |
| "`contains`" | String "`contains`" String | Boolean | "`true`" if the first string occurs anywhere within the second string, "`false`" otherwise. |
| "`equal`" | String "`equal`" String | Boolean | "`true`" if the values are the same or "`false`" if they are different. |
| "`greaterThan`" | String "`greaterThan`" String | Boolean | "`true`" if the first string is greater than the second string, "`false`" otherwise. |

| Value of attribute `stringOperation` | Form | Return Value | Description |
|---|---|---|---|
| "`greaterThanOrEqual`" | String "`greaterThanOrEqual`" String | Boolean | "`true`" if the first string is greater than or equal to the second string, "`false`" otherwise. |
| "`lessThan`" | String "`lessThan`" String | Boolean | "`true`" if the first string is less than the second string, "`false`" otherwise. |
| "`lessThanOrEqual`" | String "`lessThanOrEqual`" String | Boolean | "`true`" if the first string is less than or equal to the second string, "`false`" otherwise. |
| "`notEqual`" | String "`notEqual`" String | Boolean | "`true`" if the values are different or "`false`" if they are the same. |

2.6.1.2 Functions on a single expression

The following tables (Table 6 thru Table 10) list the functions required to be supported. Functions on a single expression are always in the form of <`'function'`><`expression`>. The function result and the return value data type must be returned. The function, the forms that the function can take, the return value data type and a description are listed.

The functions are divided into five groups depending upon the type of the operand: Boolean functions, number functions, set functions, string functions, and a substring function. Within each group several operations are possible.

When a function contains an expression that contains a value, data type errors will be caught by comparing the type of value with the data type of the operation they are contained within. For instance; the operation <`numberFunction numberAction="float"`> will fail if the operation has the value element <`stringValue`>Yes</`stringValue`>.

*Table 6 Boolean Functions*

| Value of attribute `booleanAction` | Form | Return Value | Description |
|---|---|---|---|
| "`defined`" | "`defined`" | Boolean | "`true`" if variable exists in state |

| Value of attribute `booleanAction` | Form | Return Value | Description |
|---|---|---|---|
| | <variableRef> | | table and does not have a "`noValue`" value. |
| "`not`" | "`not`" Boolean | Boolean | "`true`" if operand is "`false`". "`false`" if operand is "`true`". |

*Table 7 Number Functions*

| Value of attribute `numberAction` | Form | Return Value | Description |
|---|---|---|---|
| "`commonLogarithm`" | "`commonLogarithm`" Integer | Real | Return the common logarithm (log) of the number |
| | "`commonLogarithm`" Real | Real | |
| "`cosecant`" | "`cosecant`" Integer | Real | Return the cosecant (csc or cosec) of the number |
| | "`cosecant`" Real | Real | |
| "`cosine`" | "`cosine`" Integer | Real | Return the cosine (cos) of the number |
| | "`cosine`" Real | Real | |
| "`cotangent`" | "`cotangent`" Integer | Real | Return the cotangent (cot) of the number |
| | "`cotangent`" Integer | Real | |
| "`exponential`" | "`exponential`" Integer | Real | Return the exponential (exp) of the number. |
| | "`exponential`" Real | Real | |
| "`factorial`" | "`factorial`" Integer | Integer | Return the product of multiplying all integers up to and including the given positive integer. |
| "`float`" | "`float`" Integer | Real | Return the number converted to a real. |
| | "`float`" Real | Real | |
| "`hyperbolicCosecant`" | "`hyperbolicCosecant`" Integer | Real | Return the hyperbolic cosecant (csch) of the number |
| | "`hyperbolicCosecant`" Real | Real | |
| "`hyperbolicCosine`" | "`hyperbolicCosine`" Integer | Real | Return the hyperbolic cosine (cosh) of the number |
| | "`hyperbolicCosine`" Real | Real | |

| Value of attribute `numberAction` | Form | Return Value | Description |
|---|---|---|---|
| "hyperbolicCotangent" | "hyperbolicCotangent" Integer<br>"hyperbolicCotangent" Real | Real<br>Real | Return the hyperbolic cotangent (coth) of the number |
| "hyperbolicSecant" | "hyperbolicSecant" Integer<br>"hyperbolicSecant" Real | Real<br>Real | Return the hyperbolic secant (sech) of the number |
| "hyperbolicSine" | "hyperbolicSine" Integer<br>"hyperbolicSine" Real | Real<br>Real | Return the hyperbolic sine (sinh) of the number |
| "hyperbolicTangent" | "hyperbolicTangent" Integer<br>"hyperbolicTangent" Real | Real<br>Real | Return the hyperbolic tangent (tanh) of the number |
| "inverseCosine" | "inverseCosine" Integer<br>"inverseCosine" Real | Real<br>Real | Return the inverse cosine (arccos or $cos^{-1}$) of the number. |
| "inverseCosecant" | "inverseCosecant" Integer<br>"inverseCosecant" Real | Real<br>Real | Return the inverse cosecant (arccsc or $csc^{-1}$) of the number. |
| "inverseCotangent" | "inverseCotangent" Integer<br>"inverseCotangent" Real | Real<br>Real | Return the inverse cotangent (arccot or $cot^{-1}$) of the number. |
| "inverseSine" | "inverseSine" Integer<br>"inverseSine" Real | Real<br>Real | Return the inverse sine (arcsin) of the number. |
| "inverseSecant" | "inverseSecant" Integer<br>"inverseSecant" Real | Real<br>Real | Return the inverse secant (arcsec or $sec^{-1}$) of the number. |
| "inverseTangent" | "inverseTangent" Integer<br>"inverseTangent" Real | Real<br>Real | Return the inverse tangent (arctan or $tan^{-1}$) of the number. |
| "naturalLogarithm" | "naturalLogarithm" Integer | Real | Return the natural logarithm (ln) of the |

| Value of attribute `numberAction` | Form | Return Value | Description |
|---|---|---|---|
| | "`naturalLogarithm`" Real | Real | number |
| "`negative`" | "`negative`" Integer | Integer | Return the negative value of the number. |
| | "`negative`" Real | Real | |
| "`secant`" | "`secant`" Integer | Real | Return the secant (sec) of a number |
| | "`secant`" Real | Real | |
| "`sine`" | "`sine`" Integer | Real | Return the sine (sin) of a number |
| | "`sine`" Real | Real | |
| "`squareRoot`" | "`squareRoot`" Integer | Integer or Real | Return the square root (sqrt) of a number |
| | "`squareRoot`" Real | Real | |
| "`tangent`" | "`tangent`" Integer | Real | Return the tangent (tan or tg) of a number |
| | "`tangent`" Real | Real | |
| "`truncate`" | "`truncate`" Real | Integer | Return the real number truncated to an integer. |

*Table 8 Set Functions*

| Value of attribute `SetAction` | Form | Return Value | Description |
|---|---|---|---|
| "`empty`" | "`empty`" Set | Boolean | "`true`" if the set is empty, "`false`" otherwise. |
| "`sizeOf`" | "`sizeOf`" Set | Integer | Number of characters in the set |

*Table 9 Unary String Functions*

| Value of attribute `StringAction` | Form | Return Value | Description |
|---|---|---|---|
| "`empty`" | "`empty`" String | Boolean | "`true`" if the string is empty, "`false`" otherwise. |
| "`sizeOf`" | "`sizeOf`" String | Integer | Number of characters in the string |

*Table 10 Unary Substring Functions*

| Form | Return Value | Description |
|---|---|---|
| `<subStringFunction>`<br>`<subStringPosition>`<br>`</subStringFunction>`<br>String | String | The subStringFunction will return a substring depending on the values provided in one or two element `<subStringPosition>` and element `<subStringLength>`.<br>The subStringPosition specifies the position in the string by the following rules:<br>A positive subStringPosition means an index position counted from the beginning of the string. A negative subStringPosition is counted from the end. A one means the start and a zero means the end of the string.<br>A single subStringPosition will return a single character string.<br>A positive subStringLength means the length towards the string end. A negative subStringPosition means the length towards the string start. A zero means the returned string is from the subStringPosition to string end. A subStringLength greater then remainder of the string means the returned string is from the subStringPosition to string end (positive) or to string start (negative). |
| `<subStringFunction>`<br>`<subStringPosition>`<br>`<subStringPosition>`<br>`</subStringFunction>`<br>String | String | Two subStringPositions specify the starting position and ending position of the substring to be returned.<br>NOTE: The starting position can occur after the ending position. For example a starting position of 10 and ending position of 3 will return the range between 3 and 10. |
| `<subStringFunction>`<br>`<subStringPosition>`<br>`<subStringLength>`<br>`</subStringFunction>`<br>String | String | A subStringPosition and subStringLength specify the starting position and length, respectively, of the substring to be returned. |

2.6.1.3 Variable references

If the expression contains an element `<variableRef>`, the value of the expression is obtained by looking up the current value of the variable in the state table. Refer to state table management - accessing the value of a variable in Para 2.5.3 for the rules governing state table retrieval.

2.6.1.4 Values

Values within an expression represent a constant. The data type of the value is indicated by the name of the element. For value elements that contain character data (element <stringValue>, element <integerValue> and element <realValue>) the character data must match the data type. Data content that does not match the data type must be flagged as an error. Refer to error handing in Para 2.9.

2.6.1.5 Operations by data type

The following is provided as a quick reference to the operations supported per data type.

Operations that operate on Boolean data types are:

- "and"
- "defined"
- "equal"
- "exclusiveOr"
- "notEqual"
- "not"
- "or"

Operations that operate on integer data types are:

- "commonLogarithm"
- "cosecant"
- "cosine"
- "cotangent"
- "divide"
- "equal"
- "exponent"
- "exponential"
- "factorial"
- "float"
- "greaterThan"
- "greaterThanOrEqual"
- "hyperbolicCosecant"
- "hyperbolicCosine"
- "hyperbolicCotangent"
- "hyperbolicSecant"
- "hyperbolicSine"
- "hyperbolicTangent"
- "integerDivide"
- "inverseCosine"
- "inverseCosecant"
- "inverseCotangent"
- "inverseSine"
- "inverseSecant"
- "inverseTangent"
- "lessThan"
- "lessThanOrEqual"
- "minus"
- "modulus"

- "naturalLogarithm"
- "notEqual"
- "negative"
- "plus"
- "secant"
- "sine"
- "squareRoot"
- "tangent"
- "times"

Operations that operate on real data types are:

- "commonLogarithm"
- "cosecant"
- "cosine"
- "cotangent"
- "divide"
- "equal"
- "exponent"
- "exponential"
- "float"
- "greaterThanOrEqual"
- "greaterThan"
- "hyperbolicCosecant"
- "hyperbolicCosine"
- "hyperbolicCotangent"
- "hyperbolicSecant"
- "hyperbolicSine"
- "hyperbolicTangent"
- "integerDivide"
- "inverseCosine"
- "inverseCosecant"
- "inverseCotangent"
- "inverseSine"
- "inverseSecant"
- "inverseTangent"
- "lessThanOrEqual"
- "lessThan"
- "minus"
- "naturalLogarithm"
- "notEqual"
- "negative"
- "plus"
- "secant"
- "sine"
- "squareRoot"
- "tangent"
- "times"
- "truncate"

Operations that operate on string data types are:

- "concatenate"
- "contains"
- "empty"
- "equal"
- "greaterThan"
- "greaterThanOrEqual"
- "lessThan"
- "lessThanOrEqual"
- "notEqual"
- "sizeOf"
- <subStringFunction>

Operations that operate on set data types are:

- "add"
- "disjoint"
- "empty"
- "equal"
- "intersection"
- "member"
- "notEqual"
- "remove"
- "setDifference"
- "sizeOf"
- "subset"
- "union"

### 2.6.2 Failed evaluations

An expression that cannot be evaluated must be considered a fatal error. The logic engine must immediately stop executing the process data module and present an error message to the user. Refer to error handling in Para 2.9.

### 2.6.3 Error conditions

The following error conditions must be trapped and handled according to error handling in Para 2.9:

- Division by zero
- Calculating the nth root of a negative integer or negative real
- Calculating the factorial of a negative integer
- Fixed value content does not match the data type implied by the value element (element <stringValue>, element <integerValue>, element <realValue>)
- Operation between two expressions with incorrect data type operand(s)
- Function on a single expression with incorrect data type operand
- Expression can not be evaluated

## 2.7 Dialogs

Dialogs provide interactivity between the user and the state variables used in the process data module. Dialogs provide the capability of prompting the user to input a typed response via a fill-in dialog or select from a set of choices via a menu dialog.

### 2.7.1 Dialog state variable management

Any state variable references (element <variableRef>) used in the element <dialog> are replicated to a temporary state table when the dialog is executed. Dialog state variables are managed separately to maintain the asserted values during the dialog, not to the system state table. All dialog expressions (element <applic>, element <enabledState>, element <validate>, and element <assertion>) are evaluated using the dialog state table.

#### 2.7.1.1 System state table modification

When a dialog navigation function (submit, cancel, or reset) is selected, an event is performed to the system state table. The following navigation functions perform the following system state table event.

- submit - The system state table is updated with the dialog state values
- cancel - The system state values are unchanged
- reset - The dialog state values are reverted to the current system state values

### 2.7.2 Applicability dialog component elements

The dialog and dialog component elements (element <dialog>, element <userEntry>, element <menu>, element <menuChoice>, element <pushButton>, and element <message>) are based on the node template and can contain applicability elements that are to be processed by the rules defined in the data navigation classes in Para 2.3, above. It does not contain the element <variablePreSet> or the element <variablePostSet> from the node template.

### 2.7.3 Enable / disable dialog component elements

Each dialog component element (element <userEntry>, element <menu>, element <pushButton>, and element <menuChoice>) can contain the element <enabledState>. The logic engine must evaluate each element <enabledState> expression after each fill-in is completed or menu choice is selected and asserted. When evaluating the enable/disable expression the dialog state values are used. When the evaluated expression is 'false', the associated data entry information is disabled (not available) and visibly dimmed or grayed out. When the dialog is submitted, any asserted state variables, in a disabled data entry, are reverted to the original values.

### 2.7.4 Fill-in dialogs

A dialog element <userEntry> is constructed with an element <prompt> which contains the question to be presented to the user, an element <variableRef> which will receive the user's response, an optional element <menuChoiceDefaultFlag> which defines the default value, and an optional element <validate> which defines a criteria for the input. The fill-in can contain the element <pushButton> specifying an action push button next to the data entry field.

The attribute mandatory identifies whether the user must input text before the submit function.

A fill-in dialog is presented with the prompt and an area to enter input.

#### 2.7.4.1 Default data entry

When a default expression or value is provided, the input area is to be pre-filled with the text. The logic engine determines the default entry by evaluating the element <menuChoiceDefaultFlag> expression, if present. If no element <menuChoiceDefaultFlag> exists, the logic engine will not provide pre-filled text.

2.7.4.2 Validate data entry

The logic engine is to validate user input either as characters are entered or when the user has completed entry and wants to continue. The validation rules are enforced by getting the data type of the variable to receive the user's response and validating that all characters are valid for that data type. For an integer data type, an optional leading minus sign [-] and numeric characters [0-9] are valid. For a real data type, an optional leading minus sign [-], numeric characters [0-9], and one dot [.] or one comma [,] are valid, scientific notation is not currently supported. For a string data type, any ASCII characters are valid. Processing must not continue until a valid input is entered or the user cancels the dialog.

Fill-in dialogs that contain an element <`validate`> are to validate that the user input returns a '`true`' value against the validation expression. If the user enters a value that fails the validation check, a warning is to be presented that includes the acceptable criteria (as specified in the attribute `errorMessage`). Processing must not continue until an acceptable criterion is entered or the user cancels the dialog. Once an acceptable input value is received it is assigned to the variable in the dialog state table.

**2.7.5 Menu dialogs**

A dialog element <`menu`> is constructed with an element <`prompt`> that contains the question to be presented to the user and one or more elements <`menuChoice`> that the user can select from. The element <`prompt`> has an attribute `textDisplayPosition`, which gives the position of the prompt. It has values "`top`", "`bottom`", "`left`" and "`right`".

A menu dialog is presented with the prompt and the list of choices to select from.

- The attribute `choiceSelection` identifies whether the user is limited to selecting a single choice or can select multiple choices. For value of "`single`", the preferred method of display is a list of radio boxes. For value of "`multiple`", the preferred method of display is a list of check boxes.
- The attribute `mandatory` identifies whether the user must select a choice(s).
- The attribute `choiceType` identifies the preferred layout as either item or scrollable list. For value of "`select`", the preferred method of display is either a list of radio or check boxes, depending on attribute `choiceSelection.` An alternative method of display for a large number of choices is a scrolling list. For value of "`pulldown`", the preferred method of display is a scrolling list.
- The attribute `menuChoiceFlow` identifies the preferred layout as either in horizontal or vertical direction.

Each element <`menuChoice`> contains the element <`prompt`> for the choice, either element <`assertion`> specifying the operation to perform if the choice is selected or element <`noAssertions`> if no operation is to be performed. Each choice can contain element <`externalApplication`> specifying upon selection to execute the application, element <`dialog`> specifying upon selection to launch a secondary dialog, or element <`pushButton`> specifying an action push button next to the menu choice answer.

- The attribute `menuChoiceDefaultFlag` on the element <`menuChoice`> determines if the choice is initially displayed as pre-selected. For value of "`1`", the choice is pre-selected. For value of "`0`", the choice is not pre-selected. If more than one choice of a single choice menu dialog (<`menu choiceSelection="single"`>) has the attribute `menuChoiceDefaultFlag` value of "`1`", then only the first choice with the attribute `menuChoiceDefaultFlag` value of "`1`" must be displayed pre-selected.

The element <externalApplication> or element <dialog> is executed by the logic engine after the menu choice is selected.

The element <pushButton> is displayed next to the menu choice and is executed after the push button is selected, not when the menu choice is selected.

Each element <menuChoice> must contain one or more elements <assertion> or the element <noAssertions> specifying the action to perform when the choice is selected. For choices with element <assertion>, the logic engine must perform all of the assertions assigning values to variables in the dialog state table. For choices with an element <noAssertions>, the logic engine must not perform any assertion actions.

### 2.7.6 Push button dialogs

The logic engine launches the external application, using the element <externalApplication> or secondary dialog, using the element <dialog>, after the push button is selected.

## 2.8 External application interface

The logic engine/IETP combination must provide the capability to interface with applications external to the IETP. Examples of external applications are diagnostic tools which can run tests that return results; and additional technical data viewers, such as an interactive wiring viewer, which typically would not return results. The external application interface is intended to support interfaces with any type of application.

The requirements for the external application interface apply to the combination of logic engine and IETP. Specific projects will have to allocate the requirements between the logic engine and the IETP. Different projects or organizations can allocate the requirements differently. No specific implementation guidance is provided here.

### 2.8.1 External application

The element <externalApplication> defines an interface to an external application. The mandatory attribute application defines the "service" being requested. The attribute application refers to an ENTITY which provides further information about the service being requested. The logic engine/IETP uses this information to identify the actual application to invoke through some sort of mapping (such as XSL). The attribute provides the flexibility to use the best suited external application to perform the request. The implementation of mapping an external application request to an actual application is not specified.

### 2.8.2 Description

The element <paraBasic> provides a description of the interface. This description can aid the author and can be used to provide a display to the user if there is a delay involved, such as waiting for results in an interface to a diagnostic program which performs on-product testing.

### 2.8.3 Send parameters

The element <send> identifies parameters to send to the external application. Each element <send> can specify either a value or a name/value pair. Each send parameter value must be specified as a static value using the element <stringValue> or as a value out of the state table using the element <variableRef>. S1000D does not specify the communication protocol used between the logic engine/IETP and the application being called. The logic engine/IETP is required to format the send parameters to be compatible with the application being called.

### 2.8.4 Receive parameters

Some applications will return results which the process data module author can then use to further guide navigation through the process data module. This is accomplished by identifying

variables in the state table to receive return values from the external application. The element <receiveValue>, element <receiveByName>, and element <receiveByPosition> are used to specify what return data to assign to which variables in the state table. The three methods are mutually exclusive and cannot be mixed.

Each of the three methods specify an element <variableRef> indicating which variable to update with the value returned by the external application. The logic engine/IETP must accept the return value(s) from the external application and update the state table accordingly.

2.8.4.1 Receive

The receive method assigns each result from the external process in the order received to the variable in the state table specified in the element <receiveValue> in the order of the markup. This requires that an element <receiveValue> is provided for each expected return value. It also requires that the elements <receiveValue> are authored in the order expected from the external application results.

2.8.4.2 Receive by name

The receive by name method is used when the external application returns results with a name / value pair, such as with an XML message. The element <receiveByName> must include an element <returnedValueName> with the name to associate in the result from the external application and an element <variableRef> specifying the variable in the state table to update. The receive by name method does not require that all returned results are assigned to variables.

2.8.4.3 Receive by position

The receive by position method is used when only some of the results are needed to be stored in the state table. The element <receiveByPosition> must include an element <returnedValuePosition> with the position of the return result from the external application (starting at 1) and an element <variableRef> specifying the variable in the state table to update. The receive by position method does not require that all returned results are assigned to variables.

**2.8.5 Processing requirements**

2.8.5.1 General

The logic engine/IETP must provide a mapping to associate an actual application to invoke with the element <externalApplication> attribute application.

The logic engine/IETP must invoke the appropriate external application including parameters in the format required by the external application.

If the external application cannot be successfully invoked, an error message must be presented to the user. Refer to error handling in Para 2.9.

2.8.5.2 Send parameters

The logic engine/IETP must process the element <send> to build a list of parameters to send to the external application. If the element <variableRef> is included, the state table must be queried for the value associated with the variable referenced. If the value of the variable referenced cannot be obtained, then an error message must be presented to the user. Refer to error handling in Para 2.9.

2.8.5.3 Wait, no wait, and cancel

If no element <receiveValue>, element <receiveByName>, or element <receiveByPosition> is provided, after invoking the external application the logic engine/IETP must continue processing the process data module and must not wait for a return result from the external application.

If any element <receiveValue>, element <receiveByName>, or element <receiveByPosition> is provided, after invoking the external application the logic engine/IETP must suspend processing the data module and presents the user with an indication that the IETP is in a wait state. A cancel operation must be provided to the user.

If the logic engine/IETP is suspended waiting for an external process to return and the user invokes the cancel function, the logic engine/IETP must resume by performing the previous operation (refer to Para 2.2.1.2) and ignore any results that can eventually be returned by the external application.

If the logic engine/IETP is suspended waiting for an external process to return and the external process returns, the logic engine/IETP must process the return results as defined in the following paragraphs and if successful continue processing the process data module.

2.8.5.4 Receive

If the receive method is used, the logic engine/IETP must assign each return result in the order received to each element <receiveValue> in the order in the markup. The value of the state table variable must be updated with the associated return value.

If the external application returns a value with a data type that does not match the value-type of the variable specified by the element <variableRef>, then an error message must be presented to the user. Refer to error handling in Para 2.9.

If the number of return values does not match the number of element <receiveValue>, then an error message must be presented to the user. Refer to error handling in Para 2.9.

2.8.5.5 Receive by name

If the receive by name method is used, the logic engine/IETP must match the name specified in element <returnedValueName> with the name in a name/value pair returned from the external application. The value of the state table variable specified by the element <variableRef> must be updated with the associated return value.

If a name match cannot be made, then an error message must be presented to the user. Refer to error handling in Para 2.9.

If the external application returns a value with a data type that does not match the value-type of the variable specified by the element <variableRef>, then an error message must be presented to the user. Refer to error handling in Para 2.9.

2.8.5.6 Receive by position

If the receive by position method is used, the logic engine/IETP must assign the value of the $n^{th}$ return result as specified by element <returnedValuePosition> to the variable specified by the element <variableRef>. The value of the state table variable specified by the element <variableRef> must be updated with the associated return value.

If a position match cannot be made, then an error message must be presented to the user. Refer to error handling in Para 2.9.

If the external application returns a value with a data type that does not match the value-type of the variable specified by the element <variableRef>, then an error message must be presented to the user. Refer to error handling in Para 2.9.

## 2.9 Error handling

Due to the programmatic nature of the process data module, there exists the possibility of runtime errors occurring. Upon detection of an error, the logic engine error processing must record detailed error information that is sufficient to reconstruct the errors in order to pinpoint the

problem. An error or warning message must be presented to the user identifying the problem and the next action that will occur.

The format of the messages and reports are not specified. At a minimum, the following error conditions and actions must be trapped and reported by the logic engine.

*Table 11 Error Conditions*

| Error | Message | Action |
|---|---|---|
| Node-Alts with one or more nodes that do not contain the attribute `applicRefId` | Warning | System must process the first Node that evaluates to "`true`" (a Node without an applic is considered "`true`") |
| A variable declaration contains a data type different from an existing variable of the same name | Fatal | Fatal error, processing cannot continue |
| A variableRef references a variable that is not in the state table, was never declared | Fatal | Fatal error, processing cannot continue |
| An assertion variable data type and expression result data type do not match | Fatal | Fatal error, processing cannot continue |
| Division by zero, applies to elements <`divide`>, <`idivide`> and <`modulus`> | Fatal | Fatal error, processing cannot continue, infinity not supported |
| Calculating the $n^{th}$ root of a negative integer or negative real | Fatal | Fatal error, processing cannot continue, imaginary numbers not supported |
| Calculating the factorial of a negative integer | Fatal | Fatal error, processing cannot continue |
| Fixed value content does not match the data type implied by the value element (element <`stringValue`>, element <`integerValue`>, element <`realValue`>) | Fatal | Fatal error, processing cannot continue |
| Operation between two expressions with incorrect data type operand(s) | Fatal | Fatal error, processing cannot continue |
| Function on a single expression with incorrect data type operand | Fatal | Fatal error, processing cannot continue |
| Calculating the common logarithm or natural logarithm of a negative number | Fatal | Fatal error, processing cannot continue, imaginary numbers and infinity not supported |
| Calculating the common logarithm or natural logarithm of 0 is negative infinity (-∞) | Warning | Result will be set to the largest negative number supported by the system and processing will continue |

| Error | Message | Action |
|---|---|---|
| Calculating the cosecant or cotangent of zero or any multiple of pi (π) is infinity (∞) | Warning | Result will be set to the largest positive number supported by the system and processing will continue |
| Calculating the hyperbolic cosecant or hyperbolic cotangent of zero | Fatal | Fatal error, processing cannot continue |
| Calculating the inverse cosecant, inverse secant or inverse cotangent of 0 is infinity (∞) | Warning | Result will be set to the largest positive number supported by the system and processing will continue |
| Calculating the inverse cosine or inverse sine of a number greater than 1 or less than -1. | Fatal | Fatal error, processing cannot continue |
| Calculating the secant or tangent of π/2 or any integer multiple, such as 3π/2, 5π/2 or -3π/2 is infinity (∞) | Warning | Result will be set to the largest positive number supported by the system and processing will continue |
| Calculating the square root of a negative number produces an imaginary number | Fatal | Fatal error, processing cannot continue, imaginary numbers not supported |
| Expression can not be evaluated | Fatal | Fatal error, processing cannot continue |
| External application cannot be invoked - no return data expected | Warning | Processing will continue |
| External application cannot be invoked - return data is expected | Fatal | Fatal error, processing cannot continue |
| External application send cannot obtain the value of a variableRef | Fatal | Fatal error, processing cannot continue |
| External application return value type mismatched with receiving parameter variable type | Fatal | Fatal error, processing cannot continue |
| External application receive method - number of return values and number of receive parameters mismatch | Fatal | Fatal error, processing cannot continue |
| External application receive by name method - cannot match return value name with the receive parameter name | Fatal | Fatal error, processing cannot continue |
| External application receive by position method cannot match return value position | Fatal | Fatal error, processing cannot continue |

## 2.10 User interface

The User Interface and printing requirements are specified in Chap 6.3.

# *Chapter 7.6.2*

# Software requirements - Resource resolution service

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| IETF RFC 2483 | URI Resolution Services |
| IETF RFC 3986 | Uniform Resource Identifiers (URI): Generic Syntax |

## 1 General

To allow the use of Uniform Resource Names (Uniform Resource Names (URN)s) within IETP applications it is necessary to construct a URN resolution service. The primary function of a resolution service is to resolve a Uniform Resource Locator (URL) location from a URN name. How each project implements a resolution service is up the project or the organization. The following guidelines should be followed when implementing the resolution service.

- All solutions are constrained by Internet Engineering Task Force (IETF) Request for Comments (RFC) 2396, Uniform Resource Identifier (URI) Syntax. Since this proposal concerns URNs, the suggested URN format should conform to the current IETF proposals or superseding documents.
- All solutions must be implementable using existing technologies. Since web browsers and web servers do not support URN resolution, the solution should be able to function with the existing browsers that are not URN capable.
- No solution must require a specific method of resolving URNs. Since there are many methods of defining a URN resolution server there is no need to constrain implementers to a specific methodology.
- All solutions must be web capable. Since the internet is foreseen to be the primary medium for IETP publications, solutions should have a particular emphasis on using web-based technologies.

To allow interoperability between IETP applications this specification proposes a standard interface describing a URN resolution service. Resolution services implemented using the proposed interface must be able to communicate with each other regardless of specific implementation details. Considering the above guidelines, a compatible interface can be described as meeting IETF guidelines, be able to be implemented by vendors using existing tools they are familiar with, capable of working with any URN resolution service implementations, and focused on the use of web technologies.

# 2 Resource resolution

## 2.1 Proposed resource resolution interface

The following is a proposal to allow interoperability for IETP implementations using URN syntax for referencing. A basic interface would be a concrete implementation of IETF RFC 2483 using Hypertext Transfer Protocol (HTTP) as a transfer protocol and XML as communication medium. The interface is a web service or services implementing the service functions of RFC 2483. The interface can be used to implement a resolution service for any IETP application.

The resource resolution interface consists of two subfunctions, resource resolution and resource description. Resource resolution responds by redirecting to the resource. Resource description will provide more information about the resource in an XML document.

A standard HTTP query string provides access to this service. The service will be a URL with the following syntax:

http://urn.server.com/urnServiceName?urnQueryString

Where:

- *urn.server.com* = The Domain Name System (DNS) name or Internet Protocol (IP) of the URN resolution server.
- *urnService* = The name and location of the URN resolution service within the server.
- *urnQueryString* = The HTTP query string used to access or request information about a resource.

### 2.1.1 Resource queries

The resource resolution interface must accept queries using an HTTP query string. Query parameters will be the metadata characteristics specified as name/value pair. The resolution services attempt to resolve resources having the specified characteristics. The following parameters are service keywords that resolution services using this interface must accept:

*Table 2 Resolution service keywords*

| Parameter | Description |
|---|---|
| urn | Requests the service to return information describing a resource identified by the passed URN. |
| url | Requests the service to return information describing a resource identified by the passed URL. |
| multiple | Requests the service to return multiple information sets describing the resource, if possible. |
| allurcs | Requests the service to return all known characteristics about the requested resource. |

### 2.1.2 Parameter handling

The HTTP query string is considered the resource request. If the resolution service was a relational database the `urn` and `url` parameters could be considered the primary keys of a resource. The `multiple` parameter allows the service to describe the resource in multiple formats, if possible. The `allurcs` is a shorthand method to request that all metadata characteristics be described. The resolution service can also contain other metadata characteristics and any other parameter will be considered a query on these characteristics. There is no specified set of metadata characteristics defined, but implementations must consider the use of the Dublin Core as a standard metadata set.

If the request contains parameters without values, or parameters with and without values, the request is considered a query for the values of resource characteristics matching the names of the parameters without values, returned as an XML document. If the request contains only parameters with values the request is consider a query for the resource stream and the resource data is returned as a response. To promote interoperability the requests parameter names must be considered as case insensitive and values that are considered dates are to be in International Standards Organization (ISO) format. A service must be able to handle resource characteristic queries even if the service does not support the characteristic. A query on an unsupported characteristic will return a "not found" error message.

### 2.1.3 Multiple resource formats

A URN could be described by multiple URLs, for example a URN available in multiple formats, such as different languages. When a URN is linked to multiple URLs, the service identifies one as the default format and that resource will be returned when the resource is requested by URN only. The definition of the default resource is to be identified in the business rules of the service or application. If a URN is describing multiple URLs each match must have at least one metadata characteristic vary between differing formats.

A URL could also be described by multiple URNs, for example if the URN is available in multiple formats one URN could generically describe all resource formats and another URN could describe the specific format.

The query results will be the resource itself or an XML document describing the resource characteristics. A Resource Description Unit (RDU) will describe the resource characteristics of a particular resource or resource format. Result sets can contain multiple RDUs and messages from the resolution service.

## 2.2 Resource resolution interface definition

The interface can support the following functions as defined by RFC 2483. For interface simplicity, a single service handles the various functions. The particular function to be invoked is

based on the structure and occurrence of the HTTP query parameters sent to the resolution service.

- `N2R/L2R:` URN/URL to resource resolution
- `N2C/L2C:` URN/URL to characteristic resolution.
- `N2L/L2N:` URN to URL resolution.
- `NEN/LEL:` URN/URL equivalence.

### 2.2.1 URN/URL to resource (N2R/L2R)

This function will resolve a URN or a URL to a resource. This is the most basic service of the interface, allowing a link containing the URN to return the resource data. The service accepts a URN as a query parameter and returns the resource data. The service returns Error 004 "unknown resource" message if the resource is unknown to the service or redirect to the resource as an HTTP response. If the resource can be returned in more than one format, such as different languages, the service provides the one it considers a default or the resource most specifically identified by the additional parameters.

*Query Format*: The reserved query parameter `urn` and the parameter value is the URN string. N2R resolution occurs if only the `urn` parameter is found or only other parameters with values are found. If the service is passed a parameter with no value and the parameter name can be interpreted as a URN then the resource to resolve will be the resource specified by the parameter name. L2R performs the same function but accepts a URL as the `url` parameter.

Example to return the resource identified in English if possible:

http://urn.server.com/urnService?urn=URN:NID:NSS&lang=EN

or

http://urn.server.com/urnService?URN:NID:NSS&lang=EN

### 2.2.2 URN to characteristic (N2C/L2C)

This function resolves a URN to one or more resource characteristics. The service accepts a URN as a query parameter and returns an XML document describing the requested characteristics. The service returns each specified characteristic or an error message as an XML document. The Error 301 "unsupported characteristic" indicates that the characteristic is not found. If there are unsupported characteristics the service returns the supported characteristics and the error messages in a single document.

*Query Format*: The N2C query accepts the `urn` parameter of the N2R query and another single parameter without a value. The name of the other parameters without values are the names of the characteristics to return. Additional parameters with values will further filter the query. The `allurcs` parameter requests the service to return all characteristics of the identified resource. Characteristics for multiple formats will be returned in multiple resource description units using the `multiple` parameter. L2C performs the same function but accepts a URL as the `url` parameter.

Example to resolve the value of the author characteristic of the English language resource:

http://urn.server.com/urnService?urn=URN:NID:NSS&author&lang=EN

Example to resolve the value of the all characteristics of the identified resource:

http://urn.server.com/urnService?urn=URN:NID:NSS&allurcs

### 2.2.3 URN to URL/URL to URN (N2L/L2N)

This function resolves a URN or to a URL. The service accepts a URN or a URL as a query parameter and returns an XML document containing the URL characteristic. If the resource can

be returned in more than one format the service will provide the one it considers default or the resource most identified by the additional parameters. The error message 004 "unknown resource" indicates that the URL is not found.

*Query Format*: The N2L query accepts the `urn` parameter of the N2R query and a valueless `url` reserved parameter is used to activate this service. The service will return the URL or an error message as an XML document. This function is a special form of N2C where the reserved `url` parameter is to be recognized by all services. If the resource exists in multiple formats the `multiple` parameter requests the service to return multiple resource description units describing each format, otherwise information concerning the default format is returned. L2N accepts a URL as the reserved `url` parameter and returns the URN using a valueless `urn` parameter.

Example returning the URL of the identified resource in English:

http://urn.server.com/urnService?urn=URN:NID:NSS&url&lang=EN

### 2.2.4 URI equivalence (NEN/LEL)

This function determines if multiple URNs are equivalent, basically if the multiple URNs point to the same resource location or if the multiple URLs describe the same URN. Examples could be where a URN has multiple formats each with their own URL or if there are two URNs that identify the same URL. This service accepts two URNs and returns an XML document describing their equivalence relationship. The Errors 501 or 502 will be returned indicating the equivalence relationship

Example to return the URLs identified by the specified URI:

http://urn.server.com/urnService?urn=URN:NID:NSS1& urn=URN:NID:NSS2

### 2.2.5 General query format (QRY)

This function provides the same functionality as N2C, L2C, N2L, or L2N. The query format is the same as the matching function but does not take the reserved `urn` or `url` parameter. Basically the function will return information for all resources that match the query instead of matching against a specific URN. As this function can return many matches, services could limit the results to a specific number of matches. The messages 301 or 302 are returned as appropriate.

Example returning the titles of all the resources in English format:

http://urn.server.com/urnService?title&lang=EN

### 2.2.6 Advanced query services

Advanced query services could be implemented in a Resource Description Service (RDS) that allows the submission of complex queries and perform searches using more than name/value pairs.

## 2.3 Resource description

When the service returns resource characteristics the data returned will be an XML document. The function that returns this document is the RDS. This document will return one or more Resource Description Units (RDUs) containing the requested resource characteristics. Multiple RDUs can be returned, one for each resource or resource format queried. The document can also contain a messaging structure to allow applications using the service to intelligently respond to errors or to provide additional information.

### 2.3.1 Resource description units

RDUs are defined using the Resource Description Framework (RDF) to describe the specified resource. An RDU can be considered the resource metadata set described by a particular metadata schema. The default resource description schema used by this specification is the

Dublin Core element set defining the standard set of Uniform Resource Characteristics (Uniform Resource Characteristics (URC)s). The RDU contains the resource identifier and can contain one or more URCs that identify particular resource metadata elements, such as the document title. A URC consists of the name of the URC element and the specific value of the URC as data contained within that element. Additionally URC can describe their own RDU schema if different from the primary RDU and provide URC creation, ownership, modification, and expiry information for URC management between resolution servers. All services at a minimum must support URC characteristics for URN and URL information to allow link resolution.

### 2.3.2 Resource description framework

The result set RDU is described by a document containing a single `rdf:RDF` element and multiple `rdf:Description` elements defined by the RDF.

As defined by this specification the `rdf:Description` element can contain multiple `urc` elements identifying resource metadata elements with simple name/value pairs. The resource description must be returned in the `rdf:Description` element and for the purposes of this specification must contain both an `rds:urn` attribute specifying the resource URN and an `rdf:about` attribute identifying the resource URL. Every tag that is a first level child of the `rdf:Description` element is considered an URC and with the name of the tag as the URC name and the contents of the tag describing the URC value. The namespace of the URC element must describe the specific RDF schema used. This allows advanced resource description structures, therefore applications must not assume any particular structure within the `rdf:Description` element and process only RDF schemas that they recognize and ignore all other schemas. This implies that the query results document must be processed as well-formed, but not valid, for applications that do not recognize RDF schemas. All RDUs will contain at a minimum an empty `rdf:Description` element with the `rdf:about` and `rds:urn` elements as required by this specification. It is suggested that resource resolvers maintain URC metadata defined by the Dublin Core.

RDF structure describing a specified resource:

```
<rdf:RDF>
<rdf:Description urn="URN:S1000D:DMC-AE-A-00-40-50-50A-000A-A"
about="http:\\www.examples.org\DMC\AE-A-00-40-50-50A-000A-
A.xml">
<!-- URCs describing the resource -->
</rdf:Description>
</rdf:RDF>
```

### 2.3.3 Uniform resource characteristics

The URC defines a simple metadata structure in the form of a name/value pair. The URC name is the name of the metadata element and the URC value is the data within that metadata element, for a particular resource. Documents will return the name of the URC as the name of the XML tag and the URC value as the text string or subobject contained within that tag. To perform resolution queries the query parameters can be matched against data within the resolution resolver. This simple structure fits well with HTTP queries, which are also described by name/value pairs. The URC must fit most metadata identification needs. More advanced resource description could use RDF schemas. It is suggested URC names are processed as case insensitive without including the namespace prefix.

The following example illustrates a URC with the name of "title" and a value of "Example Resource Title" using the Dublin Core resource schema.

```
<dc:title>Example Resource Title</dc:title>
```

2.3.3.1 URC extended attributes

A URC element can be extended by the resource service to provide additional information about the returned resource characteristics. The following are specified URC extension attributes.

- `rds:name` - The name of the URC as a string. If this attribute is provided the value will override the name implied by the element name.
- `rds:type` - Datatype for the URC. If this attribute is specified the value will describe the datatype of the URC value. Valid types are constrained by the XML Schema datatypes. If this attribute is not specified the URC value will be assume to be of type "xs:string".
- `rds:schema` - This attribute will be a string indicating the resource schema describing the URC.
- `rds:created` - This attribute value will indicate the creation date of the URC.
- `rds:modified` - This attribute value will indicate the modification date of the URC.
- `rds:expiry` - This attribute value will indicate the expiry date of the URC.
- `rds:owner` - This attribute value will be a string indicating the owner of the URC.

### 2.3.4 Messaging

The resolution service can provide additional information to the requester using messages in the response. The message will consist of a text string describing the message and identify the message number and type. Certain messages should be reserved by the interface such as "Not Found", "Invalid Query", etc.

Message numbers must be assigned using the following numbering scheme:

- 000-299 Reserved for RDS errors
- 300-599 Reserved for RDS warnings
- 500-799 Reserved for RDS information
- 800-999 Reserved for future use
- >999 RDS implementation specific messages

*Table 3 RDS service messages*

| Number | Message | Description |
|---|---|---|
| 001 | General Failure. | RDS service had an internal error and could not continue. |
| 002 | Method <%TYPE%> not supported. | RDS service does not support the query type used. %TYPE% parameter values are (`N2R,L2R,N2C,L2C,N2L,L2N,N2N`). |
| 004 | Resource <%NAME%> is unknown. | Requested resource is unknown to the RDS service. %NAME% is the URN or URL of the resource. |
| 005 | Resource <%NAME%> does not exist. | Response if the resolution service is handling HTTP 404 message. %NAME% is the URN or URL of the resource. |
| 301 | Query contained unsupported metadata characteristic, <%URC_NAME%> | The query contained a characteristic that was not supported by the RDS service. %URC_NAME% parameter value will be the name of the unsupported characteristic. |
| 302 | No Matches | This message indicates that the query returned no results. |
| 501 | Resource <%NAME1%> is equivalent to resource <%NAME2%>. | Message in response to NEN/LEL indicating that the passed URIs are equivalent. %NAME1% is the URN or URL of the first resource and %NAME2% is the URN or URL of the second resource. |

| Number | Message | Description |
|---|---|---|
| 502 | Resource <%NAME1%> is not equivalent to resource <%NAME2%>. | Message in response to NEN/LEL indicating that the passed URIs are not equivalent. %NAME1% is the URN or URL of the first resource and %NAME2% is the URN or URL of the second resource. |

**Note**

Text within the '<' and '>' characters will be replaced by a value from the RDS server.

# Chapter 7.7

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## 1 General

Guidance and examples are provided in support of technical concepts.

## 2 Guidance and examples

Guidance and examples are provided in:

- Chap 7.7.1 for the logic engine
- Chap 7.7.2 for the process data module nodes
- Chap 7.7.3 for resource resolution
- Chap 7.7.4 for XLink
- Chap 7.7.5 for XPath

# Chapter 7.7.1

## *Guidance and examples - Logic engine*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

# 1 General

The purpose of this chapter is to provide technical examples of logic engine processing on various process data module structures. It presents process data module markup samples and details how a logic engine is expected to process the samples.

# 2 Guidance and examples

## 2.1 State management

The following examples will illustrate the assignment of state within the logic engine. As the nodes within the process data module are evaluated, certain elements such as element <variableDeclarations>, element <variablePreSet>, element <variablePostSet> and element <dialog> will request the logic engine to modify the state information.

### 2.1.1 Variable declarations

The element <variableDeclarations> defines the variables allocated for a particular process data module. All variables used in processing must first be declared in the element <variableDeclarations> section and are to be identified and referenced by a uniquely defined name.

*Table 2 Variable declaration example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="OnStand" valueType="boolean">` |
| 3 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 4 | `...` |

| Line | Markup |
|---|---|
| 5 | `</dialog>` |
| 6 | `</variable>` |
| 7 | `<variable variableName="BicyclePartnum" valueType="string">` |
| 8 | `<initialize>` |
| 9 | `<expression><stringValue>MC-168119</stringValue></expression>` |
| 10 | `</initialize>` |
| 11 | `</variable>` |
| 12 | `</variableDeclarations>` |

Variable declaration processing:

In the above fragment two variables are declared: *OnStand* and *BicyclePartnum*. Each element <variable> informs the logic engine to allocate a variable in the state information. The variable named *OnStand* (line 2) is allocated as a Boolean type and the value of the variable is set to "noValue" since there is no initialization code. If the variable is accessed as "noValue" the associated dialog (line 3-5) will be displayed to assign a value to the variable. The second variable named *BicyclePartnum* (lines 7-12) is allocated as a string type and is initialized to the value "MC-168119". Variable *BicyclePartnum* is not provided a dialog in this example. While a dialog is optional content of variable, the logic engine has no way of querying for a variable's value on its own without an associated dialog.

## 2.2 Expression evaluation

Expressions are evaluated by the logic engine and are used to perform dynamic state assignment and determine conditional processing. An expression can be any combination of subexpressions.

### 2.2.1 Value expressions

Value expressions are simple functions that return a constant value.

*Table 3 Value expression example*

| Line | Markup |
|---|---|
| 1 | `<expression>` |
| 2 | `<stringValue>MC-168119</stringValue>` |
| 3 | `</expression>` |

Value expression processing:

The above fragment will be processed by extracting the string constant and returning the constant value as a string.

### 2.2.2 Variable expressions

Variable expressions are functions that retrieve the value of a variable from the state table and return the value of the variable as the appropriate data type.

*Table 4 Variable expression example*

| Line | Markup |
|---|---|
| 1 | `<expression>` |
| 2 | `<variableRef variableName="BicyclePartnum"/>` |
| 3 | `</expression>` |

Variable expression processing:

To process the above fragment, the logic engine will look up the value of the previously defined variable named *BicyclePartnum* (line 2) in the state table and return the value of that variable as the result of the expression.

### 2.2.3 Unary expressions

Unary expressions are functions that operate on a single expression and return a value.

*Table 5 Unary expression example*

| Line | Markup |
|---|---|
| 1 | `<expression>` |
| 2 | `<booleanFunction booleanAction="defined"/>` |
| 3 | `<expression>` |
| 4 | `<variableRef variableName="BicyclePartnum"/>` |
| 5 | `</expression>` |
| 6 | `</expression>` |

Unary expression processing:

The above fragment illustrates use of the element <`booleanFunction`> operator (line 2). The logic engine evaluates the inner expression (lines 3-5) by checking for the existence of the previously defined variable named *BicyclePartnum* (line 4) in the state information. If the inner expression returns a value which is not "`noValue`" the outer expression returns the Boolean value "`true`", otherwise the outer expression returns the Boolean value "`false`".

### 2.2.4 Binary expressions

Binary expressions are functions that take two parameters and return a value.

*Table 6 Binary expression example*

| Line | Markup |
|---|---|
| 1 | `<expression>` |
| 2 | `<expression>` |
| 3 | `<variableRef variableName="BicyclePartnum"/>` |
| 4 | `</expression>` |
| 5 | `<numberOperator numberOperation="equal"/>` |

| Line | Markup |
|---|---|
| 6 | `<expression>` |
| 7 | `<stringValue>MC-168119</stringValue>` |
| 8 | `</expression>` |
| 9 | `</expression>` |

Binary expression processing:

The above fragment illustrates use of the element <numberOperator> operator (line 5). The logic engine evaluates the first inner expression (lines 2-4) and returns the value of the previously defined variable named *BicyclePartnum*. Then the logic engine will evaluate the second inner expression (lines 6-8) returning the string value "MC-168119". Finally, the outer expression will be evaluated using the element <numberOperator numberOperation="equal"> operator to compare the previously determined values of the inner expressions. In this case the value of the variable *BicyclePartnum* will be compared to the string "MC-168119". The Boolean value "true" is returned if the expression values are equal, the Boolean value "false" is returned if the expression values are not equal.

### 2.2.5 Combined expressions

Expressions can be combined to form more complex expressions. The level of complexity is theoretically infinite, but can be limited by software constraints.

*Table 7 Combined expression example*

| Line | Markup |
|---|---|
| 1 | `<expression>` |
| 2 | `<expression>` |
| 3 | `<booleanFunction booleanAction="defined"/>` |
| 4 | `<expression>` |
| 5 | `<variableRef variableName="BicyclePartnum"/>` |
| 6 | `</expression>` |
| 7 | `</expression>` |
| 8 | `<booleanOperator booleanOperation="and"/>` |
| 9 | `<expression>` |
| 10 | `<expression>` |
| 11 | `<variableRef variableName="OnStand"/>` |
| 12 | `</expression>` |
| 13 | `<booleanOperator booleanOperation="equal"/>` |
| 14 | `<expression>` |
| 15 | `<booleanValue><trueValue/></booleanValue>` |

| Line | Markup |
|---|---|
| 16 | `</expression>` |
| 17 | `</expression>` |
| 18 | `</expression>` |

Combined expression processing:

The above fragment will be processed by having the logic engine check for the existence of the previously defined variable named *BicyclePartnum* (lines 2-7). The result of this evaluation will be ANDed (line 12) with the result of comparing the variable *OnStand* to the Boolean value "true" (lines 9-17).

## 2.3 Applicability presets and postsets

### 2.3.1 Applicability

The element <applic>, referenced by use of the attribute applicRefId, provides an expression which determines whether the rest of the content of the current node is to be processed. When used within the element <applic>, the element <expression> must evaluate to a Boolean result.

*Table 8 Applicability example*

| Line | Markup |
|---|---|
| 1 | `<referencedApplicGroup>` |
| 2 | `<applic id="appl-001">` |
| 3 | `<expression>` |
| 4 | `<expression>` |
| 5 | `<variableRef variableName="OnStand"/>` |
| 6 | `</expression>` |
| 7 | `<booleanOperator booleanOperation="equal"/>` |
| 8 | `<expression>` |
| 9 | `<booleanValue><trueValue/></booleanValue>` |
| 10 | `</expression>` |
| 11 | `</expression>` |
| 12 | `</applic>` |
| 13 | `</referencedApplicGroup>` |
| | ... |
| 14 | `<variableDeclarations>` |
| 15 | `<variable variableName="OnStand" valueType="boolean"/>` |
| 16 | `</variableDeclarations>` |
| | ... |

| Line | Markup |
|---|---|
| 17 | `<dmNode applicRefId="appl-001">` |
| 18 | `<dmRef>...</dmRef>` |
| 19 | `</dmNode>` |

Applicability processing:

The element <dmNode> (line 17) in the above fragment is processed by the logic engine by first following the applicability statement reference, attribute applicRefId, and evaluating the expression (lines 2-12) which returns a Boolean value depending upon the value of the variable *OnStand* in the state table. If the expression evaluates to the Boolean value "true", then the node which includes element <dmRef> is displayed and presented to the user. If the expression evaluates to the Boolean value "false", then the element <dmRef> is skipped and processing continues after the current element <dmNode>.

### 2.3.2 Preset

An element <variablePreSet> will instruct the logic engine to modify the value of a variable in the state table before processing any node content.

*Table 9 Preset example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="OnStand" valueType="boolean"/>` |
| | `...` |
| 3 | `</variableDeclarations>` |
| | `...` |
| 4 | `<dmNode><!--Secure bike to stand-->` |
| 5 | `<variablePreSet>` |
| 6 | `<assertion>` |
| 7 | `<variableRef variableName="OnStand"/>` |
| 8 | `<expression>` |
| 9 | `<booleanValue><falseValue/></booleanValue>` |
| 10 | `</expression>` |
| 11 | `</assertion>` |
| 12 | `</variablePreSet>` |
| 13 | `<dmRef>...</dmRef>` |
| 14 | `</dmNode>` |

Preset processing:

In the above fragment the element <variablePreSet> (lines 5-12) contains a child element <assertion> that informs the logic engine to modify the state table by assigning the Boolean value "false" to the variable *OnStand*. After the state table is updated the data module identified by the element <dmRef> (line 13) is displayed and presented to the user and processing is halted until the user activates the "Next" function.

### 2.3.3 Postset

An element <variablePostSet> will instruct the logic engine to modify the value of a variable in the state table after the node content is processed.

*Table 10 Postset example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="OnStand" valueType="boolean"/>` |
| | `...` |
| 3 | `</variableDeclarations>` |
| | `...` |
| 4 | `<dmNode><!--Remove bike from maintenance stand-->` |
| 5 | `<dmRef>...</dmRef>` |
| 6 | `<variablePostSet>` |
| 7 | `<assertion>` |
| 8 | `<variableRef variableName="OnStand"/>` |
| 9 | `<expression>` |
| 10 | `<booleanValue><falseValue/></booleanValue>` |
| 11 | `</expression>` |
| 12 | `</assertion>` |
| 13 | `</variablePostSet>` |
| 14 | `</dmNode>` |

Postset processing:

In the above fragment the data module referenced by the element <dmRef> (line 5) will be displayed and processing will halt until the "Next" function is activated. After the user activates the "Next" function the element <variablePostSet> (lines 6-13) is processed with the child element <assertion> informing the logic engine to modify the state information by assigning the Boolean value "false" to the variable *OnStand*.

## 2.4 Step content

The process data module can include step content. The step content is grouped within the element <dmNode>. This grouping defines a screen of information to be presented to the user.

### 2.4.1 Step content grouping

The step content collected within an element <dmNode> is to be displayed as a screen of information to the user. This example illustrates two screens of information.

*Table 11 Step content grouping example*

| Line | Markup |
|---|---|
| 1 | `<dmNode>` |
| 2 | `<proceduralStep><para>This is the first screen of data</para> </proceduralStep>` |
| 3 | `<proceduralStep><para>This step has substeps</para>` |
| 4 | `<proceduralStep><para>First screen, first substep</para> </proceduralStep>` |
| 5 | `<proceduralStep><para>First screen, second substep</para> </proceduralStep>` |
| 6 | `</proceduralStep>` |
| 7 | `</dmNode>` |
| 8 | `<dmNode>` |
| 9 | `<proceduralStep><para>This is the second screen of data</para> </proceduralStep>` |
| 10 | `<proceduralStep><para>This step has substeps</para>` |
| 11 | `<proceduralStep><para>Second screen. first substep</para> </proceduralStep>` |
| 12 | `<proceduralStep><para>Second screen, second substep</para> </proceduralStep>` |
| 13 | `</proceduralStep>` |
| 14 | `</dmNode>` |

Step content grouping processing:

In the above fragment the logic engine would process the first dmNode (lines 1-7) and build a package for IETP display. Expected output can look like:

1 This is the first screen of data

2 This step has substeps

2.1 First screen, first substep

2.2 First screen, second substep

When the user has read the information and wishes to proceed, he would activate the "Next" function. The logic engine would then process the second dmNode (lines 8-14) and build a package for IETP display. Expected output can look like:

1 This is the second screen of data

2 This step has substeps

2.1 Second screen, first substep

2.2 Second screen, second substep

### 2.4.2 Embedded variable references

In this example, the user is presented with the value from a state table variable. This example represents display of a voltage reading. The example shows the voltage reading being set with an assertion, which might have been obtained using an external application interface to a piece of automated test equipment.

*Table 12 Embedded variable reference example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="Voltage" valueType="real"/>` |
| 3 | `</variableDeclarations>` |
| 4 | `...` |
| 5 | `<assertion>` |
| 6 | `<variableRef variableName="Voltage"/>` |
| 7 | `<expression><realValue>12.8</realValue></expression>` |
| 8 | `</assertion>` |
| 9 | `...` |
| 10 | `<dmNode>` |
| 11 | `<proceduralStep>` |
| 12 | `<para>` |
| 13 | `Voltage is <variableRef variableName="Voltage"/> volts.` |
| 14 | `</para>` |
| 15 | `</proceduralStep>` |
| 16 | `</dmNode>` |

Embedded variable reference processing:

In the above fragment the logic engine will create a variable named `Voltage` in the state table (line 2) and will assign the value of "`12.8`" to it (lines 5-8). When processing the dmNode (lines 10-16), the logic engine will retrieve the value of the embedded variableRef (line 13), from the state table, and embed the value directly inline with the text. The dmNode display package will then be displayed. The output would be expected to be displayed similar to the following:

1 Voltage is 12.8 volts.

## 2.5 Dialogs

A dialog will apply state after the user has completed the dialog by activating the "OK" function.

### 2.5.1 Fill-in dialog

A fill-in dialog requests the logic engine to present a dialog to the user containing an input box where the user can enter data.

*Table 13 Fill-in example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="TirePressureFront" valueType="real"/>` |
| | `...` |
| 3 | `</variableDeclarations>` |
| | `...` |
| 4 | `<dmNode><!--Air pressure dialog-->` |
| 5 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 6 | `<userEntry mandatory="1" dataEntryFieldLength="8">` |
| 7 | `<prompt>` |
| 8 | `<paraBasic>Enter front tire air pressure (PSI):</paraBasic>` |
| 9 | `</prompt>` |
| 10 | `<variableRef variableName="TirePressureFront"/>` |
| 11 | `<default>` |
| 12 | `<expression>` |
| 13 | `<realValue>65.0</realValue>` |
| 14 | `</expression>` |
| 15 | `</default>` |
| 16 | `<validate errorMessage="Tire pressure must be between 0.0 and 90.0 PSI">` |
| 17 | `<expression>` |
| 18 | `<expression>` |
| 19 | `<expression>` |
| 20 | `<realValue>0.0</realValue>` |
| 21 | `</expression>` |
| 22 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 23 | `<expression>` |
| 24 | `<variableRef variableName="TirePressureFront"/>` |
| 25 | `</expression>` |
| 26 | `</expression>` |
| 27 | `<booleanOperator booleanOperation="and"/>` |
| 28 | `<expression>` |

| Line | Markup |
|---|---|
| 29 | `<expression>` |
| 30 | `<variableRef variableName="TirePressureFront"/>` |
| 31 | `</expression>` |
| 32 | `<numberOperator numberOperation="lessThanOrEqual"/>` |
| 33 | `<expression>` |
| 34 | `<realValue>90.0</realValue>` |
| 35 | `</expression>` |
| 36 | `</expression>` |
| 37 | `</expression>` |
| 38 | `</validate>` |
| 39 | `</userEntry>` |
| 40 | `</dialog>` |
| 41 | `</dmNode>` |

Fill-in processing:

In the above fragment the element <`dialog`> will instruct the logic engine to display a dialog containing an input box pre-filled with the value "`65,0`" (lines 11-15) which prompts the user with the message "Enter front tire air pressure (PSI):" (lines 7-9). Refer to Fig 1 for tire pressure dialog fill-in example. Processing will halt until the user activates the "OK" function. If the user enters a value outside of the range 0,0 to 90,0 (lines 16-38) an error message informs the user of the acceptable range. Refer to Fig 2 for error message dialog fill-in example. When the user activates the "OK" function with an acceptable value the logic engine will modify the state table by assigning the data entered by the user to the variable identified in the element <`variableRef`> (line 10), in this case the variable named *`TirePressureFront`*.

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*Fig 1 Example tire pressure dialog fill-in*

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*Fig 2 Example error message dialog fill-in*

### 2.5.2 Menu dialog

A menu dialog requests the logic engine to present a dialog to the user containing one or more choices for the user to select. When the user selects a choice, the logic engine will perform the assertion(s) associated with the selected choice. The attribute `choiceSelection` determines whether the user is allowed to select single or multiple choices.

*Table 14 Menu example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="BicyclePartnum" valueType="string"/>` |
| | `...` |
| 3 | `</variableDeclarations>` |
| | `...` |
| 4 | `<dmNode><!--Part number dialog-->` |
| 5 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 6 | `<menu choiceSelection="single" choiceType="select" menuChoiceFlow="list" mandatory="1">` |
| 7 | `<prompt><paraBasic>Select bicycle part number:</paraBasic></prompt>` |
| 8 | `<menuChoice menuChoiceDefaultFlag="0">` |
| 9 | `<prompt><paraBasic>MC-168119</paraBasic></prompt>` |
| 10 | `<assertion>` |
| 11 | `<variableRef variableName="BicyclePartnum"/>` |
| 12 | `<expression>` |
| 13 | `<stringValue>MC-168119</stringValue>` |
| 14 | `</expression>` |
| 15 | `</assertion>` |
| 16 | `</menuChoice>` |
| 17 | `<menuChoice>` |
| 18 | `<prompt><paraBasic>MC-168120</paraBasic></prompt>` |

| Line | Markup |
|---|---|
| 19 | `<assertion>` |
| 20 | `<variableRef variableName="BicyclePartnum"/>` |
| 21 | `<expression>` |
| 22 | `<stringValue>MC-168120</stringValue>` |
| 23 | `</expression>` |
| 24 | `</assertion>` |
| 25 | `</menuChoice>` |
| 26 | `</menu>` |
| 27 | `</dialog>` |
| 28 | `</dmNode>` |

Menu processing:

In the above fragment the element <`dialog`> will instruct the logic engine to display a dialog containing a user prompt "Select bicycle part number:" (line 7) and provide choices of "`MC-168119`" (line 9) and "`MC-168120`" (line 18). Refer to Fig 3 for dialog menu example. Processing will halt until the user selects one of the choices and activates the "OK" function. When the user activates the "OK" function the logic engine will modify the state information by processing the element <`assertion`> of the selected choice (lines 10-15 or lines 19-24) and performing the appropriate modification to the state table.

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*Fig 3 Example part number dialog menu*

## 2.6 External application interface

The external application interface provides a method for the logic engine/IETP to interface with programs external to the IETP. Abilities include sending parameters to the external application, either static values or state table variable values, and receiving data from the external application which update variables in the state table.

This set of examples is built on an imaginary tool for displaying and isolating wiring defects. This tool accepts parameters consisting of a reference designator and pin to designate the wiring circuit to display and returns a status and a defective wire number.

### 2.6.1 Send parameters

Parameters to send to the external application can be specified in two ways as detailed below.

2.6.1.1 Static parameters with name pair

Start the wiring isolation tool with a set reference designator and pin, do not process any results.

*Table 15 Send parameters with name pair example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<dmNode>` |
| 3 | `<externalApplication application="WireTool">` |
| 4 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 5 | `<send>` |
| 6 | `<sendName>RefDes</sendName>` |
| 7 | `<stringValue>52P-H004</stringValue>` |
| 8 | `</send>` |
| 9 | `<send>` |
| 10 | `<sendName>Pin</sendName>` |
| 11 | `<stringValue>4</stringValue>` |
| 12 | `</send>` |
| 13 | `</externalApplication>` |
| 14 | `</dmNode>` |

Static parameters with name pair processing:

In the above example, the logic engine/IETP would invoke the wiring tool with two parameters. The format of the invocation is not specified and will depend on the actual implementation, but a typical executable invocation can look like:

Wired.exe - RefDes 52P-H004 - Pin 4

Another typical invocation can include HyperText Markup Language (HTML):

http://wired&RefDes=52P-H004&Pin=4

Yet another invocation can include XML bundled in a SOAP message:

```
<env:Envelope xmlns:env="http://www.w3.org/2003/05/soap-
envelope">
<env:Header>...</env:Header>
<env:Body>
<p:refdes>52P-H004</p:refdes>
<p:pin>4</p:pin>
</env:Body>
</env:Envelope>
```

Since there are no receive parameters, the logic engine continues processing past the external application invocation (line 14) in this data module node. Processing waits until the "NEXT" function is selected before proceeding.

2.6.1.2 Variable parameters with name pair

Start the wiring isolation tool with a reference designator and pin values obtained from state table variables, do not process any results.

*Table 16 Variable parameters with name pair example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<variableDeclarations>` |
| 3 | `<variable variableName="MyRefDes" valueType="string"/>` |
| 4 | `<variable variableName="MyPin" valueType="integer"/>` |
| 5 | `</variableDeclarations>` |
| | `...` |
| 6 | `<dmNode>` |
| 7 | `<variablePreSet>` |
| 8 | `<assertion>` |
| 9 | `<variableRef variableName="MyRefDes"/>` |
| 10 | `<expression><stringValue>52P-H004</stringValue></expression>` |
| 11 | `</assertion>` |
| 12 | `</variablePreSet>` |
| 13 | `<variablePreSet>` |
| 14 | `<assertion>` |
| 15 | `<variableRef variableName="MyPin"/>` |
| 16 | `<expression><integerValue>4</integerValue></expression>` |
| 17 | `</assertion>` |
| 18 | `</variablePreSet>` |
| 19 | `<externalApplication application="WireTool">` |
| 20 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 21 | `<send>` |
| 22 | `<sendName>RefDes</sendName>` |
| 23 | `<variableRef variableName="MyRefDes"/>` |
| 24 | `</send>` |
| 25 | `<send>` |
| 26 | `<sendName>Pin</sendName>` |
| 27 | `<variableRef variableName="MyPin"/>` |
| 28 | `</send>` |
| 29 | `</externalApplication>` |

| Line | Markup |
|---|---|
| 30 | `</dmNode>` |

Variable parameters with name pair processing:

In the above example as with the previous example, the logic engine/IETP would invoke the wiring tool with two parameters. In this case, on lines 2-5 the author has defined two variables to hold the RefDes and Pin values to be sent as parameters. The values of the variables can be assigned in many ways, but for the example two presets on lines 7-18 set the values in the state information.

On lines 19-29, the external application interface markup defines the two parameters and indicates that the parameter values should be obtained from the state table variables. The format of the invocation is not specified and will depend on the actual implementation, but a typical executable invocation can look the same as the previous example:

Wired.exe -RefDes 52P-H004 -Pin 4

Since there are no receive parameters, the logic engine continues processing past the external application invocation (line 30) in this data module node. Processing waits until the "NEXT" function is selected before proceeding.

2.6.1.3 Parameters without name pair

Start the wiring isolation tool with a set reference designator and pin, do not process any results.

*Table 17 Parameters without name pair example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<dmNode>` |
| 3 | `<variablePreSet>` |
| 4 | `<assertion>` |
| 5 | `<variableRef variableName="MyPin"/>` |
| 6 | `<expression><integerValue>4</integerValue></expression>` |
| 7 | `</assertion>` |
| 8 | `</variablePreSet>` |
| 9 | `<externalApplication application="WireTool">` |
| 10 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 11 | `<send>` |
| 12 | `<stringValue>52P-H004</stringValue>` |
| 13 | `</send>` |
| 14 | `<send>` |
| 15 | `<variableRef variableName="MyPin"/>` |
| 16 | `</send>` |

| Line | Markup |
|---|---|
| 17 | `</externalApplication>` |
| 18 | `</dmNode>` |

Parameters without name pair processing:

The external application does not require send variable name, since it only process the variables in the order received.

In the above example, the logic engine/IETP would invoke the wiring tool with two parameters in the order received. The format of the invocation is not specified and will depend on the actual implementation, but a typical executable invocation can look like:

Wired.exe 52P-H004 4

Since there are no receive parameters, the logic engine continues processing past the external application invocation (line 18) in this data module node. Processing waits until the "NEXT" function is selected before proceeding.

### 2.6.2 Return values

Return values can be specified in three different formats as detailed below. For the return values examples, the example of a wiring tool will continue to be used, but in these cases the wiring tool has the capability for the user to select the defective wire number found during isolation. The wiring tool will report the status, defective wire number A1000A26, and bundle 20201.

For these examples the wiring tool returns the following XML message:

```
<wireToolResults>
<status>Isolated</status>
<wireNumber>A1000A26</wireNumber>
<bundle>20201</bundle>
</wireToolResults>
```

#### 2.6.2.1 Return values receive by order method

In this method all return results must be accounted for an in the same order as the return results.

*Table 18 Return values receive by order example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<variableDeclarations>` |
| 3 | `<variable variableName="RtnStatus" valueType="string"/>` |
| 4 | `<variable variableName="RtnWireno" valueType="string"/>` |
| 5 | `<variable variableName="RtnBundle" valueType="string"/>` |
| 6 | `</variableDeclarations>` |
| | `...` |
| 7 | `<dmNode>` |

| Line | Markup |
|---|---|
| 8 | `<externalApplication application="WireTool">` |
| 9 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 10 | `<send>` |
| 11 | `<sendName>RefDes</sendName>` |
| 12 | `<stringValue>52P-H004</stringValue>` |
| 13 | `</send>` |
| 14 | `<send>` |
| 15 | `<sendName>Pin</sendName>` |
| 16 | `<stringValue>4</stringValue>` |
| 17 | `</send>` |
| 18 | `<receiveValue>` |
| 19 | `<variableRef variableName="RtnStatus"/>` |
| 20 | `</receiveValue>` |
| 21 | `<receiveValue>` |
| 22 | `<variableRef variableName="RtnWireno"/>` |
| 23 | `</receiveValue>` |
| 24 | `<receiveValue>` |
| 25 | `<variableRef variableName="RtnBundle"/>` |
| 26 | `</receiveValue>` |
| 27 | `</externalApplication>` |
| 28 | `</dmNode>` |

Receive by order method processing:

Using the receive by order method on lines 18-26, the logic engine will take the values received from the external application in the order received and assign them to the variables referenced within the receive markup.

In this example, after the WireTool returns, the state information variables would be updated to the following values:

- *RtnStatus* = "Isolated"
- *RtnWireno* = "A1000A26"
- *RtnBundle* = "20201"

2.6.2.2 Return values receive by position method

In this method return results are accounted for by position, all results do not have to be accounted for. This example only saves the wireNumber and bundle return values. The status return value is not used.

*Table 19 Return values receive by position example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<variableDeclarations>` |
| 3 | `<variable variableName="RtnWireno" valueType="string"/>` |
| 4 | `<variable variableName="RtnBundle" valueType="string"/>` |
| 5 | `</variableDeclarations>` |
| | `...` |
| 6 | `<dmNode>` |
| 7 | `<externalApplication application="WireTool">` |
| 8 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 9 | `<send>` |
| 10 | `<sendName>RefDes</sendName>` |
| 11 | `<stringValue>52P-H004</stringValue>` |
| 12 | `</send>` |
| 13 | `<send>` |
| 14 | `<sendName>Pin</sendName>` |
| 15 | `<stringValue>4</stringValue>` |
| 16 | `</send>` |
| 17 | `<receiveByPosition>` |
| 18 | `<returnedValuePosition>3</returnedValuePosition>` |
| 19 | `<variableRef variableName="RtnBundle"/>` |
| 20 | `</receiveByPosition>` |
| 21 | `<receiveByPosition>` |
| 22 | `<returnedValuePosition>2</returnedValuePosition>` |
| 23 | `<variableRef variableName="RtnWireno"/>` |
| 24 | `</receiveByPosition>` |
| 25 | `</externalApplication>` |
| 26 | `</dmNode>` |

Receive by position method processing:

Using the receive by position method, the logic engine will take the values received from the external application in the order received and assign them to the variables referenced within the receive by position markup, lines 17-24, as indicate by the position indicated in element <`returnedValuePosition`>. Note in this example that only two of the three return values are saved and the two that are saved are listed in the markup in reverse order as they

are received from the external application. The return value in the first position is not referenced in the markup, therefore it is not processed or saved in the state table.

In this example, after the WireTool returns, the state table variables would be updated to the following values:

- *RtnWireno* = "A1000A26"
- *RtnBundle* = "20201"

2.6.2.3 Return values receive by name method

In this method return results are accounted for by name, all results do not have to be accounted for. This example only saves the wireNumber and bundle return values. The status return value is not used.

*Table 20 Return values receive by name example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY WireTool SYSTEM "file://Wired/Wired.exe" NDATA exe>` |
| | `...` |
| 2 | `<variableDeclarations>` |
| 3 | `<variable variableName="RtnWireno" valueType="string"/>` |
| 4 | `<variable variableName="RtnBundle" valueType="string"/>` |
| 5 | `</variableDeclarations>` |
| | `...` |
| 6 | `<dmNode>` |
| 7 | `<externalApplication application="WireTool">` |
| 8 | `<paraBasic>Isolate Wiring Defect</paraBasic>` |
| 9 | `<send>` |
| 10 | `<sendName>RefDes</sendName>` |
| 11 | `<stringValue>52P-H004</stringValue>` |
| 12 | `</send>` |
| 13 | `<send>` |
| 14 | `<sendName>Pin</sendName>` |
| 15 | `<stringValue>4</stringValue>` |
| 16 | `</send>` |
| 17 | `<receiveByName>` |
| 18 | `<returnedValueName>bundle</returnedValueName>` |
| 19 | `<variableRef variableName="RtnBundle"/>` |
| 20 | `</receiveByName>` |
| 21 | `<receiveByName>` |
| 22 | `<returnedValueName>wireNumber</returnedValueName>` |

| Line | Markup |
|---|---|
| 23 | `<variableRef variableName="RtnWireno"/>` |
| 24 | `</receiveByName>` |
| 25 | `</externalApplication>` |
| 26 | `</dmNode>` |

Receive by name method processing:

In order to use the receive by name method, the external application must provide a return consisting of name/value pairs which the logic engine can use to match names with values.

Using the receive by name method, the logic engine will take the name/value pairs received from the external application and assign them to the variables referenced within the receive by name markup, lines 17-24, as indicated by the name indicated in element `<returnedValueName>`. Note in this example that only two of the three return values are saved and the two that are saved are listed in the markup in reverse order as they are received from the external application.

In this example, after the WireTool returns, the state table variables would be updated to the following values:

- *RtnWireno* = "A1000A26"
- *RtnBundle* = "20201"

### 2.6.3 External application cancel operation

This sample is included to illustrate how data can be structured in a way to provide fault tolerance when using the external application interface. In this example, assume that we are testing a piece of equipment where the test can be run both automated and manually. The automated method has the possibility of an error condition where the expected return value is never returned. The logic engine/IETP will, by default, wait forever for the return value.

*Table 21 Return values receive by name example*

| Line | Markup |
|---|---|
| 1 | `<!ENTITY AutoTest SYSTEM "multimeter/8842A-9/8842a.exe">` |
| | `...` |
| 2 | `<variableDeclarations>` |
| 3 | `<variable variableName="Reading" valueType="real"/>` |
| 4 | `<variable variableName="TestType" valueType="string"/>` |
| 5 | `</variableDeclarations>` |
| | `...` |
| 6 | `<dmNode>` |
| 7 | `<dialog submitCaption="ok01" cancelCaption="ca01">` |
| 8 | `<menu choiceSelection="single" choiceType="select" menuChoiceFlow="list" mandatory="1">` |
| 9 | `<prompt><paraBasic>Choose the type of test:</paraBasic></prompt>` |

| Line | Markup |
|---|---|
| 10 | <menuChoice><prompt><paraBasic>Automated</paraBasic></prompt> |
| 11 | <assertion> |
| 12 | <variableRef variableName="TestType"/> |
| 13 | <expression><stringValue>Auto</stringValue></expression> |
| 14 | </assertion> |
| 15 | </menuChoice> |
| 16 | <menuChoice><prompt><paraBasic>Manual</paraBasic></prompt> |
| 17 | <assertion> |
| 18 | <variableRef variableName="TestType"/> |
| 19 | <expression><stringValue>Manual</stringValue></expression> |
| 20 | </assertion> |
| 21 | </menuChoice> |
| 22 | </menu> |
| 23 | </dialog> |
| 24 | </dmNode> |
| 25 | <dmIf> |
| 26 | <expression> |
| 27 | <expression><variableRef variableName="TestType"/> </expression> |
| 28 | <stringOperator stringOperation="equal"/> |
| 29 | <expression><stringValue>Auto</stringValue></expression> |
| 30 | </expression> |
| 31 | <dmThenSeq> |
| 32 | <dmNode> |
| 33 | <externalApplication application="AutoTest">...</externalApplication> |
| 34 | </dmNode> |
| 35 | </dmThenSeq> |
| 36 | <dmElseSeq> |
| 37 | <dmNode> |
| 38 | <proceduralStep> |
| 39 | <para>Steps for taking manual reading</para> |
| 40 | </proceduralStep> |
| 41 | </dmNode> |

| Line | Markup |
|---|---|
| 42 | `</dmElseSeq>` |
| 43 | `</dmIf>` |

External application cancel operation processing:

– In this scenario, the user is first presented with a dialog (lines 7-23) (refer to Fig 4 for dialog menu example) to choose either the automated test or manual test. If the user selects automated the state table variable *TestType* is updated with the value "Auto".

Next, the if statement (line 25) expression (lines 26-30) is evaluated and the then branch (lines 31-35) is executed and the external application is invoked.

Assuming the external application has an error and does not return a result, the user would perform the cancel function.

The logic engine would perform a previous function and back up to the dialog (lines 7-23) again asking the user to choose either the automated test or manual test. At this point, the user can choose to attempt the automated test again, or proceed to bypass it with the manual test. The logic engine would reevaluate the if statement (line 25) and process the appropriate then or else leg of the data.

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*Fig 4 Example test method dialog menu*

# Chapter 7.7.2

## *Guidance and examples - Process data module nodes*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

## 1 General

The purpose of this chapter is to provide technical examples of the process data module nodes to illustrate the usage of interactivity. It contains examples which demonstrate basic functionality. The examples are not intended to express the full system capabilities.

## 2 Process data module node guidance and examples

### 2.1 Data module node

The element `<dmNode>` represents a reference to another data module, a dialog or a sequence.

*Table 2 Node example*

| Line | Markup |
|---|---|
| 1 | `<dmNode><!--Inspect bicycle-->` |

| Line | Markup |
|---|---|
| 2 | `<dmRef>...</dmRef>` |
| 3 | `</dmNode>` |

Node processing:

In the above example the logic engine will display the reference data module indicated by the element `<dmRef>` and processing will halt until the user selects the "Next" function.

## 2.2 Data module node alternates

The element `<dmNodeAlt>` represents a collection of data module nodes where only one node in the collection is displayed based on node preconditions.

*Table 3 Node alternates example*

| Line | Markup |
|---|---|
| 1 | `<referencedApplicGroup>` |
| 2 | `<applic id="appl-001">` |
| 3 | `<expression>` |
| 4 | `<expression>` |
| 5 | `<variableRef variableName="BicyclePartnum"/>` |
| 6 | `</expression>` |
| 7 | `<stringOperator stringOperation="equal"/>` |
| 8 | `<expression>` |
| 9 | `<stringValue>MC-168119</stringValue>` |
| 10 | `</expression>` |
| 11 | `</expression>` |
| 12 | `</applic>` |
| 13 | `</referencedApplicGroup>...` |
| 14 | `<variableDeclarations>` |
| 15 | `<variable name="BicyclePartnum" valueType="string"/>...` |
| 16 | `...</variableDeclarations>` |
| 17 | `<dmNodeAlt><!--Adjust brakes-->` |
| 18 | `<dmNode applicRefId="appl-001"><!--Adjust side-pull brakes-->` |
| 19 | `<dmRef>...</dmRef>` |
| 20 | `</dmNode>` |
| 21 | `<dmNode><!--Adjust center-pull brakes-->` |

| Line | Markup |
|---|---|
| 22 | `<dmRef>...</dmRef>` |
| 23 | `</dmNode>` |
| 24 | `</dmNodeAlt>` |

Node alternates processing:

The logic engine will begin examining each child element <dmNode> in sequence and evaluate each element <applic>. The logic engine will continue examining each element <dmNode> in sequence until an element <applic><expression> construct is found that evaluates to the Boolean value 'true'. The first element <dmNode> containing an element <applic> that evaluates to the Boolean value 'true', or the first element <dmNode> without an element <applic>, will have its content displayed.

In the above example, if the value of the variable named "BicyclePartnum" equals "MC-168119" (lines 2-12) then the associated element <dmRef> made by attribute applicRefId (line 19) is displayed and processing is halted. Otherwise the element <dmRef> of the second node (line 22) is displayed since it does not contain the attribute applicRefId. This data module node (lines 21-23) could be considered similar to the default case in a programmatic switch type construct.

**Note**

If none of applicability referenced by attribute **applicRefId** evaluates to the Boolean value 'true' processing continues after the element <dmNodeAlt>.

## 2.3 Data module node sequence

The element <dmSeq> represents a collection of data module nodes that are processed sequentially. The logic engine will process each node in sequential order until the end of the sequence is reached.

*Table 4 Node sequence example*

| Line | Markup |
|---|---|
| 1 | `<referencedApplicGroup>` |
| 2 | `<applic id="appl-001">` |
| 3 | `<expression>` |
| 4 | `<expression>` |
| 5 | `<variableRef variableName="TirePressure"/>` |
| 6 | `</expression>` |
| 7 | `<numberOperator numberOperation="lessThan"/>` |
| 8 | `<expression>` |
| 9 | `<realValue>60,0</realValue>` |
| 10 | `</expression>` |
| 11 | `</expression>` |

| Line | Markup |
|---|---|
| 12 | `</applic>` |
| 13 | `</referencedApplicGroup>...` |
| 14 | `<variableDeclarations>` |
| 15 | `<variable variableName="TirePressure" valueType="real"/>` |
| 16 | `...</variableDeclarations>` |
| 17 | `<dmSeq><!--Monthly periodic maintenance-->` |
| 18 | `<dmNode><!--Visually inspect-->` |
| 19 | `<dmRef>...</dmRef>` |
| 20 | `</dmNode>` |
| 21 | `<dmNode><!--Check tire pressure-->` |
| 22 | `<dialog>...</dialog>` |
| 23 | `</dmNode>` |
| 24 | `<dmNode applicRefId="appl-001"><!--Inflate tires-->` |
| 25 | `<dmRef>...</dmRef>` |
| 26 | `</dmNode>` |
| 27 | `<dmNode><!--Lubricate chain-->` |
| 28 | `<dmRef>...</dmRef>` |
| 29 | `</dmNode>` |
| 30 | `<dmNode><!--Clean bicycle-->` |
| 31 | `<dmRef>...</dmRef>` |
| 32 | `</dmNode>` |
| 33 | `</dmSeq>` |

Node sequence processing:

The logic engine will evaluate each child element <`dmNode`> in sequence and display the content as appropriate. The first node content, "Visual inspection", (lines 18-20) will be displayed and processing will halt until the user activates the "Next" function. The next function continues processing to the second node, "Check tire pressure" (lines 21-23), and a dialog is displayed with processing again halting for user input. This dialog is assumed to set the variable named "TirePressure". When the user activates the dialog "OK" function the "Inflate tires" node (lines 24-26) is processed, the attribute `applicRefId` is resolved and the applicability statement element <`applic`><`expression`> (lines 2-12) is evaluated. If the "TirePressure" variable is less than the real value of "`60,0`" then the associated element <`dmRef`> (line 25) is displayed and processing is halted, otherwise processing continues. The "Lubricate chain" (lines 27-29) and "Clean bicycle" (lines 30-33) nodes are then displayed with

processing halting as appropriate until the user activates the "Next" function. Processing will then continue past the element <dmSeq> node.

## 2.4 Data module node if

The element <dmIf> will instruct the logic engine to branch processing between "then" or "else" branches, behaving as a programmatic "if" construct.

*Table 5 Node if example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable name="BicyclePartnum" valueType="string"/>` |
| 3 | `...</variableDeclarations>...` |
| 4 | `<dmIf><!--Remove/replace brakes-->` |
| 5 | `<expression>` |
| 6 | `<expression>` |
| 7 | `<variableRef variableName="BicyclePartnum"/>` |
| 8 | `</expression>` |
| 9 | `<stringOperator stringOperation="equal"/>` |
| 10 | `<expression>` |
| 11 | `<stringValue>MC-168119</stringValue>` |
| 12 | `</expression>` |
| 13 | `</expression>` |
| 14 | `<dmThenSeq><!--Replace side-pull brakes-->` |
| 15 | `<dmNode><!--Remove side-pull brakes-->` |
| 16 | `<dmRef>...</dmRef>` |
| 17 | `</dmNode>` |
| 18 | `<dmNode><!--Repair side-pull brakes-->` |
| 19 | `<dmRef>...</dmRef>` |
| 20 | `</dmNode>` |
| 21 | `<dmNode><!--Install side-pull brakes-->` |
| 22 | `<dmRef>...</dmRef>` |
| 23 | `</dmNode>` |
| 24 | `</dmThenSeq>` |
| 25 | `<dmElseSeq><!--Replace center-pull brakes-->` |
| 26 | `<dmNode><!--Remove center-pull brakes-->` |
| 27 | `<dmRef>...</dmRef>` |

| Line | Markup |
|---|---|
| 28 | `</dmNode>` |
| 29 | `<dmNode><!--Repair center-pull brakes-->` |
| 30 | `<dmRef>...</dmRef>` |
| 31 | `</dmNode>` |
| 32 | `<dmNode><!--Install center-Pull Brakes-->` |
| 33 | `<dmRef>...</dmRef>` |
| 34 | `</dmNode>` |
| 35 | `</dmElseSeq>` |
| 36 | `</dmIf>` |

Node if processing:

In the above example the logic engine will evaluate the child element <expression> (lines 5-13). If the element <expression> construct evaluates to the Boolean value 'true' each node in the element <dmThenSeq> (lines 14-24) will be processed in sequential order. If the element <expression> construct evaluates to the Boolean value 'false' the nodes in the element <dmElseSeq> (lines 25-35) will be evaluated in sequential order. If the element <dmElseSeq> does not exist then processing will continue beyond the element <dmIf>.

## 2.5 Data module node loop

The element <dmLoop> will iterate a sequence of data module nodes as long as condition is met. The logic engine will examine the child expression and if it evaluates to the Boolean value 'true' the child nodes will be processed in sequence. When the end of the sequence is reached the logic engine will reexamine the expression and reiterate the sequence if the expression continues to evaluate to the Boolean value 'true' . Otherwise processing will continue beyond the element <dmLoop>. Node loops can also contain assertions at the end of the loop node sequence to increment or otherwise assign variable values to modify the condition after each pass of the loop. The post assertions are not illustrated in this example.

*Table 6 Node loop example*

| Line | Markup |
|---|---|
| 1 | `<variableDeclarations>` |
| 2 | `<variable variableName="ChainPlay" valueType="real">` |
| 3 | `<initialize>` |
| 4 | `<expression><realValue>100,0</realValue></expression>` |
| 5 | `</initialize>` |
| 6 | `</variable>...` |
| 7 | `...</variableDeclarations>` |
| 8 | `<dmLoop><!--Adjust chain-->` |

| Line | Markup |
|---|---|
| 9 | `<expression>` |
| 10 | `<expression>` |
| 11 | `<variableRef variableName="ChainPlay"/>` |
| 12 | `</expression>` |
| 13 | `<numberOperator numberOperation="greaterThan"/>` |
| 14 | `<expression>` |
| 15 | `<stringValue>20,0</stringValue>` |
| 16 | `</expression>` |
| 17 | `</expression>` |
| 18 | `<dmSeq>` |
| 19 | `<dmNode><!--Adjust chain-->` |
| 20 | `<dmRef>...</dmRef>` |
| 21 | `</dmNode>` |
| 22 | `<dmNode><!--Measure chain play-->` |
| 23 | `<dialog>...</dialog>` |
| 24 | `</dmNode>` |
| 25 | `</dmSeq>` |
| 26 | `</dmLoop>` |

Node loop processing:

This example illustrates a loop where the chain is adjusted then measured repeatedly until the chain play is less than 20 mm.

The "ChainPlay" variable (lines 2-6) is initialized to 100,0 when added to the state information. Processing of the element <dmLoop> begins by evaluating the element <expression> (lines 9-17) which checks if the "ChainPlay" variable (initialized to 100,0) is greater than 20,0, returning the Boolean value ‘true’. The element <dmSeq> (lines 18-25) is then processed. The "Adjust chain" node (lines 19-21) is displayed and processing will halt until the user activates the "Next" function. The next function continues processing to the second node, "Measure chain play" (lines 22-24), and a dialog is displayed with processing again halting for user input. This dialog is assumed to set the variable named "ChainPlay". When the user activates the dialog "OK" function the bottom of the loop is hit and processing returns to the element <expression> (lines 9-17). This continues until the expression evaluates to the Boolean value ‘false‘.

# Chapter 7.7.3

## *Guidance and examples - Resource resolution*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| None | |

# 1 General

The purpose of this chapter is to provide guidance and examples of resource resolution. It contains examples of resource resolution.

# 2 Guidance and examples

## 2.1 Sample resource resolution dataset

The following is a sample dataset to use in the example queries. In this example, three metadata characteristics are defined:

- title
- issue
- language

As a default, the resource service in this example will first resolve the resource with the highest issue and then resolve the English format if a resource conflict exists. Implementations can use other methods of resolving resource conflicts.

*Table 2 resource resolution dataset*

| URN | URL | Title | Issue-Inwork | Language-Country |
|---|---|---|---|---|
| URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A | www.s1000d.org/DMC-YY-A-53-25-10-02A-999A-A_I-001_W-00_L-EN_C-US.xml | Example instance | 001-00 | EN-US |
| URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A | www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-01_L-EN_C-GB.xml | English instance Issue 2 | 002-01 | EN-GB |
| URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A | www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-001_W-00_L-EN_C-US.xml | English instance Issue 1 | 001-00 | EN-US |
| URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A | www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-01_L-FR_C-FR.xml | French instance Issue 2 | 002-01 | FR-FR |
| URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A | www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-001_W-00_L-FR_C-FR .xml | French instance Issue 1 | 001 | FR |
| URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A_I-002_L-EN | www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-00_L-SX_C-US.xml | Simplified English instance Issue 2 | 002-00 | SX-US |
| URN:S1000D:ICN-1B-B-311501-B-K0999-00352-A-01-1 | www.s1000d.org/ICN-1B-B-311501-B-K0999-00352-A-01-1.cgm | Example graphic | | |

## 2.2 Query to redirect to a resource

The following query will redirect to the resource:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A
```

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A
```

Redirects to the URL:

```
http://www.s1000d.org/DMC-YY-A-53-25-10-02A-999A-A_I-001_W-00_L-EN_C-US.xml
```

## 2.3 Query to resolve a resource characteristic

The following query will return the "Issue" characteristic of the resource:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A
```

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A&Issue
```

The following XML instance will be returned:

```
<rds:RDS>
<rdf:RDF>
<rdf:Description
```

```
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-999A-A.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A">
<issueInfo issueNumber="001" inWork="00"/>
<language languageIsoCode="en" countryIsoCode="US"/>
</rdf:Description>
</rdf:RDF>
</rds:RDS>
```

## 2.4 Query for resources with multiple formats

The following query will redirect to the resource:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A
```

which exists in multiple formats. The resource indicated as the default will be returned.

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-520A-A
```

Redirects to the URL:

```
http://www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-01_L-
EN_C-GB.xml
```

## 2.5 Query to resolve a resource with multiple formats by characteristic

The following query will redirect to the resource:

URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A

which exists in multiple formats. The resource service is requested to return the second issue in French.

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-520A-
A&Issue=002&Work=01&Language=FR&Country=FR
```

Redirects to the URL:

```
http://www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-01_L-
FR_C-FR.xml
```

## 2.6 Query to resolve a conflicted resource

The following query will return the "Title" characteristic for the default format of the resource:

URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A

Since a conflict exists with multiple documents returned for the query, the resolution rules for the example resource resolution service will determine what resource description will be returned. In this example, the defined rules dictate that the highest issue of the resource in English or the resource that best matches those criteria will be returned. Within the dataset the document "English instance Issue 2" meets the conflict criteria.

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-520A-A&Title
```

The following XML instance will be returned:

```
<rds:RDS>

<rdf:RDF>
<rdf:Description
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_L-
EN.xml"
```

```
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A">
<title>Simplifiefed English instance Issue 2</title>
<issueInfo issueNumber="002" inWork="00"/>
<language languageIsoCode="sx" countryIsoCode="US"/>
</rdf:Description>
</rdf:RDF>
</rds:RDS>
```

## 2.7 Query to return results describing multiple formats

The following query will return the "Title" characteristic for all formats of the resource:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A
```

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-520A-A&multiple&Title
```

The following XML instance will be returned:

```
<rds:RDS>
<rdf:RDF>
<rdf:Description
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-
00_L-SX_C-US.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A">
<title>Simplified English instance Issue 2</title>
<issueInfo issueNumber="002" inWork="00"/>
<language languageIsoCode="sx" countryIsoCode="US"/>
</rdf:Description>
</rdf:RDF>
<rdf:RDF>
<rdf:Description
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-001_W-
00_L-EN_C-US.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A">
<title>English instance Issue 1</title>
<issueInfo issueNumber="001" inWork="00"/>
<language languageIsoCode="en" countryIsoCode="US"/>
</rdf:Description>
</rdf:RDF>
<rdf:RDF>
<rdf:Description
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-002_W-
01_L-FR_C-FR.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A">
<title>French instance Issue 2</title>
<issueInfo issueNumber="002" inWork="01"/>
<language languageIsoCode="fr" countryIsoCode="FR"/>
</rdf:Description>
</rdf:RDF>
<rdf:RDF>
<rdf:Description
rdf:about="www.s1000d.org/DMC-YY-A-53-25-10-02A-520A-A_I-001_W-
01_L-FR_C-FR.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-520A-A">
<title>French instance Issue 1</title>
<issueInfo issueNumber="001" inWork="01"/>
<language languageIsoCode="fr" countryIsoCode="FR"/>
</rdf:Description>
</rdf:RDF>
</rds:RDS>
```

## 2.8 Query to resolve all characteristics of a resource

The following query will return all characteristics of the resource:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A
```

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-999A-A&allurcs
```

The following XML instance will be returned:

```
<rds:RDS>
<rdf:RDF>
<rdf:Description
rdf:about="http://www.s1000d.org/DMC-YY-A-53-25-10-02A-999A-A_I-
001_W-00_L-EN_C-US.xml"
rds:urn="URN:S1000D:DMC-YY-A-53-25-10-02A-999A-A">
<title>Example instance 1</title>
<issueInfo issueNumber="001" inWork="00"/>
<language languageIsoCode="en" countryIsoCode="US"/>
</rdf:Description>
</rdf:RDF>
</rds:RDS>
```

## 2.9 Query to resolve the URL of a resource

The following query will return the URL of the resource:

```
URN:S1000D:ICN-1B-B-311501-B-K0999-00352-A-01-1
```

The attribute `rdf:about` within the element <`rdf:Description`> will contain the resource url location. Notice that the URL and URN are always returned for any resource description.

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:ICN-
1B-B-311501-B-K0999-00352-A-01-1&url
```

The following XML instance will be returned:

```
<rds:RDS>
<rdf:RDF>
<rdf:Description
rdf:about="http://www.s1000d.org/ICN-1B-B-311501-B-K0999-00352-
A-01-1.cgm"
rds:urn="URN:S1000D:ICN-1B-B-311501-B-K0999-00352-A-01-1">
</rdf:Description>
</rdf:RDF>
</rds:RDS>
```

## 2.10 Query that returns an error message

The following query requests an unknown instance:

```
URN:S1000D:DMC-YY-A-53-25-10-02A-720A-A
```

```
http://www.s1000d.org/resolution/resolveUrn?urn=URN:S1000D:DMC-
YY-A-53-25-10-02A-720A-A&allurcs
```

The following XML `instance` will be returned:

```
<rds:RDS>
<rds:Message number="004" type="E">The resource URN:S1000D:DMC-
YY-A-53-25-10-02A-720A-A is unknown.</rds:Message>
</rds:RDS>
```

# Chapter 7.7.4

## *Guidance and examples - XLink*

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## 1 General

The purpose of this chapter is to provide guidance and examples of the use of the XLink attributes within the various reference structures.

Linkage within an IETP will be specified using XLink attributes within the XML repository. Links must use the URN of the resource referenced, and can be created automatically from the content of element <dmRef>, element <catalogSeqNumberRef>, element <graphic>, element <symbol> and element <internalRef>. The attribute xlink:type will have the value "simple" and the attribute xlink:href will contain the URN of the requested resource. All examples are provided for illustration only.

## 2 Guidance and examples

### 2.1 DMC reference

The data module link URN must be created from the value of the subelements of the element <dmRef>.

```
<dmRef
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
```

```
xlink:title="IETP resource resolution"
xlink:href="URN:S1000D:DMC-AE-A-07-07-0400-00A-000A-A">
<dmRefIdent>
<dmCode modelIdentCode="AE" systemDiffCode="A"
systemCode="07" subSystemCode="0" sub-subsystemCode="7"
assyCode="0400" disassyCode="00" disassyCodeVariant="A"
infoCode="000" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techName>IETP resource resolution</techName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
```

Example data module code display transformation to HyperText Markup Language (HTML):

```
<a href="DMC-AE-A-07-07-0400-00A-000A-A.XML">
AE-A-07-07-0400-00A-000A-A</a>
```

## 2.2 PMC reference

The publication module link URN must be the publication module code.

```
<pmRef
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:title="Example publication module"
xlink:href="URN:S1000D:PMC-AE-I9005-00001-00">
<pmRefIdent>
<pmCode modelIdentCode="AE" pmIssuer="I9005"
pmNumber="00001" pmVolume="00"/>
</pmRefIdent>
</pmRef>
```

Example publication module code display transformation to HTML:

```
<a href="PMC-AE-I9005-00001-00.XML">PMC-AE-I9005-00001-00</a>
```

## 2.3 CSN reference

The link URN build from an implicit catalogue sequence number must consist of attribute `catalogSeqNumberValue` and attribute `itemSeqNumberValue` of element <`catalogSeqNumberRef`>. Spaces (blanks) must be replaced by dashes (hyphens).

```
<catalogSeqNumberRef
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="new"
xlink:title="Part: XXXX"
xlink:href="URN:S1000D:CSN-53251001-001-00A"
catalogSeqNumberValue="53251001 001 "
itemSeqNumberValue="00A"/>
```

Example CSN display transformation to HTML:

```
<a href = "javascript::openwindow('YY-A-53-25-10-010-999A-
A.XML#CSN-53251001-001-00A')">53251001-001-</a>
```

The CSN reference link URN build from an explicit element <`dmRef`> (contained in the <`catalogSeqNumberRef`>) is build like any <`dmRef`> based link. A reference can target

the referred item/fragment in the IPD data module, where the item has an id value of eg "CSN-0001",

```
<catalogSeqNumberRef
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="new"
xlink:title="Part: XXXX"
xlink:href="URN:S1000D:DMC-YY-A-53-25-10-010-999A-A#CSN-0001"
catalogSeqNumberValue="53251001 001 "
itemSeqNumberValue="00A"/>
```

Example CSN display transformation to HTML:

```
<a href = "javascript::openwindow('YY-A-53-25-10-010-999A-A.XML#
CSN-0001')">53251001-001-</a>
```

## 2.4 Graphic reference

The graphic link URN must be the attribute `infoEntityIdent` of element <graphic>.

```
<figure id="fig001">
<title>LH multifunction head down display</title>
<graphic
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="new"
xlink:href="URN:S1000D:ICN-1B-B-311501-B-K0999-00352-A-01-1"
infoEntityIdent="ICN-1B-B-311501-B-K0999-00352-A-01-1">
</graphic>
</figure>
```

Example ICN display transformation to HTML:

```
<a href="ICN-1B-B-311501-B-K0999-00352-A-01-1.CGM"
target="_blank">ICN-1B-B-311501-B-K0999-00352-A-01-1</a>
```

## 2.5 Symbol reference

The symbol link URN must be the attribute `infoEntityIdent` of element <symbol>.

```
<symbol
xlink:type="simple"
xlink:actuate="onLoad"
xlink:show="embed"
xlink:href="URN:S1000D:ICN-AE-A-316200-0-F0214-00352-A-01-1"
infoEntityIdent="ICN-AE-A-316200-0-F0214-00352-A-01-1"/>
```

Example ICN display transformation to HTML:

```
<img src="ICN-1B-B-311501-B-K0999-00352-A-01-1.CGM"></img>
```

## 2.6 External reference with a target

The data module link URN is created from the value of the subelements of the element <dmRef>.

In the following example the link points to a figure in another external data module with `id="fig001".`

```
<dmRef referredFragment="URN:S1000D:DMC-AE-A-06-02-0301-00A-
040A-A#fig001"
```

```
xlink:type="simple"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="URN:S1000D:DMC-AE-A-06-02-0301-00A-040A-A#fig001">
<dmRefIdent>
<dmCode modelIdentCode="AE" systemDiffCode="A"
systemCode="06" subSystemCode="0" sub-subsystemCode="2"
assyCode="0301" disassyCode="00" disassyCodeVariant="A"
infoCode="040" infoCodeVariant="A" itemLocationCode="A"/>
</dmRefIdent>
<dmRefAddressItems>
<dmTitle>
<techName>Layout front matter </techName>
<infoName> Rules and examples</infoName>
</dmTitle>
</dmRefAddressItems>
</dmRef>
```

Example data module code display transformation to HTML:

```
<a href=
"DMC-AE-A-06-02-0301-00A-040A-A.XML#fig001">
Layout front matter Rules and examples</a>
```

## 2.7 Internal reference

Internal linkage is defined by attribute `internalRefTargetType` of element `<internalRef>`.

In the following example the link points to a figure in the same data module with `id="fig001".`

```
<internalRef internalRefId="fig001"
internalRefTargetType="figure"
xlink:actuate="onRequest"
xlink:show="replace"
xlink:href="#fig001"></internalRef>
```

Example reference display transformation to HTML:

```
<a href="#fig001"></a>
```

# Chapter 7.7.5

## *Guidance and examples - XPath*

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| Chap 4.9.5 | Publication and SCORM content package management - SCORM content package module |

## 1 General

The element <xPaths> is used within the SCORM Content Package to list not just the data modules that are referenced within the learning content, but also the data inside the data module.

## 2 XPath

Links use the XPath of the elements referenced. The specific link use needs to be defined in the business rules. The attribute xPath will contain the location (XPath) of the requested resource. All examples are provided for illustration only. The elements <contentDescription> and <extraResources> can be used, as required.

The element <xPaths> is used to list portions of data modules referenced in the learning content. Through the use of the element <xPath>, the SCORM Content Package provides links to content within selected data module. For details on the SCORM Content Package, refer to Chap 4.9.5.

To meet SCORM requirements, the SCORM Content Package must list all the data modules, figures, and multimedia objects that are linked from within the learning content. The element <xPaths> is used to reference a specific piece of information in a data module. This allows for the inclusion of data module parts (eg paragraphs or figures) in a learning object. The location is entered in the attribute xPath.

## 3 Examples

```
<xPaths>
<xPath xPath="//figure[@id='f1']"/>
```

```
<xPath xPath="//para[@id='p1']"/>
</xPaths>
```

# Chapter 7.8

## *Information processing - Applicability*

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## 1 General

This chapter details technical matters concerning processing of applicability annotations and generation of human readable display text from computable applicability annotations.

Refer to Chap 4.14 and its subchapters for an overview of applicability. It is recommended that these chapters have been read and the concepts understood before reading this chapter.

# 2 Content

## 2.1 Evaluation of applicability annotations

The applicability model provides a framework which can facilitate a computer system to understand and process applicability annotations. The result of that processing will either be the Boolean value of true, meaning that the associated technical data is appropriate for the current situation, or the Boolean value of false, meaning that the associated technical data is not appropriate for the current situation.

Computer systems must follow the processing rules defined in this chapter to ensure that technical data is interchangeable between computer systems. The processing rules will ensure that different computer systems arrive at the same result given the same input.

### 2.1.1 Evaluation of assert annotations

The element <`assert`> defines a single test. The result of the test will be a Boolean value of true or false.

#### 2.1.1.1 Components of an assert annotation

Assert annotations can take on two forms: computable and textual.

##### *2.1.1.1.1 Computable assert annotation*

The computable assert annotation contains the following computable components which are used during evaluation:

- attribute `applicPropertyIdent` containing the identifier of a product attribute or condition to test, this is the same attribute used in the Products Cross-reference Table (PCT) data module element <`assign`> and provides a reference to either:
  - element <`productAttribute`> attribute `id` from the Applicability Cross-reference Table (ACT) data module, or
  - element <`cond`> attribute `id` from the Conditions Cross-reference Table (CCT) data module
- attribute `applicPropertyValues` containing the values and ranges to test against

##### *2.1.1.1.2 Textual assert annotation*

The textual assert annotation contains no computable components.

#### 2.1.1.2 Evaluation rules

1. If any of the following rules fail, the result is a Boolean value of true causing the associated technical data to be considered appropriate for display. If technical data cannot be absolutely determined to be inappropriate, then it must be considered appropriate.
2. The applicability annotation must be of the computable form.
3. There must be a PCT data module identifying product instances.
4. A specific product instance from the PCT must be identified.
5. The identified product instance in the PCT data module must have an element <`assign`> with attribute `applicPropertyIdent` value matching the applicability annotation element <`assert`> attribute `applicPropertyIdent` value.
6. The value of the attribute `applicPropertyValue` from the identified element <`assign`> in the PCT data module is tested against the values and ranges in the assert annotation attribute `applicPropertyValues`.
   - If the product instance value matches an assert annotation value or falls within an assert annotation range, the result is the Boolean value of true.

- If the product instance value does not match an assert annotation value and does not fall within an assert annotation range, the result is the Boolean value of false.

2.1.1.3 Examples
For examples, refer to Para 4.1.1.

### 2.1.2 Evaluation of evaluate annotations

The element <evaluate> groups several tests together and provides the logical operation to perform between the results of the individual tests. The result of the logical operation will be a Boolean value of true or false.

2.1.2.1 Components of an evaluate annotation
The evaluate annotation contains the following computable components which are used during evaluation:

– attribute operator containing the operation to perform
– content consisting of any combination of element <assert> and element <evaluate>, each providing a Boolean value result of true or false of their own

2.1.2.2 Evaluation rules

7 For the value of attribute operator value of "and":

- If all child element results are the Boolean value of true, then this evaluation results in the Boolean value of true.
- If any child element result is the Boolean value of false, then this evaluation results in the Boolean value of false.

8 For the value of attribute operator value of "or":

- If any child element result is the Boolean value of true, then this evaluation results in the Boolean value of true.
- If all child element results are the Boolean value of false, then this evaluation results in the Boolean value of false.

2.1.2.3 Examples
For examples, refer to Para 4.1.2.

## 2.2 Generation of display text

A project or an organization can decide to generate the human readable applicability annotation from the computable applicability annotation. The generated human readable applicability annotation can be used to populate the element <displayText> within the applicability annotation (element <applic> within data modules). Viewers can also generate a human readable applicability annotation at display time if no information is available in element <displayText>.

The guidance provided in this paragraph is a suggestion for the default format for generating display text. It is the decision of a project, an organization or a viewer vendor to determine the best format to fulfill industry and/or customer requirements.

### 2.2.1 Conversion of assert annotations

An assert annotation is used to perform a single test. The assert annotation can be a textual annotation that is already in human readable form, or it can be a test of a single product attribute or condition against a set of values and ranges.

2.2.1.1 Conversion to human readable form

A single assert annotation can be converted to human readable form by presenting the attribute `displayName` from the product attribute declaration in the ACT data module, or alternately the attribute `name` if display name is not available, followed by a colon, whitespace and the allowable value or values. If the assert annotation is textual, only the content is used.

2.2.1.2 Examples

For examples, refer to Para 4.2.1.

**2.2.2 Conversion of evaluate annotations**

An evaluate annotation is used to group several annotations together and assign a logical operation between the grouped annotations. The operation can be either a logical "and" operation or a logical "or" operation.

2.2.2.1 Conversion of a logical "and" annotation to human readable form

An evaluate annotation performing a logical "and" operation can be converted to human readable form by displaying each of the contained elements separated by whitespace. If the contained element is another element <`evaluate`> performing a logical "or" operation, then parenthesis ("(" and ")") must be placed around the displayed contents of the contained evaluate annotation.

2.2.2.2 Conversion of a logical "or" annotation to human readable form

An evaluate annotation performing a logical "or" operation can be converted to human readable form by displaying each of the contained elements separated by whitespace, the word "or" and whitespace (" or "). If the contained element is another element <`evaluate`> performing a logical "and" operation, then parenthesis ("(" and ")") must be placed around the displayed contents of the contained evaluate annotation.

2.2.2.3 Examples

For examples, refer to Para 4.2.2.

**2.2.3 Use of display class**

2.2.3.1 Concept

In order to facilitate a more sophisticated display text generation, the optional attribute `applicDisplayClass` can be used to provide a hint to the software application performing the generation of the human readable form of specific formatting that should be performed on the associated part of the applicability annotation. The use of the attribute `applicDisplayClass`, the allowable values and the meaning of those values are to be previously defined as business rules, refer to Chap 3.9.5.3.

2.2.3.2 Example

For an example, refer to Para 4.2.3.

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Generation of display text**. The project or the organization must decide whether to populate the element <`displayText`> within the applicability annotation or to rely on the publication engine and/or IETP viewer to generate the displayed applicability annotation from the computable applicability annotation. Refer to Para 2.2.

**Format of generated display text**. The project or the organization or the viewer vendor must determine the format for generating the displayed applicability annotation from the computable applicability annotation that will best fulfill industry and/or customer display requirements. Refer to Para 2.2.

# 4 Examples

## 4.1 Evaluation of applicability annotations

### 4.1.1 Evaluation of assert annotations

4.1.1.1 Textual assert annotation

The following example illustrates a textual assert annotation. Since this is not computable the result is a Boolean value of true.

Assert annotation:

```
<assert>in icy conditions</assert>
```

Boolean value result: true

4.1.1.2 Value assert annotation with Boolean value result of true

The following example illustrates an element <assert> annotation testing attribute applicPropertyIdent with a value of "model" for two attribute applicPropertyValues, with values of either "Brook trekker" or "Mountain storm". The selected product instance has an element <assign> with attribute applicPropertyIdent with a value of "model" and attribute applicPropertyValue with a value of "Mountain storm" which matches one of the test values. The result is the Boolean value of true.

Assert annotation:

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker|Mountain storm"/>
```

Assign annotation from PCT:

```
<assign applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValue="Mountain
storm"/>
```

Boolean value result: true

4.1.1.3 Value assert annotation with Boolean value result of false

The following example illustrates an element <assert> annotation testing attribute applicPropertyIdent with a value of "model" for one attribute applicPropertyValues with a value of "Brook trekker". The selected product instance has an element <assign> with attribute applicPropertyIdent with a value of "model" and attribute applicPropertyValue with a value of "Mountain storm" which does not match the test value. The result is the Boolean value of false.

Assert annotation:

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
```

Assign annotation from PCT:

```
<assign applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValue="Mountain
storm"/>
```

Boolean value result: false

4.1.1.4 Range assert annotation with Boolean value result of false

The following example illustrates an element <assert> annotation testing attribute applicPropertyIdent with a value of "serialno" for range in attribute applicPropertyValues with values from "1B070643" to "1B070799". The selected product instance has an element <assign> with attribute applicPropertyIdent with a value of "serialno" and attribute applicPropertyValue with a value of "1B070642" which falls outside of the acceptable range. The result is the Boolean value of false.

Assert annotation:

```
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070799"/>
```

Assign annotation from PCT:

```
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070642"/>
```

Boolean value result: false

4.1.1.5 Combination assert annotation with Boolean value result of true

The following example illustrates an element <assert> annotation testing attribute applicPropertyIdent with a value of "serialno" for multiple values and ranges. The selected product instance has an element <assign> with attribute applicPropertyIdent with a value of "serialno" and attribute applicPropertyValue with a value of "1B070642" which falls inside of one of the acceptable ranges. The result is the Boolean value of true.

Assert annotation:

```
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070640|1B070642~1B070720|1B070722|1B0707
30~1B070799"/>
```

Assign annotation from PCT:

```
<assign applicPropertyIdent="serialno"
applicPropertyType="prodattr" applicPropertyValue="1B070642"/>
```

Boolean value result: true

### 4.1.2 Evaluation of evaluate annotations

4.1.2.1 Logical "and" evaluate annotation

The following example illustrates an evaluate annotation performing a logical "and" operation. If all three assert annotations result in the Boolean value of true, then the evaluate result is the Boolean value of true. If any of the three assert annotations results in the Boolean value of false, then the evaluate result is the Boolean value of false.

Evaluate annotation:

```
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
```

```
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070799"/>
</evaluate>
```

4.1.2.2 Logical "or" evaluate annotation

The following example illustrates an evaluate annotation performing a logical "or" operation. If either assert annotation results in the Boolean value of true, then the evaluate result is the Boolean value of true. If both assert annotations result in the Boolean value of false, then the evaluate result is the Boolean value of false.

Evaluate annotation:

```
<evaluate andOr="or">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
</evaluate>
```

4.1.2.3 Recursive evaluate annotation

The following example illustrates the recursive nature of the evaluate annotation. The outer evaluate annotation performs a logical "or" operation on the results of the two inner evaluate annotations.

Evaluate annotation:

```
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk1"/>
</evaluate>
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
</evaluate>
</evaluate>
```

## 4.2 Generation of display text

### 4.2.1 Conversion of assert annotations

4.2.1.1 Textual assert annotation

Assert annotation:

```
<assert>in icy conditions</assert>
```

Human readable format:

"in icy conditions"

4.2.1.2 Assert annotation with a single value

Assert annotation:

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
```

Product attribute declaration from ACT:

```
<productAttribute id="model" valuePattern=".">
<name>Model name</name>
<displayName>Model:</displayName>
<descr>Model of the bike</descr>
<enumeration applicPropertyValues="Brook trekker|Mountain
storm"/>
</productAttribute>
```

Human readable format:

"Model: Brook trekker"

4.2.1.3 Assert annotation with a multiple values
Assert annotation:

```
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker|Mountain storm"/>
```

Product attribute declaration from ACT:

```
<productAttribute id="model" valuePattern=".">
<name>Model name</name>
<displayName>Model:</displayName>
<descr>Model of the bike</descr>
<enumeration applicPropertyValues="Brook trekker|Mountain
storm"/>
</productAttribute>
```

Human readable format:

"Model: Brook trekker or Mountain storm"

4.2.1.4 Assert annotation with a single range
Assert annotation:

```
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070799"/>
```

Product attribute declaration from ACT:

```
<productAttribute id="serialno">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the bicycle frame</descr>
</productAttribute>
```

Human readable format:

"Serial number (SN): 1B070643-1B070799"

4.2.1.5 Assert annotation with a combination of values and ranges
Assert annotation:

```
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
```

```
applicPropertyValues="1B070640|1B070642~1B070720|1B070722|1B0707
30~1B070799"/>
```

Product attribute declaration from ACT:

```
<productAttribute id="serialno">
<name>Serial number</name>
<displayName>SN</displayName>
<descr>Serial number etched on the bicycle frame</descr>
</productAttribute>
```

Human readable format:

"SN: 1B070640 or 1B070642-1B070720 or 1B070722 or 1B070730-1B070799"

### 4.2.2 Conversion of evaluate annotations

4.2.2.1 Single evaluate, logical "and" operation

Evaluate annotation:

```
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="version"
applicPropertyType="prodattr" applicPropertyValues="Mk9"/>
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070799"/>
</evaluate>
```

Human readable format:

"Model: Brook trekker  Version: Mk9  SN: 1B070643-1B070799"

4.2.2.2 Single evaluate, logical "or" operation

Evaluate annotation:

```
<evaluate andOr="or">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Mountain
storm"/>
</evaluate>
```

Human readable format:

"Model: Brook trekker or Model: Mountain storm"

4.2.2.3 Multiple evaluate, mixed logical operations

Evaluate annotation:

```
<evaluate andOr="and">
<assert applicPropertyIdent="model"
applicPropertyType="prodattr" applicPropertyValues="Brook
trekker"/>
<evaluate andOr="or">
<evaluate andOr="and">
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070643~1B070720"/>
```

```
<assert applicPropertyIdent="SB-S001"
applicPropertyType="condition" applicPropertyValues="Post"/>
</evaluate>
<assert applicPropertyIdent="serialno"
applicPropertyType="prodattr"
applicPropertyValues="1B070721~1B070799"/>
</evaluate>
</evaluate>
```

Human readable format:

"Model: Brook trekker ((SN: 1B070643-1B070720 Service Bulletin (SB) S001: Post) or SN: 1B070721-1B070799)"

### 4.2.3 Use of display class

An example illustrating how the civil airline community might encode an applicability annotation using the attribute `applicDisplayClass` follows:

```
<applic>
<evaluate andOr="or">
<assert applicPropertyType="prodattr"
applicPropertyIdent="serialno"
applicPropertyValues="001~010|012~034"
applicDisplayClass="ConfirmedAC"/>
<evaluate andOr="and">
<assert applicPropertyType="prodattr"
applicPropertyIdent="serialno"
applicPropertyValues="101~118|201~213"
applicDisplayClass="ConditionalAC"/>
<evaluate andOr="or" applicDisplayClass="ConditionStack">
<evaluate andOr="and" applicDisplayClass="techcond">
<assert applicPropertyType="prodattr"
applicPropertyIdent="serialno" applicPropertyValues="101~118"/>
<assert applicPropertyType="condition"
applicPropertyIdent="SB52-1085-FAPE3"
applicPropertyValues="post" applicDisplayClass="sb"/>
<assert applicPropertyType="condition"
applicPropertyIdent="SB54-1086-FAPE3"
applicPropertyValues="post" applicDisplayClass="sb"/>
</evaluate>
<evaluate andOr="and" applicDisplayClass="techcond">
<assert applicPropertyType="prodattr"
applicPropertyIdent="serialno" applicPropertyValues="201~213"/>
<assert applicPropertyType="condition"
applicPropertyIdent="SB52-1085-FAPE3"
applicPropertyValues="post" applicDisplayClass="sb"/>
</evaluate>
</evaluate>
</evaluate>
</evaluate>
</applic>
```

From this, the default human readable form could be:

"SN: 001-010 or 012-034 or (SN: 101-118 or 201-213 (SN: 101-118 SB 52-1085-(FAPE)3: (POST) SB54-1086-FAPE3: POST) or (SN: 201-213 SB52-1085-FAPE3: POST))"

This can be hard to read and interpret. Using the display class attribute values, the following human readable display can be generated, which meets specific project or organization requirements:

**Confirmed** on A/C 001-010 012-034
**Conditional** on A/C 101-118 201-213
- POST SB 52-1085 and POST SB 54-001 on A/C 101-118
- POST SB 52-1085 on A/C 201-213

The display class of "ConfirmedAlternating Current (AC)" provides the hint to display "Confirmed on A/C" prior to the values (as specified in business rules).

The display class of "ConditionalAC" provides the hint to display "Conditional on A/C" prior to the values (as specified in business rules).

Other display class values provide the information needed to generate the desired display.

# Chapter 8

## *Standard numbering systems, information codes and learn codes*

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# Chapter 8.1

## *SNS information and learn codes - General*

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| Chap 8.4 | SNS information and learn codes - Information codes |
| Chap 8.5 | SNS information and learn codes - Learn codes |

## 1 General

There are specific codes in the data module code that have definitions applied to them. These are:

- SNS
- information codes
- learn codes

# 2 SNS, information codes and learn codes

## 2.1 SNS

### 2.1.1 Maintained SNS

The maintained SNS covers the requirements for air, land and sea and is subject to CPF action in the normal manner described in Chap 1.5. A numeric, generic SNS is provided for common system information together with alphanumeric SNS specifically for air, land, sea, support and training, tactical missiles, communications, technical publications and ordnance. These SNS can be found in Chap 8.2.

### 2.1.2 Example SNS

A number of example SNS have been provided. The project or the organization can decide to reuse these SNS as they are or to modify them to suit their needs. These SNS are provided as examples only and will not be maintained by the S1000D Steering Committee. These are described in Chap 8.3 and are available for download on www.s1000d.org.

### 2.1.3 Use of the SNS

The SNS is used to codify the functional and/or physical breakdown of the Product. The project or the organization can decide to use any of the SNS given in this specification, either without change or with their own modifications. The project or the organization can also decide to create their own SNS that is not based on any of the SNS given herein. The allocation of definitions for the various levels of breakdown is given in Chap 4.3.3.

## 2.2 Information codes

Information codes are used to identify the type of information. The definitions of these codes are given in the form of short and full definitions. These can be found in Chap 8.4.

## 2.3 Learn codes

There are two types of learn codes:

- Human performance technology. These are used to identify information regarding the human performance system in which project will be used.
- Training. These are used to identify the type of information related to training but associated with the SNS and information code.

The learn codes can be found in Chap 8.5.

# 3 Business rule decisions

Business rules decisions include, but are not limited to, the following:

**Usage of the SNS**. The project or organization must decide whether to use the maintained SNS, the example SNS or to write their own.

# Chapter 8.2

## *SNS information and learn codes - Maintained SNS - General*

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| Chap 8.2.7 | Maintained SNS - General surface vehicles |
| Chap 8.2.8 | Maintained SNS - General sea vehicles |

## 1 General

The S1000D Steering Committee maintains eight SNS.

## 2 Content

The long and short definitions of the SNS are given in the following chapters:

- Chap 8.2.1 gives a generic numeric SNS that can be used for common and system level information
- Chap 8.2.2 gives the maintained SNS for support and training equipment
- Chap 8.2.3 gives the maintained SNS for ordnance
- Chap 8.2.4 gives the maintained SNS for general communications
- Chap 8.2.5 gives the maintained SNS for air vehicle, engines and equipment
- Chap 8.2.6 gives the maintained SNS for tactical missiles
- Chap 8.2.7 gives the maintained SNS for general surface vehicles
- Chap 8.2.8 gives the maintained SNS for general sea vehicles

# Chapter 8.2.1

## *Maintained SNS - Generic*

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## 1 General

The SNS is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

# 2 Generic SNS

The coding and definitions for the generic SNS is appropriate for common and system level information for all products and is described in Table 2. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

*Table 2 Index of standard systems*

| System | Title |
|---|---|
| 00 | Product - General |
| 01 | Not available for projects |
| 02 | Available for projects |
| 03 | Available for projects |
| 04 | Worthiness (fit for purpose) limitations |
| 05 | Scheduled/unscheduled maintenance |
| 06 | Dimensions and areas |
| 07 | Lifting, shoring, recovering and transporting |
| 08 | Leveling and weighing |
| 09 | Handling and maneuvering |
| 10 | Parking, mooring, storing and return to service |
| 11 | Placards and markings |
| 12 | Servicing |
| 13 | Available for projects |
| 14 | Product loading and offloading |
| 15 | Crew information |
| 16 | Change of role |
| 17 | Available for projects |
| 18 | Vibration and noise analysis and attenuation |
| 19 | Available for projects |

## 2.1 Definitions of systems and subsystems

The SNS for the basic systems of the Product are given in Table 3 thru Table 16.

*Table 3 System 00 - Product - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 00 | | **Product - General** | General information for the complete Product, procedures for the Product safety and general Product maintenance, use of the Product safety and protective devices, information on the technical publication required to support the Product. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | Product - Description | General description with illustrations of the Product and its systems to include type of Product, its roles, accommodation, salient constructional features, power system installation, systems and operational equipment. |
| | -10 | Product - General maintenance | Those instructions necessary for the Product maintenance condition, electrical (static) grounding. |
| | -20 | Product - Safety | Those specific or Product peculiar instructions necessary to make safe and prepare the Product for maintenance action. Includes instructions for returning the Product to its serviceable state. |
| | -30 | Safety and protective devices | Those instructions necessary for the use or operation of devices such as safety pins, safety locks, safety pin flag assemblies, safety struts, safety strut extensions, etc. Instructions for removal and installation of protective covers, bungs, blanks etc are to be included. |
| | -40 | Technical publication | Information on the technical publication required to support the Product (not a technical publication project in its own right) such as the Lists of Applicable Publications, Publication Guide, the coding system of technical publications, instruction for handling and updating technical publication. |
| | -41 | Publications | Information on the suite of publications that are required by the customer. |
| | -42 | Information Sets | Information on the information sets that were used to produce the suite of publications that are required by the customer. |
| | -50 | Material data | Information concerning all material (products) used for the maintenance of the complete Product and its systems. |
| | -60 thru -80 | Available for projects | |
| | -90 | Battle damage repair | Information and data which cannot be allocated to a specific SNS because the involved zone of the Product contains more than one hardware "system". |

*Table 4 System 04 - Worthiness (fit for purpose) limitations*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 04 | | Worthiness (fit for purpose) limitations | This System provides guidance for the calculation of lives for critical items/components and define the operating parameters for such calculations. |
| | -00 | General | |
| | -10 | Fatigue index calculations | Procedures and formulae for calculating Fatigue Index/Fatigue Lives of the Product structure from Fatigue Meter readings. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Operating spectrums | Assumed operating spectrums for the Product from which the safe fatigue lives are calculated. |

*Table 5 System 05 - Scheduled/unscheduled maintenance*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 05 | | Scheduled/unscheduled maintenance | Manufacturers' recommendation for time limits inspection (both scheduled and unscheduled). |
| | -00 | General | |
| | -10 | Time limits | Those manufacturer recommended time limits for maintenance and overhaul of the Product, its systems and sub-assemblies, and life of its parts. |
| | -20 | Scheduled maintenance checks lists | A list of the manufacturer recommended scheduled and unscheduled maintenance checks and inspections, including operating tests applicable to the Product, its systems and sub-assemblies. The checks listed at -40, -50 and -60 must be included. |
| | -30 | Available for projects | |
| | -40 | Scheduled maintenance checks | Those manufacturer recommended maintenance checks and inspections of the Product, its systems and sub-assemblies dictated by the time limits specified in -10 above. This section lists in more detail the items which are outlined on the user job forms (usually by title only) and cross references the detailed procedures included in the individual maintenance practices. |
| | -50 | Unscheduled maintenance checks | Those maintenance checks and inspections on the Product, its systems and sub-assemblies which are dictated by special or unusual conditions which are not related to the time limits specified in -10 above. |
| | -60 | Acceptance and functional check usage | Those current status functional checks necessary to fulfill inspection requirements to prove the safety/usage of all components and systems following delivery or maintenance activities. |

*Table 6 System 06 - Dimensions and areas*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 06 | | Dimensions and areas | Those illustrations and text which show the principal dimensions of the Product and the zones, areas and reference lines used to locate sub-assemblies/components. Shall also include all access and drainage provisions. |
| | -00 | General | |
| | -10 | Principal dimensions | To include a conventional 3-view illustration of the Product with principal dimensions. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Reference lines | To include a system for locating sub-assemblies/components in relation to the Product reference lines. |
| | -30 | Zones and areas | To include Product sub-division by zone/area to identify the zone/area in which the maintenance task is done. |
| | -40 | Access provisions | To identify all access doors and panels, and maintenance access points. Note: Walkways are covered in System 12. |

*Table 7 System 07 - Lifting, shoring, recovering and transporting*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 07 | | Lifting, shoring, recovering and transporting | Shall include all necessary procedures to lift the Product with jacks or slings, and to recover it in any of the conditions to which it may be subjected, including maintenance and repair. Shall also include information on recovering the Product from any condition to which it may be subjected (including emergency recovering) and how to transport it by air/road/rail, etc. |
| | -00 | General | |
| | -10 | Jacking | Information on jacking points, adapters, balance weights, jacking procedures and the jacks used to lift the Product during Product maintenance, repair and recovery. |
| | -20 | Shoring | Information on shoring points, shoring procedures and the shoring equipment used during Product maintenance, repair and recovery. |
| | -30 | Slinging | Information on slinging points, slinging procedures and the slings used to lift the Product during maintenance, repair and recovery. |
| | -40 | Recovering | Information on recovery procedures and the tools and equipment required to recover the Product from any condition to which it may be subjected, including emergency recovery. |
| | -50 | Transporting | Information on how to dismantle the Product to a standard of breakdown consistent with the Product in which it may have to be transported.<br>Information for the manufacture of transportation sledges or pallets. For removal procedures and maintenance information, refer to appropriate system/subsystem. |

*Table 8 System 08 - Leveling and weighing*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 08 | | Leveling and weighing | This System includes the necessary information to level the Product for any of the various maintenance, overhaul or major repairs which becomes necessary during the life of the Product. It also includes those on- Product sub-assemblies or components which are specifically dedicated to record, store or compute mass and balance data. Includes those maintenance practices necessary to prepare the Product for weighing and the weighing procedure. Mass and c.g. data also to be included. |
| | -00 | General | |
| | -10 | Mass and balance | Those sub-assemblies or components on the Product dedicated to the specific function of recording, storing or computing mass and balance data. |
| | -20 | Leveling | Those instructions necessary to prepare the Product for leveling and the leveling procedure. Includes information on the leveling equipment used. |
| | -30 | Weighing | Those instructions necessary to prepare the Product for weighing and the weighing procedure. Includes information on the weighing equipment used. To include limits of variation allowed between physical recorded mass and calculated mass based and specific Product record. |
| | -40 | Mass and c.g. data | Mass and moment or index information characteristic of the Product, limitations, datum points and lines, center of gravity. range, mass and balance management of the fuel and other expendable loads, residual fuel, ballast and the effects of change-of-role.<br>Can include:<br>Expression of c.g. as a percentage of Mean Aerodynamic Chord (MAC).<br>Diagram of c.g. envelope and equipment location charts if necessary.<br>Effect on the c.g. position of dropping or picking up stores (with an example).<br>Relevant equipment included in the basic mass, plus variable equipment ie "role" or "fit-list" equipment, tabulated and showing mass, load arm and moment or index of each item.<br>Relationship between the Product and ECU datum lines including the jet pipe and/or propeller datum lines and the effect of an ECU change (with a worked example). |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 08 | -50 | Static stability | Information detailing the static stability limits of the Product.<br>Can include information required to determine the minimum nose wheel reaction necessary to ensure that the Product is stable about its main wheels whilst being moved and whilst static during servicing operations, and to ensure the Product remains stable during jacking operations.<br>May include tabular and graphical data for the calculation of nose wheel reaction in relation to Product mass and residual moment for both a fully equipped Product and for situations where items of equipment/stores have been removed or the fuel state is outside the normal sequence.<br>Safety precautions and limitations covers de-fuelling sequences, maximum movement speeds and movement on gradients or over rough ground. |

*Table 9 System 09 - Handling and maneuvering*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 09 | | Handling and maneuvering | Those instructions necessary to handle and taxi the Product. Illustrations showing the location of attachment points, turning radius etc are included. Includes those maintenance procedures necessary to prepare the Product for handling and taxiing. |
| | -00 | General | |
| | -10 | Handling | Those instructions necessary to tow, winch or handle the Product in normal or other conditions such as towing and handling with engines removed, berthing sea vessels, etc. Shall include the equipment and materials required such as tow bars, steering arms, towing cables/bridles etc, safety precautions and limitations. |
| | -20 | Maneuvering | Those instructions necessary to maneuver or taxi the Product in normal or abnormal conditions such as adverse weather conditions, etc. Shall include procedures to be used such as use of engines, interphone and brakes, ground turning techniques etc; safety precautions and limitations such as exhaust danger areas, minimum turning radius, friction coefficients for various ground conditions, etc. |

*Table 10 System 10 - Parking, mooring, storing and return to service*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 10 | | Parking, mooring, storing and return to service | This System is to contain the necessary information to park, moor and/or store the Product in all conditions to which it may be subjected. Where appropriate, it is to include the procedures to prepare for parking, mooring and storing and any related return to service requirements. Illustrations, where appropriate, are to show, for example, locations of any fixing or mooring points and any controls used in the parking/mooring and storing procedure. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | |
| | -10 | Parking | Information necessary to park the Product in all weather conditions, where parking is considered as a routine short-term activity (eg overnight, over-weekend) performed on a serviceable Product, ie where return to service can normally be expected to be accomplished by a standard pre-operation check. Includes equipment required. |
| | -20 | Mooring | Information necessary to moor the Product under all weather conditions, where mooring is considered as a long or short term activity whose purpose is to tie down or otherwise secure the unit. Shall also include information such as special techniques applicable to ballasting, installation and use of special support equipment applicable to mooring (eg installation of tie-down rings to strong points) precautions and limits for the safety of the Product in high wind conditions etc. |
| | -30 | Storing | Information necessary to store the Product in normal or abnormal conditions under all weather conditions, where storing is considered as a non-operational period of long or short term duration in excess of that defined for parking. Shall include all appropriate inspection and preventive maintenance to safeguard structural and system integrity during storage. Where applicable, a stored Product may also be moored. Mooring during storage is covered under Section -20, not integrated within Section -30.<br><br>Shall include equipment required.<br>Shall also include information concerning, but not be limited to:<br>- techniques for entry into and removal from storage (eg cleaning and inhibition/de-inhibition), fluid system draining/replenishing, static grounding, protective blanking etc<br>- timescales for routine in-storage maintenance such as wheel rotation, pressure checks, engine running etc<br>- procedures or techniques uniquely applicable to long or short term storage (project-defined terms)<br>- preparation of the Product after storage and return to service |
| | -40 | Return to Service | Those instructions necessary to prepare the Product for operation following mooring, parking or a period of storage. |

*Table 11 System 11 - Placards and markings*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 11 | | Placards and markings | All procurable placards, labels etc is included in the Illustrated Parts Catalog. They are illustrated, showing the part number, legend and location.<br>The Maintenance Manual is provide the approximate location (ie FWD-UPPER-RH) and illustrate each placard, label, marking, self illuminating sign etc required for safety information, maintenance significant information or by government regulations. Those required by government regulations are so identified. |
| | -00 | General | |
| | -10 | Exterior color schemes and markings | The specifications and requirements covering Product exterior color schemes and markings. |
| | -20 | Exterior placards and markings | Those placards and markings required for ground servicing instructions, inspections, cautions, warnings, etc. |
| | -30 | Interior placards and markings | Those placards, markings self illuminating signs etc required for interior general and emergency information, instructions, cautions, warnings, etc. |

*Table 12 System 12 - Servicing*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 12 | | Servicing | Those instructions for the replenishment and depletion of fluids, scheduled and unscheduled servicing applicable to the whole Product. The information is concise and preferably in tabular or chart form.<br>Precautions to be observed in servicing a particular container (eg tank, reservoir, bottle, LOX converter, tire) such as grounding and prevention of fire hazards, is clearly stated.<br>A diagram showing location of regular and emergency servicing points a included. "No-step" areas or walkways, with necessary precautions, are indicated. |
| | -00 | General | |
| | -10 | Replenishing and depleting | Those instructions necessary for the replenishment or depletion of fluids. Container capacities in US, imperial and SI measure, are included. ANA or other standard specification number and grade (if applicable) of fuel, oil, fluid, and other material used are given. Specifications and grades should be shown grouped on one page to facilitate revisions. For fuel, give expansion volume, total fuel capacity, sump capacity, net fuel capacity (as applicable) for each tank. For oil give allowance for expansion. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Scheduled servicing | Those instructions necessary to carry out servicing that can be scheduled. Includes instructions such as those for periodic lubrication of components, radioactivity decontamination, Product external and internal cleaning, etc. Shall not include lubrication procedures required for the accomplishment of maintenance practices. |
| | -30 | Unscheduled servicing | Those instructions necessary to carry out servicing that is normally unscheduled. Includes instructions such as those for ice and snow removal from parked Product. |

*Table 13 System 14 - Product loading and offloading*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 14 | | Product loading and offloading | This System contains those procedures and illustrations necessary to load and offload internal and external stores and munitions and cargo. The System also contain information on the ground equipment and special tools required. Cross-references are made to applicable systems for information on the Product attachment points, pylons and carriers. |
| | -00 | General | |
| | -10 | Ground equipment | A list of all ground equipment and special tools, also information and illustrations as necessary on those items not covered in other documentation. |
| | -20 | Cargo | Examples of loading and offloading techniques, interior layout, floor loadings, location and strength of lashing points, methods of stowing and securing, capacities and dimensions of compartment and doors. |
| | -30 | Internal and external stores | A list of stores carried and the carrier/adapter on which they are fitted. |
| | -31 | Basic information | Includes the basic information on internal and external stores. |
| | -32 | Supplementary information | Includes any supplementary information on internal and external stores. |
| | -33 | Loading procedures | Includes the loading procedures for internal and external stores. |
| | -34 | Offloading procedures | Includes the offloading procedures for internal and external stores. |
| | -35 | Loading and offloading procedures checklists | Includes the checklists for loading and offloading of internal and external stores. |
| | -40 | Non-nuclear munitions | A list of the non-nuclear munitions (eg rockets, missiles, bombs, ammunition) and the carrier/adapter on which they are fitted. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -41 | Basic information | Includes the basic information on non-nuclear munitions. |
| | -42 | Supplementary information | Includes any supplementary information on non-nuclear munitions. |
| | -43 | Loading procedures | Includes the loading procedures for non-nuclear munitions. |
| | -44 | Offloading procedures | Includes the offloading procedures for non-nuclear munitions. |
| | -45 | Loading and offloading procedures checklists | Includes the checklists for loading and offloading for non-nuclear munitions. |
| | -46 | Integrated combat turnaround procedures | Includes information on integrated combat turnaround procedures. |
| | -47 | Integrated combat turnaround procedures checklists | Includes the checklists for integrated combat turnaround procedures. |
| | -48 | Cross servicing checklists | Includes the checklists for cross servicing for non-nuclear munitions. |
| | -50 | Nuclear munitions | A list of the nuclear munitions and the carrier/adapter on which they are fitted. |

*Table 14 System 15 - Crew information*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 15 | | Crew information | This System provide all specific information given to crew for performing all the designed missions of the Product.<br><br>Description and function of the Product systems, system controls and installed equipment areincluded only to the extent that the information is essential to crew/operators and is not covered in the relevant system (21 and up). |
| | -00 | General | This section contains an introduction which gives a general overview of the salient features of the Product. |
| | -10 | Aircraft release/operating limitations | This section contains all limitations that must be observed throughout the cleared operating envelope. |
| | -20 | Operational characteristics | This section contains a comprehensive description of the operational characteristics of the Product including both those advantageous and those undesirable. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Normal procedures | This section contains in narrative and/or checklist form all normal procedures required to accomplish operation. Procedures for special conditions such as scramble or missions requiring intermediate operational stops re included.<br><br>This section also contains the handling of installed equipment, which is not satisfactorily covered in the systems with regard to crew. |
| | -40 | Emergency procedures | This section contains in narrative and/or checklist form the procedures to be followed to meet any emergency that could reasonably be expected. |
| | -41 | General | Includes general information on crew/operator emergency procedures. |
| | -42 | Ground emergencies | Includes information on crew/operator ground based emergency procedures. |
| | -43 | Initialization emergencies | Includes information on crew/operator initialization emergency procedures. |
| | -44 | System related emergencies | Includes information on crew/operator system related emergency procedures. |
| | -45 | Single or multi-engine failures | Includes information on crew/operator single or multi-engine emergency failure procedures. |
| | -46 | Arrival/Disembarking emergencies | Includes information on crew/operator arrival/disembarking emergencies. |
| | -47 | Control system failures | Includes information on control system failures. |
| | -48 | Other emergencies or failures | Includes information on other emergencies or failures. |
| | -49 | Multi-function display readouts giving emergency information | Includes information on crew/operator multi-function display related emergencies. |
| | -50 | Special conditions | This section contains information pertaining to the operation of the Product under special conditions, eg adverse weather and climatic conditions. |
| | -60 | Performance data | This section contains the Product performance data required by the project and agreed in the Performance Substantiation document. |
| | -70 | Role Operation/Weapon system procedures | This section contains in narrative and/or checklist form all normal and reversionary procedures relating to role operation and the role/weapons systems not covered in the relevant systems (21 and up). All relevant safety requirements shall be specified. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Configuration | This section contains the various stores configurations, including weapons and fuel tanks, carried both internally and externally and should include details of the effect on weight, drag index, limitations. |

*Table 15 System 16 - Change of role*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 16 | | Change of role | Those instructions necessary to change the Product from one role to another. |
| | -00 | General | List of the primary and secondary roles of the Product and the role equipment to be removed/installed presented in tabular format. |
| | -10 | Role changes | Individual procedures to cover all changes from any one role to any other role including any necessary testing. |

*Table 16 System 18 - Vibration and noise analysis and attenuation*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 18 | | Vibration and noise analysis and attenuation | This System provides the necessary information to enable operators to monitor and diagnose vibration and noise levels in order to identify imbalance, damage or misalignment in the Product dynamic and structural components. It also includes those Product and components which furnish a means of automatically controlling and/or reducing the force and/or value of the levels of vibration and/or noise within the Product through the use of active or passive systems/equipment. |
| | -00 | General | |
| | -10 | Vibration analysis | Those instructions necessary to monitor, measure, diagnose and locate sources of vibration in dynamic and structural components. |
| | -20 | Noise analysis | Those instructions necessary to monitor, measure, diagnose and locate sources of noise in dynamic and structural components. |
| | -30 | Active attenuation/actuation | That portion of the system which from a power source ensures distribution to the system and provides a physical means of reducing vibration. Included are items such as actuating mechanisms, control valves, motors, plumbing, etc. |
| | -40 | Sensing | Those sub-assemblies or components which provide a means of detecting vibration levels and conveying information to the control computing or indicating systems. Includes items such as accelerometers. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Control/computing | Those Product or components used for processing data, from multiple sources, employed to activate and control attenuation systems. Includes items such as computers, switches, etc. |
| | -60 | Passive attenuation | Those Product and components which provide a means of passive attenuation. Includes items such as vibration absorbers, suspension bars, etc. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS.** The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions.** The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.2

## *Maintained SNS - Support and training equipment*

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| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

The SNS is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

# 2 Support and training equipment SNS

The coding and definitions for the support and training equipment SNS are appropriate for common and system level information for all Products and is described in Table 2 and shown in Fig 1. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

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*Fig 1 Top level breakdown for support and training equipment*

## 2.1 System breakdown

### 2.1.1 Main systems

This support and training equipment SNS is divided into 18 main systems.

*Table 2 Top level breakdown for support and training equipment*

| System | Title |
|---|---|
| A | Measuring, testing and adjusting |
| B | Signal and power generating, supplying, storing and converting (excludes transducers) |
| C | Communicating, signaling and lighting |
| D | Engine and missile system checkout and testing |
| E | Gas and liquid supplying, processing, storing and shipping |
| F | Personnel and solid material protection |
| G | Maintenance and servicing |
| H | Handling, moving, stopping, propelling and landing |
| I | NOT AVAILABLE FOR PROJECTS |
| J | Heating, cooling, ventilating, humidity control, pressurizing and filtering |
| K | Fire fighting, rescue and survival |
| L | Training and simulating |
| M | Detecting, ranging and fire control |
| N | Demolition and destruction |
| O | Flight control and navigation |
| P | Ignition systems |
| Q | Photographic |
| R | Data processing and storing |
| S | Automatic test equipment (ATE) |
| T | NOT AVAILABLE FOR PROJECTS |

## 2.2 Definition of systems and subsystems

### 2.2.1 System A - Measuring, testing and adjusting

*Table 3 System A - Measuring, testing and adjusting*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| A | | Measuring, testing and adjusting | |

| System | Sub-system | Title | Definition |
|---|---|---|---|
| | -A | Voltage, current and resistance measuring and indicating | Includes voltage, current and resistance measuring, voltage leakage, short circuit, continuity and cable testing and multimeters. |
| | -B | Standing wave ratio and impedance measuring | Includes standing wave ratio, impedance and related parameter measuring. |
| | -C | Waveform measuring and analyzing | Includes oscillographs, oscilloscopes, synchroscopes, waveform and spectrum analyzing. |
| | -D | Power and mechanical energy measuring | Includes electrical power measuring (including metered loads), radiated (non-cabled) and mechanical power measuring. |
| | -E | Intensity measuring | Includes mechanical force, sound and light measuring, motion, displacement, impact, electric and magnetic field detecting and measuring, infrared, ultraviolet, X and nuclear radiation detecting and measuring. |
| | -F | Acceleration, velocity, rate, frequency and time measuring and counting | Includes acceleration, velocity, rate and mechanical frequency measuring, electrical frequency measuring and indicating, mechanical and electrical counting, reference time, elapsed time and duration measuring and interval measuring (chronoscopes). |
| | -G | Optical measuring, testing and aligning | Includes collimation and similar optical measuring, spectroscopic, spectrographic and microscopic testing, photographic measuring and testing. |
| | -H | Material measuring and testing | Includes physical dimension, weight, density, volume, pressure, stress and strain, tension and compression, static and dynamic balance measuring, shock testing, solid, liquid and gas analysis. |
| | -J | Multifunction measuring and testing (excludes engines and missile systems but includes most test sets) | Includes electronic, electrical, mechanical and hydraulic systems and components testing, circuit board, circuit card, electron tube, semiconductor, relay, selsyn, synchro, etc testing. |
| | -K | Standards and calibration equipment for measuring and testing | Includes calibration equipment for voltage, current and resistance measuring devices, SWR, impedance and related parameters, waveform measuring and analyzing devices, power, mechanical energy and intensity measuring devices, velocity, frequency and time measuring devices, optical devices, material measuring and testing devices. |

| System | Sub-system | Title | Definition |
|---|---|---|---|
| | -L | Active devices for test purposes (excludes most test sets) | Includes transducers, active filters, active mixers and modulators, active couplings matching and distribution devices, test amplifiers, active terminations and dummy loads. |
| | -M | Passive devices for test purposes (excludes most test sets) | Includes variable resistors and unqualified variable attenuators, variable capacitors, variable inductances, passive electrical coupling matching and distribution devices (including fixed attenuators and most dividers and probes), passive electromagnetic and electro-static coupling, matching and distribution devices (including inductive voltage dividers and probes), mounting devices and passive mechanical coupling devices, passive filters, passive delay devices, passive non-power measuring terminations and dummy loads, passive mixer, modulator and detectors. |
| | -N | Nondestructive inspection and oil analysis | Includes fluorescent penetrant, magnetic particle, X-ray, ultrasonic, eddy current, oil analysis and acoustic emission. |

### 2.2.2 System B - Signal and power generating, supplying, storing and converting (excludes transducers)

*Table 4 System B - Signal and power generating, supplying, storing and converting (excludes transducers)*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| B | | Signal and power generating, supplying, storing and converting (excludes transducers) | |
| | -A | Signal generating | Includes AM/FM pulse-modulated, audio, sweep, square-wave, triangular-wave, saw tooth etc generators, random noise and noise generators and waveform synthesizers. |
| | -B | Electrical power supplying, generating, storing and converting | Includes electrical generators, converters, inverters, dynamotors, power supplies and battery chargers, transformers and distribution networks. |

| System | Sub-system | Title | Definition |
|---|---|---|---|
| | -C | Mechanical, hydraulic, pneumatic and vacuum power supplying, storing and converting | Includes mechanical power supplying, storage and converting (including motors, turbines etc), general purpose compressing and pumping, hydraulic and pneumatic power and vacuum generating and storing, mechanical, hydraulic, pneumatic and vacuum devices (including those which also supply power). |

### 2.2.3 System C - Communicating, signaling and lighting

*Table 5 System C - Communicating, signaling and lighting*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| C | | Communicating, signaling and lighting | |
| | -A | Communicating (excludes headsets, loudspeakers, etc) | Includes intercommunication systems, public address systems, non-airborne and airborne multifunction and special purpose communication devices. |
| | -B | Signaling | Includes signal lights, mechanical signaling devices and special purpose signaling devices. |
| | -C | Lighting | Includes area, search, marking and identification lighting and special purpose lighting. |

### 2.2.4 System D - Engine and missile system checkout and testing

*Table 6 System D - Engine and missile system checkout and testing*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| D | | Engine and missile system checkout and testing | |
| | -A | Engine checkout and testing | Includes automotive engine, air vehicle engine and missile engine testing and general and special purpose engine testing.<br>**Note:**<br>This code is also applicable to engine modules and accessories. |
| | -B | Missile system checkout and testing | Includes missile guidance, missile target or flight programming, missile telemetering and training, missile hydraulic, pneumatic and fuel systems checkout, miscellaneous missiles system checkout and testing and missile countdown equipment. |

### 2.2.5 System E - Gas and liquid supplying, processing, storing and shipping

*Table 7 System E - Gas and liquid supplying, processing, storing and shipping*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| E | | Gas and liquid supplying, processing, storing and shipping | |
| | -A | Gas storage, processing, supplying and shipping | Includes gas storage containers, gas storage processing, supplying and shipping equipment and vehicles and multipurpose and special purpose gas handling equipment. |
| | -B | Liquid storage, processing, supplying and shipping | Includes liquid storage containers, liquid storage, processing, supplying and shipping equipment and vehicles and multipurpose and special purpose liquid handling equipment. |

### 2.2.6 System F - Personnel and solid material protection

*Table 8 System F - Personnel and solid material protection*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| F | | Personnel and solid material protection | |
| | -A | Shelters and chambers | Includes personnel and maintenance shelters, test chambers and test shelters, special purpose and multipurpose shelters and chambers. |
| | -B | Protective deflectors, shields, screens and coverings | Includes deflectors, shields, screens, protective coverings, miscellaneous protective equipment. |
| | -C | Supports for shoring and shipping | Includes supports for storing and shipping. |
| | -D | Special purpose and multipurpose devices | Includes special purpose and multipurpose devices. |
| | -E | Flight clothing and accessories | Includes flight clothing and accessories. |

### 2.2.7 System G - Maintenance and servicing

*Table 9 System G - Maintenance and servicing*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| G | | Maintenance and servicing | |
| | -A | General mechanical cleaning, degreasing and scaling | Includes pressure and vacuum cleaners, spray cleaners and degreasers, scalars, special purpose and multipurpose cleaning devices. |
| | -B | Deicing and decontaminating | Includes deicing and decontaminating equipment. |
| | -C | Road and runway cleaning and repairing | Includes road and runway cleaning and repairing, combination and special purpose road and runway cleaning and repairing and associated devices. |
| | -D | Lubricating | Includes oiling and greasing equipment and special purpose lubricating equipment. |
| | -E | Wheel, tire and mechanical system servicing | Includes wheel and tire servicing, brake, hydraulic and pneumatic systems servicing and special purpose and multipurpose mechanical system servicing. |
| | -F | Special purpose and multipurpose servicing | Includes maintenance tool sets, kits and machines, repair kits, maintenance trailers, welding machines, purging units, spray outfit preservation units, etc. |
| | -G | Maintenance platform, stands, supports and accessories | Includes maintenance platforms and stands for personnel, equipment supports, weapon and special purpose supports and maintenance accessories. |
| | -H | Special machines | Includes maintenance tools eg extractors, guiders, stackers, specific spanners, etc and also other means such as complex machines/parts interfaces. |

### 2.2.8 System H - Handling, moving, stopping, propelling and landing

*Table 10 System H - Handling, moving, stopping, propelling and landing*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| H | | Handling, moving, stopping, propelling and landing | |
| | -A | Hoisting, jacking, lifting, towing and positioning | Includes hoisting, lifting, jacking, erecting and towing equipment and special purpose and multipurpose lifting and positioning equipment. |
| | -B | Transporting of equipment and solid material | Includes powered trucks and tractors, hand trucks, carts, dollies, trailers, transporting vehicles and devices, accessory equipment for transporting, delivery and recovery systems, tires and tubes. |
| | -C | Launching | Includes air vehicle, guided missile, rocket and space vehicles launching equipment and special purpose and multipurpose launching equipment. |
| | -D | Arresting, parking and securing | Includes auxiliary braking, emergency braking and arresting, securing, checking, looking and parking and similar storing. |
| | -E | Special purpose and multipurpose handling and moving | Includes combined lifting and moving vehicles and equipment (trailers, dollies and cradles for air vehicle equipment and components handing, installation, removal, transportation and storage; handling adapter sets; trailers for ammunition lifting and transportation; trucks for loading munitions, fuel tanks, pylons and special weapons onto air vehicles, etc). |
| | -F | Propulsion system | Includes rocket engines, motors and hybrids, reciprocating engines, turbine engines and miscellaneous engines and components. |

### 2.2.9 System J - Heating, cooling, ventilating, humidity control, pressurizing and filtering

*Table 11 System J - Heating, cooling, ventilating, humidity control, pressurizing and filtering*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| J | | Heating, cooling, ventilating, humidity control, pressurizing and filtering | |
| | -A | Heating | Includes area heating equipment and special purpose and multipurpose heating equipment. |

| System | Sub-system | Title | Definition |
|---|---|---|---|
| | -B | Air cooling and air conditioning | Includes air cooling and air conditioning equipment and special purpose and multipurpose cooling equipment. |
| | -C | Ventilating and air circulating | Includes ventilating and air circulating and special purpose and multipurpose ventilating and air conditioning equipment. |
| | -D | Humidity controlling | Includes humidity reducing, humidity increasing, constant humidity equipment and special purpose and multipurpose humidity controlling equipment. |
| | -E | Refrigerating | Includes general purpose refrigerating equipment and special purpose and multipurpose pressurizing equipment. |
| | -F | Multipurpose and special purpose equipment | Includes multipurpose and special purpose heating, cooling, ventilating and humidity control equipment. |
| | -G | Pressurizing | Includes compartment pressurizing and special purpose and multipurpose pressurizing equipment. |
| | -H | Water cooling | Includes engine cooling systems and components and special purpose and multipurpose water cooling equipment. |
| | -I | Filtering | Includes pneumatic and liquid filtering and special purpose and multipurpose filtering equipment. |

### 2.2.10 System K - Fire fighting, rescue and survival

*Table 12 System K - Fire fighting, rescue and survival*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| K | | Fire fighting, rescue and survival | |
| | -A | Fire fighting, crash and rescue equipment | Includes fire fighting, crash, rescue equipment and special purpose and multipurpose fire fighting, crash and rescue equipment. |
| | -B | Survival equipment and devices | Includes survival tools and accessories, survival vehicles and special purpose and multipurpose survival items. |

### 2.2.11 System L - Training and simulating

*Table 13 System L - Training and simulating*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| L | | Training and simulating | |
| | -A | Pilot and flight crew flight simulators | Includes basic flight and advanced flight simulator trainers, instrument, flight trainers and mobile training units. |
| | -B | Ground crew training flight simulators | Includes flight principle trainers, flight control, navigation, warning indicator instrument system trainers, mechanical and electrical systems trainers, engine operation and maintenance trainers, aircraft servicing equipment trainers and mobile training units. |
| | -C | Armament trainers | Includes stationary airborne gunnery, free airborne gunnery, airborne rocketry, high altitude bombing, ground support bombing, armament components and multipurpose armament trainers and mobile training units. |
| | -D | Navigation trainers | Includes dead-reckoning, celestial, electronic and crew navigation trainers, mobile and aerospace navigation training units. |
| | -E | Radar and communications trainers | Includes primary and advanced communications equipment trainers, primary and advanced radar equipment trainers and radar countermeasures trainers. |
| | -F | Psychological and psycho-physiological trainers | Includes low pressure chambers, ejection seat trainers, underwater escape trainers and other survival procedures, space environment and vertigo simulator trainers. |
| | -G | Ground-to-ground and ground-to-air missile trainers | Includes ground crew, missile operation and maintenance trainers, launch control and flight control equipment trainers. |
| | -H | Special project trainers | Includes synthetic warfare tactics trainers and combat information centers equipment trainers. |
| | -J | Training aids | Includes charts and posters, maneuvering boards and demonstrator panels, self instruction cards, training manuals, three-dimensional models, projectors, sound recorders and reproducers, training films and recordings and miscellaneous classroom teaching aids. |
| | -K | Command training programs (tangible items) | Includes service-school training programs and activity training programs. |

| System | Sub-system | Title | Definition |
|---|---|---|---|
| | -L | Miscellaneous training and simulating devices | Includes automotive and airfield training devices, simulators for material testing, hydraulic, pneumatic, oxygen, fuel, air systems training, dummy guided missiles, simulated bombs for test aid training purposes, training dummy or practice warhead and aircraft simulated rockets. |

### 2.2.12 System M - Detecting, ranging and fire control

*Table 14 System M - Detecting, ranging and fire control*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| M | | Detecting, ranging and fire control | |
| | -A | Detecting, range bearing and search | Includes transmitting, receiving, designating, indicating and locating equipment. |
| | -B | Directing | Includes computing sights and devices, optical sighting and ranging, stabilizing mechanisms and transmitting and receiving equipment. |
| | -C | Miscellaneous fire control | Includes fuse setters, ordnance cable system, aiming circles, flash and round ranging sets. |

### 2.2.13 System N - Demolition and destruction

*Table 15 System N - Demolition and destruction*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| N | | Demolition and destruction | |
| | -A | Guns | Includes air vehicle and non air vehicle guns, ammunition feeders, loaders, storage drums, etc. |
| | -B | Ammunition | Includes dummy or blank ammunition, tracer projectiles, live or special purpose ammunition. |
| | -C | Bombs, rockets and missiles | Includes photo flashing, chemical warfare, general purpose, practice, guided or drones bombs and rockets and warheads and explosive components. |

### 2.2.14 System O - Flight control and navigation

*Table 16 System O - Flight control and navigation*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| O | | Flight control and navigation | |
| | -A | Automatic flight or remote control | Includes guided missiles and spaces vehicles. |
| | -B | Navigation | Includes airborne and non airborne direction finding equipment. |

### 2.2.15 System P - Ignition systems

*Table 17 System P - Ignition systems*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| P | | Ignition systems | |
| | -A | Engine ignition system | Includes air vehicle and non air vehicle ignition systems. |
| | -B | Special ignition systems | Includes special purpose and multipurpose ignition systems. |

### 2.2.16 System Q - Photographic

*Table 18 System Q - Photographic*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| Q | | Photographic | |
| | -A | Picture taking equipment | Includes strike recording, aerial mapping, still and motion pictures. |
| | -B | Picture processing equipment | Includes processing mechanisms, developers, washers and driers. |
| | -C | Picture using equipment | Includes still projectors, motion picture projectors and viewing devices. |

### 2.2.17 System R - Data processing and storing

*Table 19 System R - Data processing and storing*

| System | Sub-system | Title | Definition |
|---|---|---|---|
| R | | Data processing and storing | |
| | -A | Analog computing | Includes all analog computing devices. |
| | -B | Digital computing | Includes all digital computing devices. |
| | -C | Hybrid computing | Includes all computing equipment that is a hybrid of analog and digital. |
| | -D | Input/output and storage | Includes all input and out devices such as keyboards, mice, displays, projectors, flash cards, hard disks and other storage media. |
| | -E | Collating, reading and interpreting | Includes cameras and scanners. |
| | -F | Special purpose equipment | Includes special purpose and multipurpose data processing equipment. |

### 2.2.18 System S - Automatic test equipment (ATE)

*Table 20 System S - Automatic test equipment (ATE)*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S | | Automatic test equipment (ATE) | |
| | -A | Available for projects | |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions.** The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.3

## *Maintained SNS - Ordnance*

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## *References*

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| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

This is an SNS, for ordnance. It is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

# 2 Ordnance SNS

The coding and definitions for the ordnance SNS is appropriate for common and system level information for all Products and is described in Table 2 and shown in Fig 1. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

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*Fig 1 Top level breakdown of an ordnance system (Sheet 1 of 2)*

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*Fig 1 Top level breakdown of an ordnance system (Sheet 2 of 2)*

## 2.1 System breakdown

### 2.1.1 Main systems

This ordnance SNS is divided into 17 main systems.

*Table 2 Top level breakdown of an ordnance system*

| System | Title |
|---|---|
| A0-00-00 | Propulsion - General |
| B0-00-00 | Structure - General |
| C0-00-00 | Armaments - General |
| D0-00-00 | Electrical systems - General |
| E0-00-00 | Communications - General |
| F0-00-00 | Navigation - General |
| G0-00-00 | Surveillance - General |
| H0-00-00 | Steering - General |
| J0-00-00 | Ventilation/heating/cooling - General |
| K0-00-00 | Hydraulic systems - General |
| L0-00-00 | Electronic systems - General |
| M0-00-00 | Auxiliary - General |
| N0-00-00 | Survivability - General |
| P0-00-00 | Special equipment - General |
| Q0-00-00 | Outfit and furnishings - General |
| R0-00-00 | Training - General |
| S0-00-00 | Repair test and support - General |

## 2.2 Definitions of systems and subsystems

### 2.2.1 System A - Propulsion - General

*Table 3 System A0 - Propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A0 | -00 | Propulsion - General | A system or equipment for producing and delivering power, to move/position the launcher. |

*Table 4 System A1 - Power unit - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A1 | -00 | Power unit - General | The power unit element refers to a discrete means for generating and delivering power for maneuvering the ordnance system in the battlefield. It can include, for example, flywheel and clutch assemblies. |
| | -10 | Engine | Refers to a diesel, petrol, electric, etc fuelled means for generating power and a means whereby this power can be delivered to the transmission. It can include, for example, flywheel and clutch assemblies and engine mounted cooling, fuel, air and exhaust, lubrication, auxiliary and electrical systems. |
| | -20 | Cooling system | Refers to systems designed to maintain the correct operating temperatures for the power unit. It includes, for example, cooling air ducting, coolant pumps, liquid filled radiators, intercoolers, fans and associated heat exchange equipment. |
| | -30 | Fuel systems | Refers to a system or equipment designed to deliver fuel to the power unit. It includes, for example, fuel storage facilities, pumps, filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors. |
| | -40 | Air and exhaust systems | Refers to a system which supplies air to, or collects and removes exhaust gasses from the engine. It includes, for example, all pipes, ducting, filters, couplings, gaskets, turbochargers/superchargers, silencers and catalytic converters. |
| | -50 | Lubrication systems | Refers to a system that provides lubrication to the power unit and any external components related to the power unit lubrication system. It includes, for example, delivery and return pipes, pumps, filters, intercoolers and separately mounted heat exchangers. |
| | -60 | Electrical | Refers to a system that provides or uses electrical power associated with the power unit. It includes, for example, starter motors, alternators and generators directly mounted on the power unit. It also includes, for example, ignition system components including spark plugs, distributor, coils and leads. |
| | -70 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the power unit. It includes, for example, engine mountings. |
| | -80 | Hydraulic | Refers to a system that provides or uses hydraulic power associated with the power unit. It includes, for example, hydraulic pumps, valves, pipes, and tanks. It also includes any external components related to the power unit hydraulic systems. |

*Table 5 System A2 - Transmission - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A2 | -00 | Transmission - General | Refers to a means to transmit power from the engine to the driving member and can include clutch, torque converter, gearbox. It can also include steering and brakes if they are integral to the transmission. Also included are differentials and power takeoffs. |
| | -10 | Gearbox | Refers to a means for varying the speed/torque delivered from the power unit to the driving member. It can include the steering control and brake assemblies. |
| | -20 | Steering control assembly | Refers to a discrete means for varying the drive applied, through the transmission system, to each of the launcher's driving members. |
| | -30 | Brake assembly | Refers to a discrete means for applying braking forces through the launcher transmission system. |
| | -40 | Auxiliary drive/ power takeoff | Refers to an auxiliary means of obtaining an output from the engine. It includes transfer gearboxes which can also include a slip differential. |
| | -50 | Clutch | Refers to a means for engaging/disengaging the transmission to/from the engine, when fitted as a separate assembly. |
| | -60 | Drive shaft | Refers to the means for connecting power output from the engine to the driving member. It includes muff couplings, universal joints, chains, belts and final drives. |
| | -70 | Torque converter | Refers to a means for varying the torque delivered from the engine to the driving member. |
| | -80 | Differential | Refers to a means for changing the direction of rotation delivered from the engine to the driving member or wheels. |

*Table 6 System A3 - Automotive/remote piloting and digital control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A3 | -00 | Automotive/ remote piloting and digital control systems - General | The automotive and remote piloting and Digital Automotive Control System (DACS) element refers to that equipment (hardware/software) installed in the launcher which is used to plan and control its speed and direction either autonomously or via tele-operation. This includes equipment which senses, processes and displays imagery data such as stereo vision systems, laser scanners, multiple sensor fusion algorithms and processors, image enhancement algorithms and processors etc. This includes, for example, equipment which performs intelligence analysis and planning functions such as automated route planners, image understanding algorithms and processors, computer aided driving algorithms, DACS and processors. |
| | -10 | Control | Refers to processing and control elements. It includes central processors, analogue/digital converters, associated software, memory boards, servo units, actuators, associated wiring, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Sensors | Refers to sensors which are specifically associated with providing inputs to an automotive/remote piloting system or DACS. |
| | -30 | Indicators | Refers to the part of the system used to indicate/ monitor an automotive/remote piloting system or DACS. It includes indicators, wiring, etc. |

*Table 7 System A4 - Controls (drivers) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A4 | -00 | Controls (drivers) - General | Given in this element are the controls required to start, stop, steer and generally control the launcher, commensurate with the mobility role of the equipment. It includes, for example, on-board diagnostic systems. |
| | -10 | Foot controls | Refers to the foot-operated controls to start, stop, steer and generally control the launcher. It includes, for example, pedal assemblies (clutch, brake, accelerator, etc), associated linkages, cables, hydraulic/pneumatic connections, master and slave cylinders, brake shoes and pads and disks and drums. |
| | -20 | Hand controls | Refers to the hand-operated controls to start, stop, steer and generally control the launcher. It includes, for example, stop/start, steering (wheel, tiller, etc) and braking controls. |
| | -30 | Ancillary controls | Refers to ancillary controls and associated systems. It includes, for example, such items as screen wash equipment, windscreen wipers and adjustable wing mirrors. |
| | -40 | Propulsion control systems | Refers to systems which monitor and/or control engine speed and performance. |
| | -50 | Instrumentation | Refers to systems (hardware/software) which monitor/ report on the operation of launcher systems. It includes, for example, the driver's instrumentation panel, warning lights and condition monitoring systems. |

*Table 8 System A5 - Launcher propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A5 | -00 | Launcher propulsion - General | The launcher propulsion element provides the forces to expel the complete round from the launcher to the target. It does not include propulsion provided by the projectile. |
| | -10 | Chemical | Refers to the chemical launch element. |
| | -20 | Mechanical | Refers to the mechanical launch element. |
| | -30 | Electrical | Refers to the electrical launch element, including magnetic propulsion systems. |
| | -40 | Pneumatic | Refers to the pneumatic launch element. |

*Table 9 System A6 - projectile propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A6 | -00 | Projectile propulsion - General | The projectile propulsion element provides the forces to transport the complete round from the launch position to the target. For artillery ammunition this element includes the cartridge case and if applicable the primer as well as the explosive charge itself. It does not include propulsion provided by the launcher assembly. |
| | -10 | Chemical | Refers to the chemical projectile propulsion element, including such devices as chemical precision initiation charges. |
| | -20 | Mechanical | Refers to the mechanical projectile propulsion element. |
| | -30 | Electrical | Refers to the electrical projectile propulsion element. It includes such devices as electric power charges. |
| | -40 | Pneumatic | Refers to the pneumatic projectile propulsion element. |
| | -50 | Rocket motor | Refers to the rocket motor projectile propulsion element. |

### 2.2.2 System B - Structure - General

*Table 10 System B0 - Structure - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B0 | -00 | Structure - General | Framework and/or basic structural housing for a system, including load bearing components. |

*Table 11 System B1 - Frame/carriage/ trail legs - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B1 | -00 | Frame/carriage/ trail legs General | The frame/carriage/trail legs element refers to the primary load bearing components of the launcher which provide the structural integrity to withstand operational loading stresses generated whilst in use, for example when traversing various terrain profiles. This element applies to firing posts, wheeled frames, etc. It does not apply to hand-held weapons. It includes all structural subassemblies and appendages which attach directly to the primary structure. This element, for example, includes towing and lifting fittings, bumpers, hatches and grilles. It also includes provision to accommodate other subsystems such as mountings for suspension, weapons, turret, track body, cab, special equipment, loads etc. |
| | -10 | Frame/firing post | Refers to the basic structural housing for a non-wheeled ordnance system, including load bearing components, recoil mechanisms, mountings, firing platforms, stays, fittings and fixtures. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Carriage | Refers to the basic structural housing for a wheeled ordnance system, including load bearing components, recoil mechanisms, mountings, towing assemblies, fittings and fixtures. |
| | -30 | Trail legs/spades | Refers to trail legs and spades provided to ensure launch platform stability during firing. They can also be used for towing. |
| | -40 | Traverse/ elevation mechanism | Refers to elevating/ traversing mechanisms (manual or powered) and their associated systems/components directly mounted on the frame/carriage/trail legs. |
| | -50 | Armor | Refers to protective amour and associated components directly mounted on the frame/carriage/trail legs. |
| | -60 | Ammunition storage | Refers to ammunition storage facilities and associated components directly mounted on the frame/carriage/trail legs. |
| | -70 | Seats | Refers to seating which is directly mounted on the frame/ carriage/trail legs. |

*Table 12 System B2 - Suspension/ wheels - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B2 | -00 | Suspension/ wheels - General | The suspension/track/wheels element refers to the means for providing mobility or generating tractive effort, thrust and lift, generally at or in proximity to the earth's surface and adapting the launcher to the irregularities of the surface. It includes, for example, wheels and steering gears for traction and control functions. Also, it includes springs, shock absorbers, braking mechanisms, and other suspension members. |
| | -10 | Suspension unit | Refers to the means for adapting the launcher to irregularities of the surface. It includes shock absorbers, leaf and coil springs, pneumatic suspension units, etc. |
| | -20 | Axle | Refers to axle assemblies. It includes, for example, axle arms, links, torsion arms, bearings, wheels that transfer tractive effort to the surface and rolling wheels, hub assemblies, tires, valves, inner-tubes, brake drums, pads, slave cylinders and discs. |
| | -30 | Braking assembly | Refers to a means for preventing un-planned movement of the ordnance system, not integral to the axle assembly. It includes, for example, hydraulic master cylinders, pipes, cables, over-run braking systems and hand brakes. |

*Table 13 System B3 - projectile structure - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B3 | -00 | Projectile structure - General | This element refers to the portion of the complete round which carries the payload to the target. It includes the casing of a projectile, the housing of a bomb and the body of a torpedo. |
| | -10 | Projectile casing | Refers to the basic casing of the projectile. It includes those structural devices which provide stability, eg fins. |
| | -20 | Bomb housing | Refers to the basic housing of the bomb. It includes those structural devices which provide power, stability and control eg fins, parachutes, anchors, batteries. |
| | -30 | Torpedo body | Refers to the basic housing of the torpedo. It includes those structural devices which provide power, stability and control eg fins, parachutes, anchors, batteries. |
| | -40 | Rocket housing | Refers to the basic housing of the rocket. It includes those structural devices which provide power, stability and control eg fins, parachutes, anchors, batteries. |

### 2.2.3 System C - Armaments - General

*Table 14 System C0 - Armaments - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C0 | -00 | Armaments - General | A defensive or offensive system or equipment. |

*Table 15 System C1 - Gun control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C1 | -00 | Gun control systems - General | The gun control element refers to that equipment (hardware/ software) installed in the launcher which provides intelligence necessary to power elevate and traverse the weapons systems and also to control via stabilization systems, and gun drives, including gun position indicators and sensors. |
| | -10 | Installation | Refers to the Gun Control Equipment (GCE) installation. |
| | -20 | Control panel | Refers to control panels associated with GCE. |
| | -30 | Power supply | Refers to power supply units associated with GCE. |
| | -40 | Switch units | Refers to switch units associated with GCE. It includes trimming units, fire control switches, etc. |
| | -50 | Gun controller | Refers to control systems associated with GCE. It includes controls for the gun, motor generators, metadynes, amplidynes, magnicons, power amplifiers. |
| | -60 | Power motors | Refers to gearbox drive motors, associated with GCE. It includes the power, elevation and traverse drive motors. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | Gyroscope assembly | Refers to gyroscope assemblies associated with GCE. |
| | -80 | Ancillary | Refers to ancillary GCE controls and associated systems. It includes such items as turnbuckle assemblies, traverse displacement units, fire control quadrants, inter-connecting boxes, wiring, connectors, etc. |

*Table 16 System C2 - Fire control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C2 | -00 | Fire control systems - General | The fire control element refers to that equipment (hardware/ software) installed in the launcher which provides intelligence necessary for weapons delivery such as launching and firing. This element includes, for example, radar and other sensors necessary for search recognition, meteorological and/ or tracking; controls and displays, fire control computers, and computer programs. |
| | -10 | Computer/ interface | Refers to computer interface systems and equipment associated with fire control systems. It includes computer/ interface units, program loading facilities, etc. |
| | -20 | Control/monitor | Refers to control and monitoring equipment associated with the fire control systems. |
| | -30 | Filter units | Refers to filter units associated with the fire control systems. |
| | -40 | Sensors | Refers to sensors associated with the fire control systems. It includes sensors for elevation and traverse displacement, trunnion tilt, sighting angle, etc. |
| | -50 | Firing handles | Refers to firing handles associated with the fire control systems, including trigger mechanisms. |
| | -60 | Fire control boxes | Refers to control boxes associated with the fire control system. It includes the commander's, and gunner's control boxes, the loader's safety box, etc. |
| | -70 | Ancillary | Refers to ancillary items and associated systems. It includes, for example, such items as junction boxes, cables, connectors and services. |

*Table 17 System C3 - Thermal imaging - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C3 | -00 | Thermal imaging - General | This element refers to that equipment (hardware/software) which provides a thermal picture for the crew or operator to use for surveillance and weapon guidance. It includes thermal imaging sensor heads, drive units, processors, sights, power supply units, and display units. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Sensor | Refers to sensors specifically associated with thermal imaging systems. It includes scanner head assemblies, IR telescopes, tilt sensors, focal telescopes, etc. |
| | -20 | Processing | Refers to processing elements associated with thermal imaging systems. It includes symbology units, processors, etc. |
| | -30 | Display | Refers to the display elements of a thermal imaging system. It includes binocular viewers, commander's and gunner's display units, display drive units, etc. |
| | -40 | Control | Refers to the control elements of a thermal imaging system. It includes servo units, gunner's and commander's control units, etc. |
| | -50 | Converter units | Refers to converter elements of a thermal imaging system. It includes isolating converter units, etc. |
| | -60 | Structure and framework | Refers to framework and/or basic structural housing for a thermal imaging system, including load bearing components. |
| | -70 | Ancillary | Refers to ancillary controls, items and associated systems related to thermal imaging systems. It includes such items as wash/wipe equipment, cables, connectors, services, etc. |

*Table 18 System C4 - Thermal imaging cooling systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C4 | -00 | Thermal imaging cooling systems - General | This element refers to that equipment which provides a cooling medium, for thermal images. It will include, for example, compressors, bottles, pipes, fans, mini coolers, air cleaning columns and stirling cycle cooling machines. |
| | -10 | Compressors | Refers to the part of the system used to pressurize the cooling system. It includes motors, pumps, etc. |
| | -20 | Storage | Refers to the part of the system used for storage of coolant. It includes tanks, pressurized containers, filling systems, sumps, drains, etc. |
| | -30 | Distribution | Refers to the part of the system used for distribution of coolant. It includes pipes, valves, etc. |
| | -40 | Indicating | Refers to the part of the system used to monitor the condition of coolant (quantity, temperature and pressure). It includes transmitters, indicators, wiring, warning systems, etc. |

*Table 19 System C5 - Optical sighting systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C5 | -00 | Optical sighting systems - General | The optical element refers to the sighting systems for search, observation, identification, tracking, range-finding and will include sensors and displays associated with this system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Surveillance | Refers to optical surveillance equipment. It includes, for example, such items as observation periscopes, etc. |
| | -20 | Sighting | Refers to optical sighting equipment. It includes, for example, such items as sighting and aiming periscopes and iron sights. |
| | -30 | Reticle image projector | Refers to a means for displaying a reticle image in/on the sighting device. |
| | -40 | Sighting unit | Refers to a means for displaying a reticle image in the sighting device. |
| | -50 | Ancillary | Refers to ancillary controls, items and associated systems related to optical sighting systems. It includes such items as wash/ wipe equipment, cables, connectors, services, etc. |

*Table 20 System C6 - Weapon/gun - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C6 | -00 | Weapon/gun - General | The weapon/gun element refers to the means for the launcher to deliver fire on hostile targets or for logistics and other vehicles to exercise self-defense. This element includes, for example, the main gun/ elevating mass and secondary armaments such as small arms and mortars. Fire control, gun control, and optical systems are excluded. |
| | -10 | Launcher | The launcher assembly provides initial guidance for launch of projectiles. It includes, for example, barrels, tubes (mortar, torpedo, etc) and rails. |
| | -20 | Breech, housing and firing mechanism | Refers to a system which provides a means of access for the projectile/case to enter the barrel. It also provides a pressure seal and firing mechanism, together with the means by which the breech and firing mechanism are housed within the equipment. It includes all associated housing items. |
| | -30 | Mountings | Refers to the means for attaching the barrel assembly and can include the mountlet assembly as well as the means to balance the armament system. It also includes tripods and bipods. |
| | -40 | Recoil mechanism | Refers to systems which provide a means for absorbing energy created by projectile launch. It includes recuperator and recoil assemblies, etc. |
| | -50 | Smoke discharger | Refers to a means for dispersing smoke/fumes generated when a round is fired. |
| | -60 | Secondary armaments installation | Refers to systems which provide a secondary armaments installation. |
| | -70 | Sights | Refers to a mechanical sighting system used on small arms, machine guns, man-portable launchers, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Ancillary | Refers to ancillary items and associated systems. It includes, for example, such items as spare barrels and other parts, wallets, cleaning kits and sustained fire kits. |

*Table 21 System C7 - Automatic loading systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C7 | -00 | Automatic loading systems - General | The automatic loading element consists of that equipment (hardware/software) providing the means to select ammunition from a stored position, its transfer to and loading of the armament system. This element also includes the means to eject spent cases and misfired rounds. Components include all ammunition storage racks, transfer/ lift mechanisms, ramming and ejecting mechanisms as well as specialized hydraulic and electrical controls. It does not include storage provided externally from the main system. |
| | -10 | Storage (ready round) | Refers to ammunition storage racks, bins, etc. |
| | -20 | Rocket pods/mine racks/dispensers | Provides a means of holding/supporting the projectile during transportation, and a means of releasing the projectile. |
| | -30 | Transfer/lift | Refers to the means to select ammunition from a stored position in the launcher and transfer it to the armament system. It includes transfer and lift mechanisms |
| | -40 | Loading/ramming | Refers to the means to loading the armament system. It includes ramming and ejecting mechanisms. |
| | -50 | Feed mechanism | The feed mechanism element refers to the equipment for placing ammunition in a position, ready for chambering. |
| | -60 | Automatic loading devices | The automatic loading element consists of that equipment providing the means to select ammunition from a stored position and transferring it to a feed mechanism or ready magazine. |
| | -70 | Control | Refers to the means to control loading the armament system. It includes specialized hydraulic and electrical controls and safety devices. |

*Table 22 System C8 - Armaments projectile - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C8 | -00 | Armaments projectile - General | This element refers to the portion of the projectile which carries the payload to the target. It is the basic housing of the bomb or rocket, casing of the projectile, body of a torpedo or the tactical munitions dispenser containing sub-munitions. It also includes those structural devices which provide stability and control eg fins, parachutes, anchors. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Payload | Payload element refers to the subsystem which contains the warhead and its support assemblies. In some munitions such as small arms and munitions, the payload can only be the warhead. With complex munitions the payload can contain sub munitions (the payload subsystem can also include discrete guidance and control, fuse, safety/armament and propulsion systems). |
| | -20 | Fuse | Fuse element refers to the mechanical or electronic device in the projectile designed to detonate or to set forces into action to detonate the charge or primer under desired conditions. |
| | -30 | Initial safety & arming | The initial safety and arming element refers to the device in the projectile which controls the capability of initiating the explosive sequence. |
| | -40 | Secondary safety & arming | The secondary safety and arming element refers to the device in the complete round which controls the capability of initiating the explosive sequence, should the initial safety and arming device fail. |

*Table 23 System C9 - Dispenser containing sub-munitions - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C9 | -00 | Dispenser containing sub-munitions - General | This element refers to the portion of the projectile which carries sub-munitions to the target. |
| | -10 | Tactical munitions dispenser | Tactical munitions dispenser containing sub-munitions, other than those contained within the payload. |

### 2.2.4 System D - Electrical system - General

*Table 24 System D0 - Electrical systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D0 | -00 | Electrical systems - General | A system or equipment for generation, distribution and/or control of electric power. |

*Table 25 System D1 - Launcher electrical systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D1 | -00 | Launcher electrical systems - General | This element refers to the electrical or electronic systems for the launcher. It will include wiring harnesses, line replaceable units (LRUs), sensors, lighting, batteries, generators, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Generating | Refers to generating systems and equipment related to the launcher. It includes such items as alternators, dynamos, generator panels, etc. |
| | -20 | Batteries | Refers to battery equipment related to the launcher. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment related to the launcher. It includes such items as tachometers, speedometers, indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment related to the launcher. It includes such items as inspection lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms related to the launcher. It includes looms, wires, harnesses, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the launcher. It includes, for example, actuators, engine controls and ignition systems. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment related to the launcher. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the launcher. It includes such items as fuses, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the launcher. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 26 System D2 - projectile electrical systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D2 | -00 | Projectile electrical systems - General | This element refers to the devices within the projectile which provide electrical power. |
| | -10 | Ac power | Refers to AC power systems within the projectile, eg generators. |
| | -20 | Dc power | Refers to disassembly code power systems within the projectile, eg batteries, quartz crystal, etc. |
| | -30 | External power | That portion of the system within the projectile that connects external electrical power sources, eg battery charging points. |

### 2.2.5 System E - Communications - General

*Table 27 System E0 - Communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E0 | -00 | Communications - General | A system or equipment for transferring information. |

*Table 28 System E1 - Launcher communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E1 | -00 | Launcher communications - General | The communications element refers to that equipment (hardware/ software) which provides the means within the system for commanding, controlling and transmitting/ receiving information and data to launcher crews and other personnel exterior to the operating environment. This element includes radio frequency equipment, microwave and optic communication links, networked equipment for multiple launcher control and intercoms and external phones systems. It can include navigational system and data displays when these are integral with the equipment of crew stations of the turret assembly or drivers automotive display. |
| | -10 | UHF/SHF/EHF | Refers to that portion of the system used for communications utilizing ultra, super and extra high frequency (UHF, SHF, EHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -20 | VHF | Refers to that portion of the system used for communications utilizing very high frequency (VHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -30 | HF | Refers to that portion of the system used for communications utilizing high frequency (HF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -40 | LF | Refers to that portion of the system used for communications utilizing low frequency (LF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -50 | Audio | Refers to that portion of the system used for voice communications. It includes such items as intercoms, headphones, loudspeakers, switching/control panels, etc. |
| | -60 | Digital | Refers to that portion of the system used for digital/data communications. It includes modems, encryption devices, etc. |
| | -70 | Satellite | Refers to that portion of the system used for communications via satellites. It includes transmitters, receivers, control, antennas, etc. |
| | -80 | Optical | Refers to that portion of the system used for communications via line-of-site. It includes transmitters, receivers, control, signaling devices, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -90 | Ancillary | Refers to ancillary controls and associated systems. It includes such items as wiring, connectors, etc. |

*Table 29 System E2 - Launcher identification friend/foe (IFF) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E2 | -00 | Launcher identification friend/foe (IFF) - General | IFF equipment is common to all services and is therefore interactive with many other users. It covers the equipment (hardware/software) that identifies friend or foe and transmits that information using the launcher communication system(s). |
| | -10 | Transmitting | Refers to that part of the launcher system which is used to send data. |
| | -20 | Receiving | Refers to that part of the launcher system which is used to receive IFF data. |
| | -30 | Indicating | Refers to that part of the launcher system which is used to display IFF data. |

*Table 30 System E3 - Projectile communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E3 | -00 | Projectile communications - General | The communications element refers to that equipment (hardware/software) which provides the means within the system for commanding, controlling and transmitting/ receiving information and data to the projectile. This element includes radio frequency equipment, microwave and optical communication links and networked equipment for multiple control. It can include navigational system and data displays when these are integral with the projectile equipment. |
| | -10 | UHF/SHF/EHF | Refers to that portion of the system used for communications utilizing ultra, super and extra high frequency (UHF, SHF, EHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -20 | VHF | Refers to that portion of the system used for communications utilizing very high frequency (VHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -30 | HF | Refers to that portion of the system used for communications utilizing high frequency (HF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -40 | LF | Refers to that portion of the system used for communications utilizing low frequency (LF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -50 | Digital | Refers to that portion of the system used for digital/data communications. It includes modems, encryption devices, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -60 | Satellite | Refers to that portion of the system used for communications via satellites. It includes transmitters, receivers, control, antennas, etc. |
| | -70 | Optical | Refers to that portion of the system used for communications via line-of-site. It includes transmitters, receivers, control, signaling devices, etc. |
| | -80 | Ancillary | Refers to ancillary controls and associated systems. It includes such items as wiring, connectors, etc. |

*Table 31 System E4 - Projectile identification friend/foe (IFF) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E4 | -00 | Projectile identification friend/foe (IFF) - General | IFF equipment is common to all services and is therefore interactive with many other users. It covers the equipment (hardware/software) within the projectile that identifies friend or foe. |
| | -10 | Transmitting | Refers to that part of the launcher system which is used to send data. |
| | -20 | Receiving | Refers to that part of the launcher system which is used to receive IFF data. |
| | -30 | Indicating | Refers to that part of the launcher system which is used to display IFF data. |

### 2.2.6 System F - Navigation - General

*Table 32 System F0 - Navigation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F0 | -00 | Navigation - General | A system or equipment used to determine, conduct, manage, or plot a position or course. |

*Table 33 System F1 - Launcher navigation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F1 | -00 | Launcher navigation - General | The navigation element refers to that equipment (hardware/ software) installed in the launcher which permits the crew to determine location and to plot a course. It includes navigation systems such as dead reckoning, inertial and global positioning systems. Landmark recognition algorithms and processors are also included. |
| | -10 | Independent | Refers to that portion of the system (hardware/software) which provides information to determine position and is independent on ground installations or orbiting satellites. It includes inertial guidance systems, tracking systems, sextants, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Dependant | Refers to that portion of the system (hardware/software) which provides information to determine position and is mainly dependant on ground installations or orbiting satellites. It includes GPS, radio compass, etc. |
| | -30 | Computing | Refers to that portion of the system (hardware/software) which combines/processes navigational data to compute or manage the geographical position of the launcher. It includes course computers, landmark recognition algorithms, processors, displays, etc. |

*Table 34 System F2 - Launcher guidance and control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F2 | -00 | Launcher guidance and control - General | This system refers to the complex of electronic equipment/ hardware/software, based on the launcher, which evaluates and correlates the path of the projectile with target information and which performs the necessary functions to enable the payload to intercept the target. This element also includes emplacement of mines. |
| | -10 | Computers/ software | This element refers to any computational devices hardware/ software associated with launcher-based guidance and control of the projectile. This element also includes emplacement of mines. |
| | -20 | Control consoles | This element refers to any control consoles (hardware/ software), associated with launcher-based guidance and control of the projectile. This element also includes emplacement of mines. |

*Table 35 System F3 - Projectile guidance and control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F3 | -00 | Projectile guidance and control - General | This system refers to the complex of electronic equipment/ hardware/software which evaluates and correlates the path of the projectile with target information and which performs the necessary functions to enable the payload to intercept the target. It includes, for example, laser guided bombs. |
| | -10 | Projectile built-in stability mechanisms | This element refers to the control devices within the projectile which provide stability during flight. It does not include fixed fins, etc which form part of the structure. |
| | -20 | Projectile built-in control mechanisms | This element refers to the devices within the projectile which provide guidance control. For example navigation systems, laser target sensors, etc. |

### 2.2.7 System G - Surveillance - General

*Table 36 System G0 - Surveillance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G0 | -00 | Surveillance - General | A system or equipment used to sense the environment. |

*Table 37 System G1 - Launcher surveillance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G1 | -00 | Launcher surveillance - General | The surveillance element is defined as all equipment (hardware/software) and associated systems used to sense the surrounding environment and then process, display and record the resulting information. This can include, for example, Meteorological equipment. It does not include specific thermal imaging or meteorological/atmospheric systems. |
| | -10 | Control | Refers to the processing, control and recording elements of the sensor systems. It includes central processors, analogue/ digital converters, associated software, storage units, etc. |
| | -20 | Indicating | Refers to the part of the system used to indicate/monitor sensor information. It includes data identification, indicators, displays panels, etc. |
| | -30 | Recording | Refers to the part of the system used to record sensor information. |
| | -40 | Infra-red | Refers to that portion of a system that uses heat-sensing devices to acquire information. It includes infra-red scanners and image intensifiers. It does not include specific thermal imaging systems. |
| | -50 | Laser | Refers to that portion of a system that uses laser devices to acquire information. It includes distance measuring, target identification, etc. |
| | -60 | Radar | Refers to that portion of a system that uses radar devices to acquire information. It includes antennas, receivers, transmitters, indicators, etc. |
| | -70 | Magnetic | Refers to that portion of a system that uses magnetic sensors to acquire information. It includes magnetometers, amplifiers, processors, indicators, etc. |
| | -80 | Sonar | Refers to that portion of a system that uses sonar to acquire information. It includes modulators, transducers, processors, indicators, etc. |
| | -90 | Acoustic | Refers to that portion of a system that uses sound to acquire information. It includes listening devices, amplifiers, processors, indicators, etc. |

*Table 38 System G2 - Launcher sensors - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G2 | -00 | Launcher sensors - General | The sensor element refers to those systems (hardware/ software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -10 | Radar | The radar element refers to those radar systems (hardware/ software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -20 | Sonar | The sonar element refers to those sonar systems (hardware/ software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -30 | Thermal | The thermal imaging element refers to those thermal imaging and image intensifying systems (hardware/ software) within the launcher that provide data required for targeting, launch, and payload delivery. |
| | -40 | Laser | The laser element refers to those laser target-designator systems (hardware/software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -50 | Magnetic | The magnetic element refers to those magnetic systems (hardware/software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -60 | Acoustic | The acoustic element refers to those sound sensing systems (hardware/ software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -70 | Pressure | The pressure element refers to those pressure systems (hardware/software) within the launcher that provide data required for targeting, launch, arming and payload delivery. |
| | -80 | Proximity | This element refers to the proximity sensing systems (hardware/software) within the launcher that provide proximity sensing data required for targeting, launch, arming and payload delivery. |

*Table 39 System G3 - Projectile sensors - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G3 | -00 | Projectile sensors - General | The sensor element refers to those systems (hardware/ software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -10 | Radar | The radar element refers to those radar systems (hardware/ software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -20 | Sonar | The sonar element refers to those sonar systems (hardware/ software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Thermal | The thermal imaging element refers to those thermal imaging and image intensifying systems (hardware/ software) within the projectile that provide data required for targeting, launch, and payload delivery. |
| | -40 | Laser | The laser element refers to those laser target-designator systems (hardware/software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -50 | Magnetic | The magnetic element refers to those magnetic systems (hardware/software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -60 | Acoustic | The acoustic element refers to those sound sensing systems (hardware/software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -70 | Pressure | The pressure element refers to those pressure systems (hardware/software) within the projectile that provide data required for targeting, launch, arming and payload delivery. |
| | -80 | Proximity | This element refers to the proximity sensing systems (hardware/software) within the projectile that provide proximity sensing data required for targeting, launch, arming and payload delivery. |

*Table 40 System G4 – Meteorological/atmospheric research - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G4 | -00 | Meteorological/ atmospheric research - General | Refers to the systems and devices which furnish a means of providing, processing and recording meteorological data. |
| | -10 | Weather | Refers to that portion of a system which is used to detect, measure, process or record weather (moisture, temperature, cloud, wind, etc) data. It includes hygrometers, thermometers, anemometers, etc. |
| | -20 | Air turbulence | Refers to that portion of a system which is used to detect, measure, process or record air turbulence data. |
| | -30 | Pollutants | Refers to that portion of a system which is used to detect, measure, process or record contaminated particles. |
| | -40 | Magnetic/ gravitational | Refers to that portion of a system which is used to detect, measure, process or record the earth's magnetic or gravitational forces. |

### 2.2.8 System H - Steering - General

*Table 41 System H0 - Steering - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H0 | -00 | Steering - General | A system or equipment used to guide or govern direction. |

*Table 42 System H1 - Launcher guidance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H1 | -00 | **Launcher guidance - General** | This element refers to the devices within the launcher used to guide or govern direction of the projectile. |
| | -10 | Guidance mechanism | This element refers to the devices (hardware/software) within the launcher used to govern direction of the projectile. |

*Table 43 System H2 - Projectile guidance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H2 | -00 | Projectile guidance - General | This element refers to the devices within the projectile used to govern direction or placement. |
| | -10 | Projectile direction control | This element refers to the devices within the projectile which provide direction control. For example rudders, etc. |

### 2.2.9 System J - Ventilation, heating, cooling - General

*Table 44 System J0 - Ventilation/ heating/cooling - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J0 | -00 | Ventilation/ heating/cooling - General | A system or equipment used to provide a controlled environment. |

*Table 45 System J1 - Launcher ventilation/ heating/cooling - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J1 | -00 | Launcher ventilation/ heating/cooling - General | This element refers to those subassemblies or components which provide a micro-climatic condition (heating or cooling), for the launcher, including heating/cooling suits or components. It also covers purification systems not covered by NBC. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Compression | That portion of the system and its controls which supplies pressurized air/gas. Includes items such as controls and indicating systems related to pressure, gas-filled systems, etc. |
| | -20 | Distribution | That portion of the system used to induct and distribute air. It includes equipment rack cooling, seals, demisting, waveguide pressurization system and items of such systems, like blowers, ducting and inlets. |
| | -30 | Heating | That portion of the system and its controls which supply heated air. It includes items such as heater units, wiring, etc. |
| | -40 | Cooling | That portion of the system and its controls which supply cooled air. Includes items such as the cooling unit, indicating systems related to the cooler operation, wiring etc. Does not include temperature control and indicating systems. |
| | -50 | Temperature control | That portion of the system used to control the temperature of the air. Includes items such as, thermal sensing devices, switches, indicators, wiring etc. |
| | -60 | Moisture/air | That portion of the system used to contaminant control moisture in the air, to control ozone concentrations, to filter radioactive debris and chemical/biological contaminants, etc. |
| | -70 | Liquid coolant | Those components required to supply liquid coolant to a cooling system. |

*Table 46 System J2 - Projectile ventilation/ heating/cooling - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J2 | -00 | Projectile ventilation/ heating/cooling - General | Those units and components which furnish a means of pressurizing, heating, cooling, moisture controlling, filtering and treating the air/gas used to condition areas of the projectile system environment. It includes cooling, heating, vents, ducts, seals, wiring etc. |
| | -10 | Compression | That portion of the system and its controls which supplies pressurized air/gas. Includes items such as controls and indicating systems related to pressure, gas-filled systems, etc. |
| | -20 | Distribution | That portion of the system used to induct and distribute air. It includes equipment rack cooling, seals, demisting, waveguide pressurization system and items of such systems like blowers, ducting and inlets. |
| | -30 | Heating | That portion of the system and its controls which supply heated air. Includes items such as heater units, wiring, etc. |
| | -40 | Cooling | That portion of the system and its controls which supply cooled air. Includes items such as the cooling unit, indicating systems related to the cooler operation, wiring etc. Does not include temperature control and indicating systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Temperature control | That portion of the system used to control the temperature of the air. Includes items such as, thermal sensing devices, switches, indicators, wiring etc. |
| | -60 | Moisture/air | That portion of the system used to contaminant control moisture in the air, to control ozone concentrations, to filter radioactive debris and chemical/biological contaminants, etc. |
| | -70 | Liquid coolant | Those components required to supply liquid coolant to an equipment cooling system. |

### 2.2.10 System K - Hydraulic system - General

*Table 47 System K0 - Hydraulic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K0 | -00 | Hydraulic systems - General | A system or equipment for generation, distribution and/or control of hydraulic (or pneumatic) power. |

*Table 48 System K1 - Launcher hydraulic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K1 | -00 | Launcher hydraulic system - General | This element refers to a system or equipment within the launcher for the generation, distribution and/or control of hydraulic power. |
| | -10 | Main | This element refers to a system or equipment within the launcher which is used to generate, store, distribute or control hydraulic power. It includes such items as tanks, valves, pumps, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | That portion of the launcher hydraulic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main hydraulic system. |
| | -30 | Indicating | That part of the launcher hydraulic system which is used to monitor condition of the hydraulic system or fluid. It includes transmitters, indicators, warning systems, etc. |

*Table 49 System K2 - Projectile hydraulic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K2 | -00 | Projectile hydraulic system - General | This element refers to a system or equipment within the projectile for the generation, distribution and/or control of hydraulic power. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Main | This element refers to a system or equipment within the projectile which is used to generate, store, distribute or control hydraulic power. It includes such items as tanks, valves, pumps, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | That portion of the projectile hydraulic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main hydraulic system. |
| | -30 | Indicating | That part of the projectile hydraulic system which is used to monitor condition of the hydraulic system or fluid. It includes transmitters, indicators, warning systems, etc. |

*Table 50 System K3 - Launcher pneumatic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K3 | -00 | Launcher pneumatic systems - General | This element refers to a system or equipment (hardware/ software) within the launcher for the generation, distribution and/ or control of pneumatic (including vacuum) power. |
| | -10 | Main | This element refers to a system or equipment within the launcher which is used to generate, store, distribute or control pneumatic power. It includes such items as tanks, valves, pumps, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | That portion of the launcher pneumatic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main pneumatic system. |
| | -30 | Indicating | That part of the launcher pneumatic system which is used to monitor condition of the system. It includes transmitters, indicators, warning systems, etc. |

*Table 51 System K4 - Projectile pneumatic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K4 | -00 | Projectile pneumatic systems - General | This element refers to a system or equipment (hardware/ software) within the projectile for the generation, distribution and/or control of pneumatic (including vacuum) power. |
| | -10 | Main | This element refers to a system or equipment within the projectile which is used to generate, store, distribute or control pneumatic power. It includes such items as tanks, valves, pumps, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | That portion of the projectile pneumatic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main pneumatic system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Indicating | That part of the projectile pneumatic system which is used to monitor condition of the system. It includes transmitters, indicators, warning systems, etc. |

### 2.2.11 System L - Electronic system - General

*Table 52 System L0 - Electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L0 | -00 | Electronic system - General | A system or equipment using electronic/automated software and/or firmware elements not specifically included in other systems. |

*Table 53 System L1 - Launcher electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L1 | -00 | Launcher electronic system - General | This element refers to a system or equipment within the launcher which uses electronic/automated software and/or firmware elements not specifically included in other systems. |

*Table 54 System L2 - Projectile electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L2 | -00 | Projectile electronic system - General | This element refers to a system or equipment within the projectile which uses electronic/automated software and/or firmware elements not specifically included in other systems. |

### 2.2.12 System M - Auxiliary - General

*Table 55 System M0 - Auxiliary - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M0 | -00 | Auxiliary - General | Subsidiary systems that provide services or support to main systems or equipment. |

*Table 56 System M1 - Launcher auxiliary systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M1 | -00 | Launcher auxiliary systems - General | This element refers to subsidiary systems that provide services or support to main systems or equipment related to the launcher system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Magazine | The magazine element refers to the structure or compartment for storing ammunition or explosives in a 'ready for use' condition, or position, not directly mounted on the launcher. |

*Table 57 System M2 - Projectile auxiliary systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M2 | -00 | Projectile auxiliary systems - General | This element refers to subsidiary systems that provide services or support to main systems or equipment within the projectile. |

*Table 58 System M3 - Adapter kits - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M3 | -00 | Adapter kits - General | The adapter kits element refers to the equipment (hardware/software) for adapting the launch system to particular applications. For example, vehicle adapter kits and for adaption to different aircraft and/ or ship models. Also, kits for backpacking, etc. |

### 2.2.13 System N - Survivability - General

*Table 59 System N0 - Survivability - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N0 | -00 | Survivability - General | A system or equipment used to provide hazard detection, protection, survivability and escape facilities. |

*Table 60 System N1 - Launcher fire protection systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N1 | -00 | Launcher fire protection systems - General | This element refers to systems (hardware/software) that provide a warning to the launcher crew that a possible fire hazard exists. It includes the suppression/fire fighting and heat sensors required for this system. |
| | -10 | Detecting | Refers to that part of the system which is used to sense the presence of excessive heat, smoke or fire. |
| | -20 | Indicating | Refers to that part of the system which is used to indicate the presence of excessive heat, smoke or fire. |
| | -30 | Extinguishing | Refers to that part of the system, either fixed or portable, which is used to extinguish fire. |

*Table 61 System N2 - Launcher nuclear, biological and chemical protection - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N2 | -00 | Launcher nuclear, biological and chemical protection - General | The NBC element refers to those subassemblies or components which provide nuclear, biological and chemical detection, protection and survivability to the launcher and/ or crew, either individually or collectively, during an NBC attack. This can include a positive pressure system, purification system, ventilated face piece (mask), NBC detection and warning devices, decontamination equipment and chemical resistant coatings. It can also include environmental control equipment, such as heaters, coolers, etc. |
| | -10 | Pack | Refers to NBC protection packs. |
| | -20 | Control | Refers to NBC protection controls. |
| | -30 | Pressure relief | Refers to pressure relief devices specifically fitted for NBC protection purposes. |
| | -40 | Door assemblies | Refers to NBC protection fitted to doors and hatches. |
| | -50 | Ancillary | Refers to ancillary controls and associated systems. It can include, for example, such items as wiring, connectors, heaters, coolers and ducting. |

*Table 62 System N3 - Projectile fire protection systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N3 | -00 | Projectile fire protection systems - General | This element refers to systems (hardware/software) that provide a warning within the projectile that a possible fire hazard exists. It includes the suppression/fire fighting and heat sensors required for this system. |
| | -10 | Detecting | Refers to that part of the system which is used to sense the presence of excessive heat, smoke or fire. |
| | -20 | Indicating | Refers to that part of the system which is used to indicate the presence of excessive heat, smoke or fire. |
| | -30 | Extinguishing | Refers to that part of the system, either fixed or portable, which is used to extinguish fire. |

*Table 63 System N4 - Projectile nuclear, biological and chemical protection - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N4 | -00 | Projectile nuclear, biological and chemical protection - General | The NBC element refers to those subassemblies or components which provide nuclear, biological and chemical detection, protection and survivability to the projectile, either individually or collectively, during an NBC attack. This includes a positive pressure system, purification system, NBC detection and protection devices, decontamination equipment and chemical resistant coatings. |
| | -10 | Pack | Refers to NBC protection packs. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Control | Refers to NBC protection controls. |
| | -30 | Pressure relief | Refers to pressure relief devices specifically fitted for NBC protection purposes. |
| | -40 | Door assemblies | Refers to NBC protection fitted to doors and hatches. |
| | -50 | Ancillary | Refers to ancillary controls and associated systems. It includes such items as wiring, connectors, etc. |

### 2.2.14 System P - Special equipment - General

*Table 64 System P0 - Special equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P0 | -00 | Special equipment - General | A system or equipment used to provide a special mission capability. |

*Table 65 System P1 - Launcher special to type equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P1 | -00 | Launcher special to type equipment - General | This element refers to that special equipment (hardware/ software) to be mated to a launcher, to enable the achievement of a special mission capability, recovery operations, winterization, etc. It can include, for example blades, booms, cranes, winches, robotic arms, and manipulators. |
| | -10 | Launcher special recovery equipment | This element refers to that special recovery equipment (hardware/software) to be mated to a launcher, to enable the achievement of a recovery capability. It includes cranes and towing equipment. |
| | -20 | Launcher special fit equipment | This element refers to that special fit equipment (hardware/ software) to be mated to a launcher, to enable the achievement of a specialized capability. It will include supply, DROPS, lift trucks, side loaders, etc. |
| | -30 | Launcher special purpose equipment | This element refers to that special-to-purpose equipment (hardware/software) to be mated to a launcher, for the achievement of a special mission purpose. It covers, for example, ISO container bodies and equipment and other special purpose vehicles. |
| | -40 | Installation kit | The installation kit element refers to the equipment (hardware/software) for installation of the launch system related to a particular application. |
| | -50 | Portability kit | The portability kit refers to that equipment required to prepare the launcher for transportation, other than its prime means of movement. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -60 | Bore variation/ velocity change kits | This refers to equipment (hardware/software) designed to affect the velocity of a projectile. |
| | -70 | Winterization kit | The winterization kit element refers to the equipment (hardware/software) for protection of the launcher/ crew, in adverse weather conditions. |

*Table 66 System P2 - Projectile special equipment/ systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P2 | -00 | Projectile special equipment/ systems - General | A system or equipment used to provide a special mission capability for the projectile. |
| | -10 | Portability kit | The portability kit refers to that equipment required to prepare projectiles for transportation. |

### 2.2.15 System Q - Outfit and furnishings - General

*Table 67 System Q0 - Outfit and furnishings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q0 | -00 | Outfit and furnishings - General | A function or equipment used to provide habitability or operability that is not specifically included in other systems. |

*Table 68 System Q1 - Launcher stowage - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q1 | -00 | Launcher stowage - General | This element is required to provide for personal equipment stowage as well as operational equipment stowage on or in the launcher. |
| | -10 | Charge bin | Refers to charge bin stowage facilities. |
| | -20 | Shell stowage | Refers to shell stowage facilities. |
| | -30 | Ammunition | Refers to stowage facilities for both secondary and personal ammunition. |
| | -40 | Launcher internal | Refers to stowage facilities within the launcher. |
| | -50 | Launcher external | Refers to stowage facilities mounted on launcher. |

*Table 69 System Q2 - Complete equipment schedule (CES) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q2 | -00 | Complete equipment schedule (CES) - General | This element refers to lists detailing the equipment required by the user to operate and maintain the system. It includes, for example, both fitted and loose items, spares, tools and operator manuals. |
| | -10 | Production CES | This element refers to the production version of the CES. |
| | -20 | Service CES | This element refers to the service version of the CES. |
| | -30 | Complex CES | This element refers to the complex version of the CES. |

*Table 70 System Q3 - Projectile stowage - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q3 | -00 | Projectile stowage - General | This element is required to provide for equipment stowage on or in the projectile. |

### 2.2.16 System R - Training - General

*Table 71 System R0 - Training - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R0 | -00 | Training - General | The training element is defined as the deliverable training services, devices, accessories, aids, equipment and facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. This element includes all effort associated design, development and production of deliverable training equipment as well as the execution of training services. |

*Table 72 System R1 - Training services - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R1 | -00 | Training services - General | The training services element refers to the deliverable training services, used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -10 | Devices/ accessories/aids | The training devices/accessories/aids element refers to the deliverable devices, accessories and aids used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Equipment | The training equipment element refers to the deliverable training equipment used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -30 | Facilities | The training facilities element refers to the deliverable training facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |

### 2.2.17 System S - Repair, test and support - General

*Table 73 System S0 - Repair test and support - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S0 | -00 | Repair test and support - General | A system, equipment or facilities used to maintain operational capability. |

*Table 74 System S1 - Launcher repair facilities - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S1 | -00 | Launcher repair facilities - General | This element refers to the facility which will allow unserviceable launchers to be repaired, tested and returned to service use. |
| | -10 | Mobile | This element refers to a mobile facility which will allow unserviceable launchers to be repaired, tested and returned to service use. |
| | -20 | Fixed | This element refers to a static facility which will allow unserviceable launchers to be repaired, tested and returned to service use. |

*Table 75 System S2 - Sighting systems repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S2 | -00 | Sighting systems repair facility - General | This element refers to equipment (hardware/software) that enables the repair, test or calibration of the optical sighting equipment, including laser range finders for example. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/or calibration of optical sighting equipment. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of optical sighting equipment. |

*Table 76 System S3 - Thermal imaging repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S3 | -00 | Thermal imaging repair facility - General | To provide a transportable facility (hardware/software) whereby thermal imaging equipment including its associated cooling systems can be repaired, tested and returned to service. The equipment covered will include, for example, clean air equipment, jigs, fixtures, computer interface adapters and test equipment. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/or calibration of thermal imaging equipment. |
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of thermal imaging equipment. |

*Table 77 System S4 - General purpose electronic repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S4 | -00 | General purpose electronic repair facility - General | This element refers to equipment (hardware/software) that enables unserviceable electrical/electronic items to be repaired, tested and returned to service use. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/or calibration of general purpose electronic equipment. |
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of general purpose electronic equipment. |

*Table 78 System S5 - Projectile repair facilities - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S5 | -00 | Projectile repair facilities - General | This element refers to the facility which will allow unserviceable projectiles to be repaired, tested and returned to service use. |
| | -10 | Mobile | This element refers to a mobile facility which will allow unserviceable projectiles to be repaired, tested and returned to service use. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Fixed | This element refers to a static facility which will allow unserviceable projectiles to be repaired, tested and returned to service use. |

*Table 79 System S6 - Launcher common support equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S6 | -00 | Launcher common support equipment - General | The launcher common support equipment element refers to those items required to support and maintain the launcher or portions of the launcher systems while not directly engaged in the performance of its mission, and which are presently in the MOD inventory for support of other systems. This element includes all efforts required to assure the availability of this equipment for support of the particular defense Product item. It also includes the acquisition of additional quantities of this equipment if caused by the introduction of the defense material item into operational service. |

*Table 80 System S7 - Projectile common support equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S7 | -00 | Projectile common support equipment - General | The projectile common support equipment element refers to those items required to support and maintain the projectiles or portions of the projectile systems while not directly engaged in the performance of their mission, and which are presently in the MOD inventory for support of other systems. This element includes all efforts required to assure the availability of this equipment for support of the particular defense Product item. It also includes the acquisition of additional quantities of this equipment if caused by the introduction of the defense material item into operational service. |

*Table 81 System S8 - Launcher test and measurement equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S8 | -00 | Launcher test and measurement equipment - General | The launcher test and measurement equipment element is defined as common testing and measurement equipment which allows an operator or maintenance function to evaluate operational conditions of a launcher system or equipment by performing specific diagnostics, screening or QA effort at an organizational, intermediate, or depot level of equipment support. It includes test measurement and diagnostic equipment, precision measuring equipment, automatic test equipment, manual test equipment, automatic test systems, test program sets, appropriate interconnect devices, automated load modules, tap(s), and related software, firmware and support hardware (power supply equipment, etc) used at all levels of maintenance. It includes packages which enable a line or shop replaceable unit, printed circuit boards, or similar items to be diagnosed using automatic test equipment. |

*Table 82 System S9 - Projectile test and measurement equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S9 | -00 | Projectile test and measurement equipment - General | The projectile test and measurement equipment element is defined as common testing and measurement equipment which allows an operator or maintenance function to evaluate operational conditions of a projectile, subsystem or equipment by performing specific diagnostics, screening or QA effort at an organizational, intermediate, or depot level of equipment support. It includes test measurement and diagnostic equipment, precision measuring equipment, automatic test equipment, manual test equipment, automatic test systems, test program sets, appropriate interconnect devices, automated load modules, tap(s), and related software, firmware and support hardware (power supply equipment, etc) used at all levels of maintenance. It includes packages which enable a line or shop replaceable unit, printed circuit boards, or similar items to be diagnosed using automatic test equipment. |

*Table 83 System SA - Launcher support and handling equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| SA | -00 | Launcher support and handling equipment - General | The launcher support and handling equipment element is defined as the deliverable tools and handling equipment used for support of the launcher system. It typically includes ground support equipment, vehicular support equipment, powered support equipment, non-powered support equipment, and software support equipment. |

*Table 84 System SB - Projectile support and handling equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| SB | -00 | Projectile support and handling equipment - General | The projectile support and handling equipment element is defined as the deliverable tools and handling equipment used for support of the projectile, eg munitions Product handling equipment and software support equipment. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.4

## *Maintained SNS - General communications*

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| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

## 1 General

This is a SNS, for a general communications. It is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

## 2 General communications SNS

The coding and definitions for the general communications SNS is appropriate for common and system level information for all Products and is described in Table 2 and shown in Fig 1. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

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*Fig 1 Top level breakdown for a general communications system (Sheet 1 of 2)*

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*Fig 1 Top level breakdown for a general communications system (Sheet 2 of 2)*

## 2.1 System breakdown

### 2.1.1 Main systems

This general communications SNS is divided into 71 main systems.

*Table 2 Top level breakdown for a general communications system*

| System | Title |
|---|---|
| A0-00-00 | Propulsion - General |
| A1-00-00 | Power pack - General |
| A2-00-00 | Power unit - General |
| A3-00-00 | Engine cooling system - General |
| A4-00-00 | Fuel systems - General |
| A5-00-00 | Air and exhaust systems - General |
| A6-00-00 | Lubrication systems - General |
| A7-00-00 | Transmission - General |
| A8-00-00 | Automotive/remote piloting & digital control systems - General |
| A9-00-00 | Controls (drivers) - General |
| B0-00-00 | Structure - General |
| B1-00-00 | Hull/frame - General |
| B2-00-00 | Body/cab - General |
| B3-00-00 | Suspension/track/wheels - General |
| B4-00-00 | Turret assembly - General |
| B5-00-00 | Structures and buildings - General |
| B6-00-00 | Sites - General |
| B7-00-00 | Masts - General |
| B8-00-00 | Containers - General |
| C0-00-00 | Armaments - General |
| D0-00-00 | Electrical systems - General |
| D1-00-00 | Mobile electrical systems (engine/power pack) - General |
| D2-00-00 | Mobile electrical systems (hull/frame) - General |
| D3-00-00 | Mobile electrical systems (body/cab) - General |
| D4-00-00 | Mobile electrical systems (turret) - General |
| D5-00-00 | Power supply - General |
| E0-00-00 | Communications - General |
| E1-00-00 | Communications systems - General |
| E2-00-00 | Connectivity - General |

| System | Title |
|---|---|
| E3-00-00 | Antennas - General |
| E4-00-00 | Tempest - General |
| F0-00-00 | Navigation - General |
| F1-00-00 | Navigation systems - General |
| G0-00-00 | Surveillance - General |
| G1-00-00 | Surveillance systems - General |
| H0-00-00 | Steering - General |
| H1-00-00 | Steering systems - General |
| J0-00-00 | Ventilation cooling & heating - General |
| J1-00-00 | Ventilation cooling & heating systems - General |
| K0-00-00 | Hydraulic systems - General |
| K1-00-00 | Hydraulics - General |
| K2-00-00 | Pneumatic - General |
| L0-00-00 | Electronic systems - General |
| L1-00-00 | Amplifiers/attenuators - General |
| L2-00-00 | Filters - General |
| L3-00-00 | Computer/logic hardware-analogue - General |
| L4-00-00 | Computer/logic hardware-digital - General |
| L5-00-00 | Optoelectronics - General |
| L6-00-00 | Oscillators/waveform generators - General |
| M0-00-00 | Auxiliary - General |
| M1-00-00 | Auxiliary systems - General |
| M2-00-00 | Adapter kits - General |
| M3-00-00 | Fire - General |
| N0-00-00 | Survivability - General |
| N1-00-00 | Surface finish - General |
| N2-00-00 | Intrusion - General |
| N3-00-00 | Nuclear, biological & chemical - General |
| P0-00-00 | Special equipment - General |
| P1-00-00 | Special equipment/systems - General |
| P2-00-00 | Software - General |
| Q0-00-00 | Outfit and furnishings - General |

| System | Title |
|---|---|
| Q1-00-00 | Stowage - General |
| Q2-00-00 | Complete equipment schedule (ces) - General |
| R0-00-00 | Training - General |
| R1-00-00 | Training services - General |
| S0-00-00 | Repair test and support - General |
| S1-00-00 | Repair facilities - General |
| S2-00-00 | Common support equipment - General |
| S3-00-00 | Test and measurement - General |
| S4-00-00 | Support and handling equipment - General |

## 2.2 Definitions of systems and subsystems

### 2.2.1 System A - Propulsion - General

*Table 3 System A - Propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A0 | -00 | **Propulsion - General** | A system or equipment for producing and delivering power. |

*Table 4 System A1 - Power pack - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A1 | -00 | **Power pack - General** | The power pack element refers to a self-contained means for generating and delivering power. It includes such systems as the main engine, transmission and interfaces. Subsystems can include such items as cooling, fuel, air and exhaust, lubrication, auxiliaries and electrical. |
| | -10 | Main engine | Refers to a diesel, petrol, electric, etc fuelled means for generating power and a means whereby this power can be delivered to the transmission It can include, for example, engine-mounted flywheel and clutch assemblies, cooling, fuel, air and exhaust, lubrication, auxiliary and electrical systems. |
| | -20 | Transmission | Refers to a system which transmits power from the engine to the driving member and can include torque converter and gearbox. It can also include flywheel and clutch assemblies, steering and brakes if they are integral to the transmission. Also included are differentials and power takeoffs. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Power pack interfaces | Refers to the mounting assemblies connecting the main engine and transmission, together with associated ancillaries, including such systems as cooling, fuel, air and exhaust, lubrication, auxiliary and electrical. It can also include transmission items. |

*Table 5 System A2 - Power unit - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A2 | -00 | **Power unit - General** | The power unit element refers to a discrete means for generating and delivering power to the transmission. It can include, for example, flywheel and clutch assemblies. |
| | -10 | Engine | Refers to a diesel, petrol, electric, etc fuelled means for generating power and a means whereby this power can be delivered to the transmission. It can include, for example, flywheel and clutch assemblies and engine mounted cooling, fuel, air and exhaust, lubrication, auxiliary and electrical systems. |
| | -20 | Cooling system | Refers to systems designed to maintain the correct operating temperatures for the power unit. It includes, for example, cooling air ducting, coolant pumps, liquid filled radiators, intercoolers, fans and associated heat exchange equipment. |
| | -30 | Fuel systems | Refers to a system or equipment designed to deliver fuel to the power unit. It includes, for example, fuel storage facilities, pumps, filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors. |
| | -40 | Air and exhaust systems | Refers to a system which supplies air to, or collects and removes exhaust gasses from the engine. It includes, for example, all pipes, ducting, filters, couplings, gaskets, turbochargers/superchargers, silencers and catalytic converters. |
| | -50 | Lubrication systems | Refers to a system that provides lubrication to the power unit and any external components related to the power unit lubrication system. It includes, for example, delivery and return pipes, pumps, filters, intercoolers and separately mounted heat exchangers. |
| | -60 | Electrical | Refers to a system that provides or uses electrical power associated with the power unit. It includes, for example, starter motors, alternators and generators directly mounted on the power unit. It also includes, for example, ignition system components including spark plugs, distributor, coils and leads . |
| | -70 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the power unit. It includes, for example, engine mountings. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Hydraulic | Refers to a system that provides or uses hydraulic power associated with the power unit. It includes, for example, hydraulic pumps, valves, pipes, and tanks. It also includes any external components related to the power unit hydraulic systems. |

*Table 6 System A3 - Engine cooling system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A3 | -00 | **Engine cooling system - General** | This system includes cooling air ducting, coolant pumps, liquid filled radiators, fans and associated heat exchange equipment. |
| | -10 | Fluid | Refers to fluid (water/oil) filled coolant systems. It includes pumps, radiators, fans, pipes and associated heat exchange equipment. |
| | -20 | Air | Refers to cooling air ducting, fans and associated heat exchange equipment. |

*Table 7 System A4 - Fuel systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A4 | -00 | **Fuel systems - General** | Equipment to provide fuel storage facilities, filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors mounted externally to the power unit/pack. |
| | -10 | Storage | Refers to the portion of the system which stores fuel. It includes, for example, tanks, filler necks, seals, valves, vents and drainage. |
| | -20 | Distribution | Refers to the portion of the system which is used to distribute fuel from the storage system. It includes, for example, filters, restrictors, valves, controls and pipes. |
| | -30 | Priming | Refers to the portion of the system which is used to pressurize/pump the fuel. It includes, for example, lift pumps, pressurization pumps, and cold starting systems. |
| | -40 | Fuel injection | Refers to the portion of the system which delivers fuel. It includes, for example, FIP, fuel injectors, fuel pump metering and carburetors. |
| | -50 | Indicating | Refers to the portion of the system which is used to monitor the condition of fuel (quantity, temperature and pressure). It includes, for example, transmitters, indicators, wiring and pressure warning systems. |
| | -60 | Venting and de-fuelling | Refers to the portion of the system which is used to vent fumes from the fuel system and to provide a means for removing/dumping unwanted fuel. |

*Table 8 System A5 - Air and exhaust systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A5 | -00 | **Air and exhaust systems - General** | Refers to a system which supplies and filters air to the engine and collects and removes exhaust gases from the engine. It includes, for example, all filters, pipes, couplings, silencers, catalytic converters and ducting mounted externally to the power unit/pack. |
| | -10 | Air system | Refers to a system which supplies and filters air to the engine. It includes, for example, pre-filters, main air filters, and associated ducting. It can also include air cooling/heating systems and intercoolers. |
| | -20 | Collector | Refers to that portion of the system which collects exhaust gases from the engine manifold. It includes pipes, joints, gaskets, etc. |
| | -30 | Noise suppression | Refers to that portion of the system which reduces noise produced by the engine exhaust gases. It includes silencers, baffles, shields, etc. |
| | -40 | Emission control | Refers to that portion of the system which is designed to reduce or eliminate engine exhaust gas emissions. It includes, for example, catalytic converters and tail pipes. |

*Table 9 System A6 - Lubrication systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A6 | -00 | **Lubrication systems - General** | This system is to include lubrication storage facilities that are external to the engine/power pack. It includes delivery and return pipes, pumps, filters and heat exchangers mounted externally to the power unit/pack. |
| | -10 | Storage | Refers to the part of the system used for storage of engine and/or transmission lubricating oil. It includes tanks, filling systems, sumps, drains, etc. |
| | -20 | Distribution | Refers to the part of the system used for distribution of lubricating oil to and from the engine and/or transmission. It includes pipes, pumps, filters, valves, etc. |
| | -30 | Indicating | Refers to the part of the system used to monitor the condition of engine and/or transmission lubricating oil (quantity, temperature and pressure). It includes transmitters, indicators, wiring, pressure warning systems, etc. |

*Table 10 System A7 - Transmission - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A7 | -00 | **Transmission - General** | Refers to a means to transmit power from the engine to the driving member and can include clutch, torque converter, gearbox. It can also include steering and brakes if they are integral to the transmission. Also included are differentials and power takeoffs. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Gearbox | Refers to a means for varying the speed/torque delivered from the power unit to the driving member. It can include the steering control and brake assemblies. |
| | -20 | Steering control assembly | Refers to a discrete means for varying the drive applied, through the transmission system, to each of the vehicle's driving members (eg tracked vehicles). |
| | -30 | Brake assembly | Refers to a discrete means for applying braking forces through the vehicle transmission (eg tracked vehicles). |
| | -40 | Auxiliary drive/ power takeoff | Refers to an auxiliary means of obtaining an output from the engine. It includes transfer gearboxes which can also include a slip differential. |
| | -50 | Clutch | Refers to a means for engaging/disengaging the transmission to/from the engine, when fitted as a separate assembly (for clutches fitted to a flywheel, see A21000). |
| | -60 | Drive shaft | Refers to the means for connecting power output from the engine to the driving member. It includes muff couplings, propeller shafts, universal joints and final drives. |
| | -70 | Torque converter | Refers to a means for varying the torque delivered from the engine to the driving member. |
| | -80 | Differential | Refers to a means for changing the direction of rotation delivered from the engine to the driving member or wheels. For wheeled vehicles, it includes the driving axles, half shafts, hubs, etc. |

*Table 11 System A8 - Automotive/remote piloting and digital control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A8 | -00 | **Automotive/ remote piloting and digital control systems - General** | The automotive and remote piloting and Digital Automotive Control System (DACS) element refers to that equipment (hardware/software) installed in the vehicle which is used to plan and control vehicle speed and direction either autonomously or via tele-operation. This includes equipment which senses, processes and displays imagery data such as stereo vision systems, laser scanners, multiple sensor fusion algorithms and processors, image enhancement algorithms and processors etc. This includes, for example, equipment which performs intelligence analysis and planning functions such as automated route planners, image understanding algorithms and processors, computer aided driving algorithms, DACS and processors. |
| | -10 | Control | Refers to processing and control elements. It includes central processors, analogue/digital converters, associated software, memory boards, servo units, actuators, associated wiring, etc. |
| | -20 | Sensors | Refers to sensors which are specifically associated with providing inputs to an automotive/remote piloting system or DACS. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Indicators | Refers to the part of the system used to indicate/monitor an automotive/remote piloting system or DACS. It includes indicators, wiring, etc. |

*Table 12 System A9 - Controls (drivers) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A9 | -00 | **Controls (drivers) - General** | Given in this element are the controls required to start, stop, steer and generally control the vehicle commensurate with the mobility role of the equipment. It includes, for example, on-board diagnostic systems. |
| | -10 | Foot controls | Refers to the foot-operated controls to start, stop, steer and generally control the vehicle. It includes, for example, pedal assemblies (clutch, brake, accelerator, etc), associated linkages, cables, hydraulic/pneumatic connections, master and slave cylinders, brake shoes and pads and disks and drums. |
| | -20 | Hand controls | Refers to the hand-operated controls to start, stop, steer and generally control the vehicle. It includes, for example, stop/start, steering (wheel, tiller, etc) and braking controls. |
| | -30 | Ancillary controls | Refers to ancillary controls and associated systems. It includes, for example, such items as screen wash equipment, windscreen wipers and adjustable wing mirrors. |
| | -40 | Propulsion control systems | Refers to systems which monitor and/or control engine speed and performance. |
| | -50 | Instrumentation | Refers to systems (hardware/software) which monitor/report on the operation of vehicle systems. It includes, for example, the drivers instrumentation panel, warning lights and condition monitoring systems. |

### 2.2.2 System B - Structure - General

*Table 13 System B - Structure - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B0 | -00 | **Structure - General** | Framework and/or basic structural housing for a system, including load bearing components. |

*Table 14 System B1 – Hull/frame - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B1 | -00 | **Hull/frame - General** | This element refers to the vehicles primary load bearing component which provides the structural integrity to withstand the operational loading stresses generated while traversing various terrain profiles. This element could be a simple wheeled vehicle frame or a more complicated combat vehicle hull which satisfies not only the structural requirements but also provides armor protection. It includes all structural subassemblies and appendages which attach directly to the primary structure. This element, for example, includes towing and lifting fittings, bumpers, hatches and grilles. It also includes provision to accommodate other Subsystems such as mountings for suspension, weapons, turret, track body, cab, special equipment, loads etc. |
| | -10 | Internal mountings | Refers to internal fitments mounted on the hull/frame. It includes brackets, stud welding, floors and insulation panels. |
| | -20 | External mountings | Refers to the chassis and external fitments mounted on the hull/frame. It includes brackets, stud welding, steps, bumpers, mud-guards, windows, etc. |
| | -30 | Doors/hatches | Refers to loading/entry hatches and doors in, or directly mounted on, the hull/frame assembly. It includes shell loading doors, driver and passenger doors, hatches, locks, handles, drivers/operators hoods, cowls and windshields, etc. |
| | -40 | Seats | Refers to seating which is directly mounted on the hull/frame. |
| | -50 | Drinking water tank | Refers to a system designed to provide drinking water for the driver and crew, which is directly mounted on the hull/frame. It includes tanks, filler necks, filters, pipes, seals, valves, vents, drainage, etc. |
| | -60 | Access cover plates | Refers to access cover plates directly mounted on the hull/frame. It includes, for example, guards, plugs, drain/inspection covers. It can also include deck area assemblies. |
| | -70 | Gun crutch/ depression rails | Refers to gun crutch and depression rails directly mounted on the hull/frame. |
| | -80 | Skirting plates/ brackets/splash plates | Refers to skirting plates, brackets and splash plates directly mounted on the hull/frame. It includes the plates and associated fittings, brackets, towing attachments, etc. |

*Table 15 System B2 - Body/cab - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B2 | -00 | **Body/cab - General** | Refers to the major components to be mated to a chassis or frame to provide a complete vehicle having a defined mission capability. This element includes accommodation for personnel, cargo, and such Subsystems as need to be placed in proximity of the operators. |
| | -10 | Internal mountings | Refers to internal fitments mounted on the body/cab. It includes panels, brackets, clips, fascia, instrument panels, stud welding, internal windows, etc. |
| | -20 | External mountings | Refers to external fitments mounted on the body/cab. It includes the external cab assembly, panels, brackets, stud welding, steps, windows, cab tilt and locking mechanism, etc. |
| | -30 | Doors/hatches | Refers to loading/entry hatches and doors in, or directly mounted on, the body/cab. It includes loading doors, driver and passenger doors, hatches, locks, handles, etc. |
| | -40 | Seats | Refers to seating and associated fittings which are directly mounted on the body/cab. It includes, for example, seat belts and harnesses. |
| | -50 | Drinking water tank | Refers to a system designed to provide drinking water for the driver and crew, which is directly mounted on the body/cab. It includes tanks, filler necks, filters, pipes, seals, valves, vents, drainage, etc. |
| | -60 | Access panels | Refers to access panels directly mounted on the body/cab. |
| | -70 | Load bay | Refers to load (or passenger) carrying areas in the body/cab and any soft/hard top covering, supports, etc. |
| | -80 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the body or cab. |

*Table 16 System B3 - Suspension/track/wheels - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B3 | -00 | **Suspension/ track/wheels - General** | This element refers to the means for generating tractive effort, thrust and lift, generally at or in proximity to the earth's surface and adapting the vehicle to the irregularities of the surface. It includes, for example, wheels, tracks and steering gears for traction and control functions. Also, it includes springs, shock absorbers, skirts and other suspension members such as track adjusting mechanisms. It does not include specific steering mechanisms. |
| | -10 | Suspension unit | Refers to the means for adapting the vehicle to irregularities of the surface. It includes hydrogas units, shock absorbers, leaf and coil springs, pneumatic suspension units, etc. Also included is the lift mechanism, skirts, etc, for hovercraft. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Road wheel/hub assembly | Refers to a means for distributing the nominal ground pressure of the vehicle. On wheeled vehicles, it includes wheels that transfer tractive effort to the surface and rolling wheels. It includes road wheels, hub assemblies, tires, valves, inner-tubes, etc. |
| | -30 | Sprocket wheel assembly | Refers to the sprocket drive wheels which transfer tractive effort to the track. |
| | -40 | Track assembly | Refers to the track and associated linkages. |
| | -50 | Idler wheels | Refers to the feed/guide mechanism(s) associated with track laying. It includes idler wheels and track tensioners. |
| | -60 | Roller assembly | Refers to the track roller guide assemblies. |
| | -70 | Axle | Refers to non-driving axles not covered under the transmission system. It includes axle arms, links, bearings, etc. |

*Table 17 System B4 - Turret assembly - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B4 | -00 | **Turret assembly - General** | The turret assembly refers to the structures and equipment installation required to provide the fighting compartment element of combat vehicles. This element includes turret armour, EMC shielding, turret rings, slip rings, attachments and appendages such as latches and cupolas, and accommodation for personnel, weapons and $C^3I$. |
| | -10 | Internal mountings | Refers to internal fitments mounted in the turret. It includes drinking water installations, periscope mountings, panels, brackets, clips, stud welding, etc. |
| | -20 | External mountings | Refers to external fitments mounted on the turret. It includes brush deflector assemblies, cooler boxes, gun covers, splash curtains, panels, brackets, stud welding, etc. |
| | -30 | Hatches | Refers to loading/entry hatches in, or directly mounted on, the turret. It includes loading hatches, crew hatches and associated locks, handles, fittings, etc. It does not include cupolas. |
| | -40 | Seats | Refers to seating which is directly mounted in the turret. |
| | -50 | Ring assembly | Refers to a circular track and roller/ball-race assembly designed to facilitate turret rotation. |
| | -60 | Cupola | Refers to a roof aperture and domed hatch assembly, primarily for observation purposes. It can be capable of rotation, and can also provide access for entry/exit. |
| | -70 | Elevating/ traversing gearbox | Refers to elevating traversing gearboxes mounted on the turret wall. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Turntable assembly | Refers to the turret turntable assembly. It includes drive and roller assemblies, RBJ mountings, etc. |
| | -90 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the turret. It includes such items as wash/wipe equipment, turret and elevation locks, position indicators and adjustable mirrors, etc. |

*Table 18 System B5 - Structures and buildings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B5 | -00 | **Structures and buildings - General** | This element refers to the structural portion of the electronic/automated software system. It includes, for example, frames, chassis, racks, etc. |
| | -10 | Frame/chassis | Refers to the structural frame or chassis of the electronic/automated software system. |
| | -20 | Rack | Refers to the mounting rack of the electronic/automated software system. |
| | -30 | Fixtures/fittings | Refers to fixtures and fittings in the racks of the electronic/automated software system. It includes, for example, blank panels, runners, bonding rails, anti-vibration mounts, grilles, cable trays and guides. |
| | -40 | Encapsulation | Refers to the enclosure of items within the electronic/automated software system by use of a potting compound. |

*Table 19 System B6 - Sites - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B6 | -00 | **Sites - General** | This element refers to the physical make-up of a site where an electronic/automated software system is installed or housed. It includes, for example, boundaries, buildings, chambers, radomes and hard-standing. |
| | -10 | Buildings | Refers to the buildings in which the electronic/automated software system is housed. |
| | -20 | Radomes | Refers to the radomes in which the electronic/automated software system is housed. |
| | -30 | Chambers | Refers to the chambers in the electronic/automated software system. It includes, for example, underground chambers, cable and EMP vaults, secure and other storage areas. |
| | -40 | Hard standing | Refers to hard standing on the site where the electronic/automated software system is installed or located. |

*Table 20 System B7 - Masts - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B7 | -00 | **Masts - General** | Refers to structures erected to provide support for antennas etc. It includes, for example, masts, towers and securing equipment. |
| | -10 | Masts | Refers to those erected structures which are not free-standing. |
| | -20 | Towers | Refers to those erected structures which are free-standing. |
| | -30 | Securing equipment | Refers to the equipment and devices which is used to secure masts, towers and antennas. |

*Table 21 System B8 - Containers - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B8 | -00 | **Containers - General** | Refers to containers that form part of the electronic/automated software system. It includes, for example, ISO containers, cabins and cases. |
| | -10 | ISO containers | Refers to ISO containers which form part of the electronic/automated software system. |
| | -20 | Cabins | Refers to cabins which form part of the electronic/automated software system. |
| | -30 | Cases | Refers to covers and cases which form part of the electronic/automated software system. |

### 2.2.3 System C - Armaments - General

***Table 22 System C - Armaments - General***

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C0 | -00 | **Armaments - General** | A defensive or offensive system or equipment (including small arms and machine guns). |

### 2.2.4 System D - Electrical system - General

*Table 23 System D - Electrical systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D0 | -00 | **Electrical systems - General** | A system or equipment for generation, distribution and/or control of electric power. |

*Table 24 System D1 - Mobile electrical systems (engine/power pack) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D1 | -00 | **Mobile electrical systems (engine/power pack) - General** | This element refers to the electrical or electronic systems for the engine/power pack. It will include wiring harnesses, line replaceable units (LRUs), sensors, lighting, batteries, generators, etc. |
| | -10 | Generating | Refers to generating systems and equipment in the engine/power pack compartment that are not directly mounted on the engine/power-pack. It includes such items as alternators, dynamos, generator panels, etc. |
| | -20 | Batteries | Refers to battery equipment mounted in the engine/power pack compartment. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment mounted in the engine/power pack compartment. It includes such items as tachometers, speedometers, indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment mounted in the engine/power pack compartment. It includes such items as inspection lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms mounted in the engine/power pack compartment. It includes looms, wires, harnesses, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment mounted in the engine/power pack compartment. It includes, for example, actuators, engine controls and ignition systems. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment mounted in the engine/power pack compartment. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment mounted in the engine/power pack compartment. It includes such items as fuses, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment mounted in the engine/power pack compartment. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 25 System D2 - Mobile electrical systems (hull/frame) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D2 | -00 | **Mobile electrical systems (hull/ frame) - General** | This element refers to the electrical or electronic systems for the hull and frame. It will include both internal and external wiring harnesses, junction and distribution boxes, line replaceable units (LRUs), sensors and lighting systems. It also includes the interfaces and connectors associated with the engine, power pack, generating and starting systems. |
| | -10 | Internal electrical systems | Refers to the internal electrical or electronic systems mounted in the hull/frame. It will include, for example, wiring harnesses, LRUs, junction and distribution boxes. It also includes the interfaces and connectors associated with the engine, power pack, generating and starting systems. |
| | -20 | Batteries | Refers to battery equipment related to the hull/frame. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Internal lights | Refers to lighting systems mounted internally in the hull/frame. |
| | -40 | External electrical systems | Refers to the electrical or electronic systems mounted externally on the hull/frame. It will include, for example, external lighting systems, horns and flashing beacons. |
| | -50 | Wiring | Refers to wiring, cable looms and clips related to the hull/frame or associated with connecting to the engine/power pack. It includes looms, wires, clips, harnesses, connectors, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the hull/frame. It includes, for example, actuators, wiper controls, heaters, cooking pots, horns, radio fittings and ancillary items. |
| | -70 | Distribution | Refers to electrical distribution and interconnecting systems and equipment related to the hull/frame. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the hull/frame. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the hull/frame. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 26 System D3 - Mobile electrical systems (body/cab) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D3 | -00 | **Mobile electrical systems (body/cab) - General** | This element refers to the electrical or electronic systems for either the body or cab. It will include wiring harnesses, line replaceable units (LRUs), sensors and lighting systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Generating | Refers to generating systems and equipment related to the body/cab. It includes such items as generator control panels, etc. |
| | -20 | Batteries | Refers to battery equipment related to the body/cab. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment related to the body/cab. It includes such items as indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment related to the body/cab. It includes such items as inspection lights, head lights, spot lights, tail/side lights, indicators, panel lights, convoy lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms related to the body/cab. It includes looms, wires, harnesses, earthing straps, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the body cab. It includes, for example, actuators, wiper controls, heaters, cooking pots and horns. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment related to the body/cab. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the body/cab. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the body/cab. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 27 System D4 - Mobile electrical systems (turret) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D4 | -00 | **Mobile electrical systems (turret) - General** | This element refers to the electrical or electronic systems for the turret. It will include wiring harnesses, line replaceable units (LRUs), sensors and lighting systems. |
| | -10 | Generating | Refers to generating systems and equipment related to the turret. It includes such items as generator control panels, etc. |
| | -20 | Batteries | Refers to battery equipment related to the turret. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment related to the turret. It includes such items as indicating panels, electronic circuit panels, control transmitters, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Lights | Refers to lighting systems and equipment related to the turret. It includes such items as inspection lights, panel lights, roof lights, spot lights, convoy lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms related to the turret. It includes looms, wires, harnesses, earthing straps, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the turret. It includes, for example, actuators, wiper controls, heaters and cooking pots. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment related to the turret. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the turret. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the turret. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 28 System D5 - Power Supply - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D5 | -00 | **Power supply - General** | Refers to the systems, Subsystems, equipment and devices which provide power for a non-mobile facility. It includes, for example, AC power, disassembly code power, external power and protection. |

### 2.2.5 System E - Communications - General

*Table 29 System E - Communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E0 | -00 | **Communications - General** | A system or equipment for transferring information. |

*Table 30 System E1 - Communications systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E1 | -00 | **Communications systems - General** | This element refers to the devices within the electronic/automated software system which provide the means for transmitting and receiving data. It includes, for example, fixed, tactical and mobile systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | UHF/SHF/EHF | Refers to that portion of the electronic/automated software system that is used for communications utilizing UHF/SHF/EHF carriers (excluding satellite). It includes, for example, transmitters, receivers, antennas, signal processors, modems, etc. |
| | -20 | VHF | Refers to that portion of the electronic/automated software system that is used for communications utilizing VHF carriers. It includes, for example, transmitters, receivers, antennas, signal processors, modems, etc. |
| | -30 | HF | Refers to that portion of the electronic/automated software system that is used for communications utilizing HF carriers. It includes, for example, transmitters, receivers, antennas, signal processors, modems, etc. |
| | -40 | LF | Refers to that portion of the electronic/automated software system that is used for communications utilizing LF carriers. It includes transmitters, receivers, antennas, signal processors, modems, etc. |
| | -50 | Digital | That portion of the electronic/automated software system that is used for digital/data communications. It includes, for example, data processors and disassembly code line bays. |
| | -60 | Audio/video | Refers to that portion of the electronic/automated software system that is used for audio and visual communications. It includes, for example, telephone equipment, fax machines, public address systems, modems and audio line bays. |
| | -70 | Satellite | Refers to that portion of the electronic/automated software system that is used for communications via satellite. It includes, for example, satellite ground stations, fixed, transportable and portable satellite ground terminals. |
| | -80 | Command & control | Refers to that portion of the electronic/automated software system that is used for command and control. It includes, for example, network and system control centers and other command and control subsystems. |
| | -90 | Signal distribution | Refers to that portion of the electronic/automated software system that distributes signals. It includes, for example, switching matrices, combiners, dividers, slip-rings and commutators. |

*Table 31 System E2 - Connectivity - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E2 | -00 | **Connectivity - General** | Refers to that portion of the electronic/automated software system that provides connectivity. It includes, for example, landlines, twin-feeders, waveguides, inter and intra connection cabling, fiber optic cables and patching facilities. |
| | -10 | Landlines | Refers to that portion of the electronic/automated software system that provides connectivity via landline. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Twin feeders | Refers to that portion of the electronic/automated software system that provides connectivity via twin feeders. |
| | -30 | Inter-connectivity | Refers to that portion of the electronic/automated software system that provides inter-connectivity |
| | -40 | Intra-connectivity | Refers to that portion of the electronic/automated software system that provides intra-connectivity |
| | -50 | Optical fibre | Refers to that portion of the electronic/automated software system that provides connectivity via optical fiber cables. |
| | -60 | Patching facilities | Refers to that portion of the electronic/automated software system that provides patching/switching facilities within the connectivity area. It includes, for example, jack-field panels. |
| | -70 | Power cables | Refers to that portion of the electronic/automated software system that provides power connectivity. |

*Table 32 System E3 - Antennas - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E3 | -00 | **Antennas - General** | Refers to that portion of the electronic/automated software system that radiates or absorbs electromagnetic waves. |
| | -10 | UHF/SHF/EHF | Refers to that portion of the electronic/automated software system that radiates or absorbs electromagnetic waves in the UHF/SHF/EHF frequency bands. |
| | -20 | VHF | Refers to that portion of the electronic/automated software system that radiates or absorbs electromagnetic waves in the VHF frequency band. |
| | -30 | HF | Refers to that portion of the electronic/automated software system that radiates or absorbs electromagnetic waves in the HF frequency band. |

*Table 33 System E4 - Tempest - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E4 | -00 | **Tempest - General** | Refers to that portion of the system that provides TEMPEST protection. It includes, for example, cages and vaults. |
| | -10 | Cages | Refers to the cages in the electronic/automated software systems that provide TEMPEST protection. |
| | -20 | Vaults | Refers to the vaults in the electronic/automated software systems that provide TEMPEST protection. |

### 2.2.6 System F - Navigation - General

*Table 34 System F - Navigation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F0 | -00 | **Navigation - General** | A system or equipment used to determine, conduct, manage, or plot a position or course. |

*Table 35 System F1 - Navigation systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F1 | -00 | **Navigation systems - General** | Refers to that portion of the electronic/automated software system that provides range, bearing and/or height information for the system. |
| | -10 | Radar | Refers to that portion of the electronic/automated software system which uses radar principles to provide range, bearing and/or height information. It includes, for example, air defense, precision and tracking radars. |
| | -20 | Radio guidance | Refers to that portion of the electronic/automated software system which uses modulated radio waves to provide range, bearing and/or height information. It includes, for example, beacons, landing aids and direction finding equipment. |
| | -30 | Laser | Refers to that portion of the electronic/automated software system which uses laser principles to provide range, bearing and/or height information. |
| | -40 | Satellite | Refers to that portion of the electronic/automated software system which uses satellites to provide range, bearing and/or height information. It includes, for example, both satellite and ground positioning elements. |
| | -50 | Magnetic | Refers to that portion of the electronic/automated software system which uses magnetic principles to provide range and/or bearing information. It includes, for example, compasses. |
| | -60 | Thermal | Refers to that portion of the electronic/automated software system which uses heat sensing or infra-red principles to provide range, bearing and/or height information. |
| | -70 | Optical | Refers to that portion of the electronic/automated software system which uses optical sighting to provide range, bearing and/or height information. |

### 2.2.7 System G - Surveillance - General

*Table 36 System G - Surveillance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G0 | -00 | **Surveillance - General** | A system or equipment used to sense the environment. |

*Table 37 System G1 - Surveillance systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G1 | -00 | **Surveillance systems - General** | Refers to that portion of the electronic/automated software system which senses, monitors and, where required provides alarms and environmental data. It includes, for example, radar, sonar, thermal, optical and environmental technologies. |
| | -10 | Radar | Refers to that portion of the electronic/automated software system which uses the principles of radar. |
| | -20 | Sonar | Refers to that portion of the electronic/automated software system which uses the principles of sonar. |
| | -30 | Thermal | Refers to that portion of the electronic/automated software system which uses thermal imaging/intensifying and temperature monitoring principles. It includes, for example, electronic thermostats and IR detectors. |
| | -40 | Optical | Refers to that portion of the electronic/automated software system which uses optical and/or laser principles. It includes, for example, CCTV. |
| | -50 | Magnetic | Refers to that portion of the electronic/automated software system which uses magnetic principles. |
| | -60 | Acoustic | Refers to that portion of the electronic/automated software system which uses acoustic principles. |
| | -70 | Pressure | Refers to that portion of the electronic/automated software system which operates through pressure sensing techniques. |
| | -80 | Proximity | Refers to that portion of the electronic/automated software system which operates through proximity sensing techniques. |
| | -90 | Environmental | Refers to that portion of the electronic/automated software system which provides environmental data. It includes, for example, air quality (NBC, smoke) and weather (anemometer) monitoring. |

### 2.2.8 System H - Steering - General

*Table 38 System H - Steering - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H0 | -00 | **Steering - General** | A system or equipment used to guide or govern direction. |

*Table 39 System H1 - Steering systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H1 | -00 | **Steering systems - General** | Refers to those units and devices within the electronic/automated software system which govern movement and/or direction of assemblies. It includes, for example, motors, gearboxes, drives and turning gear. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Motors | Refers to the motor drive units within the electronic/automated software system which affect movement and/or direction of assemblies. |
| | -20 | Gearboxes | Refers to the geared units within the electronic/automated software system which vary torque, speed and/or direction of movement of assemblies. |
| | -30 | Drives | Refers to the interconnecting links between motor, gearbox and device, within the electronic/automated software system, which affect movement and/or direction of assemblies. |
| | -40 | Turning gear | Refers to the final drive link to moving assemblies within the electronic/automated software system. |
| | -50 | Control systems | Refers to those units within the electronic/automated software system which control movement and/or direction of assemblies. |

### 2.2.9 System J - Ventilation cooling & heating

*Table 40 System J - Ventilation cooling & heating*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J0 | -00 | **Ventilation cooling & heating** | A system or equipment used to provide a controlled environment. |

*Table 41 System J1 - Ventilation cooling & heating systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J1 | -00 | **Ventilation cooling & heating systems - General** | Refers to those units and devices which furnish a means of pressurizing, heating, cooling, moisture controlling, filtering and treating the air/gas used to condition areas of the electronic/automated software system environment. It includes, for example, cooling, heating, vents, ducts and seals. |
| | -10 | Compression | Refers to that portion of the electronic/automated software system which supplies pressurized air/gas. It includes, for example, gas-filled systems, controls and indicating systems. |
| | -20 | Distribution | Refers to that portion of the electronic/automated software system used to induct and distribute air/gas. It includes, for example, rack cooling, seals, demisting, blowers, ducting and inlets. |
| | -30 | Heating | Refers to that portion of the electronic/automated software system and its controls which supply heated air/gas. It includes, for example, heater units, control and indicating systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Cooling | Refers to that portion of the electronic/automated software system and its controls which supply cooled air/gas. It includes, for example, cooling units, control and indicating systems. |
| | -50 | Temperature control | Refers to that portion of the electronic/automated software system used to control the temperature of the air/gas. It includes, for example, sensing devices, switches and indicators. |
| | -60 | Moisture/air | Refers to that portion of the electronic/automated software system used to contaminant control the air/gas. It includes, for example, control of moisture and/or ozone concentrations, filtration of radioactive debris and removal of chemical/biological contaminants. |
| | -70 | Liquid coolant | Refers to those units and devices within the electronic/automated software system which supply liquid coolant to an equipment cooling system. |

### 2.2.10 System K - Hydraulic systems - General

*Table 42 System K - Hydraulic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K0 | -00 | **Hydraulic systems - General** | A system or equipment for generation, distribution and/or control of hydraulic (or pneumatic) power. |

*Table 43 System K1 - Hydraulic - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K1 | -00 | **Hydraulic - General** | Refers to that portion of the electronic/automated software system which generates, distributes and/or controls hydraulic power. |
| | -10 | Main | Refers to that portion of the electronic/automated software system which generates, distributes and/or controls primary hydraulic power. It includes, for example, tanks, valves, pumps and plumbing. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | Refers to that portion of the electronic/automated software hydraulic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main hydraulic system. |
| | -30 | Indicating | Refers to that portion of the electronic/automated software hydraulic system which is used to monitor its condition. It includes, for example, transmitters, indicators and alarm systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Support | Refers to that portion of the electronic/automated software system which is used to hydraulically raise or lower other units. |

*Table 44 System K2 - Pneumatic - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K2 | -00 | **Pneumatic - General** | Refers to that portion of the electronic/automated software system which generates, distributes and/or controls pneumatic (including vacuum) power. |
| | -10 | Main | Refers to that portion of the electronic/automated software system which generates, distributes and/or controls primary pneumatic (including vacuum) power. It includes, for example, tanks, valves, pumps and plumbing. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | Refers to that portion of the electronic/automated software pneumatic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main pneumatic system. |
| | -30 | Indicating | Refers to that portion of the electronic/automated software pneumatic system which is used to monitor its condition. It includes, for example, transmitters, indicators and alarm systems. |
| | -40 | Pressurization | Refers to that portion of the electronic/automated software system which is used to pressurize cables, waveguides, and other system devices. It includes, for example, dehydrators and compressors. |

### 2.2.11 System L - Electronic system - General

*Table 45 System L - Electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L0 | -00 | **Electronic system - General** | A system or equipment using electronic/automated software and/or firmware elements not specifically included in other systems. |

*Table 46 System L1 - Amplifiers/attenuators - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L1 | -00 | **Amplifiers/ attenuators - General** | Refers to equipment and devices within the electronic/automated software system which increase or decrease the magnitude of a signal, voltage or current. It applies to elements not specifically included in other groups. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Audio | Refers to equipment and devices within the electronic/automated software system which increase or decrease the magnitude of a signal, voltage or current within the audio frequency range (up to 30 kHz). |
| | -20 | Power | Refers to equipment and devices within the electronic/automated software system which increase or decrease the magnitude of a signal, voltage or current with a power of greater than or equal to 5 watts. |
| | -30 | RF | Refers to equipment and devices within the electronic/automated software system which increase or decrease the magnitude of a signal, voltage or current within the radio frequency range. |

*Table 47 System L2 - Filters - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L2 | -00 | **Filters - General** | Refers to that portion of the electronic/automated software system, which passes or rejects a signal, voltage or current. It applies to elements not specifically included in other groups. |
| | -10 | Low-pass | Refers to equipment and devices within the electronic/automated software system which pass low-frequency and reject high frequency signals. |
| | -20 | High-pass | Refers to equipment and devices within the electronic/automated software system which reject low-frequency and pass high frequency signals. |
| | -30 | Band-pass | Refers to equipment and devices within the electronic/automated software system which pass signals within a defined frequency band. |
| | -40 | Band-stop | Refers to equipment & devices within the electronic/ automated software which reject signals within a range. |

*Table 48 System L3 - Computer/logic hardware-analogue - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L3 | -00 | **Computer/logic hardware-analogue - General** | Refers to equipment and devices within the electronic/automated software system which process or store analogue data. It applies to elements not specifically included in other groups. |
| | -10 | Processing | Refers to equipment and devices within the electronic/automated software system which perform a process on a signal, voltage or current. It includes, for example, mixers, converters, decoders and microwave devices (including couplers, cavity devices and circulators). |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Input | Refers to equipment and devices within the electronic/automated software system which provide a means for inputting analogue data. It includes, for example, acoustic couplers, work stations, analogue controls and microphones. |
| | -30 | Output | Refers to equipment and devices within the electronic/automated software system which provide a means of outputting analogue data. It includes, for example, headphones, loudspeakers, moving coil displays, visual display units and projectors. |
| | -40 | Data storage | Refers to equipment and devices within the electronic/automated software system which retain analogue data. It includes, for example, video and audio recorders. |
| | -50 | Multiplexer | Refers to equipment and devices within the electronic/automated software system which multiplex and/or switch signals. It includes, for example, time division multiplexers and switching multiplexers. |
| | -60 | Comparator/ discriminator/ integrator | Refers to equipment and devices within the electronic/automated software system which compare, discriminate and/or integrate signals. |

*Table 49 System L4 - Computer/logic hardware-digital - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L4 | -00 | **Computer/logic hardware-digital - General** | Refers to equipment and devices within the electronic/automated software system which process or store digital data. It applies to elements not specifically included in other groups. |
| | -10 | Processing | Refers to equipment and devices within the electronic/automated software system which receive and perform arithmetic and/or logic operations on digital data. It includes, for example, central processing units and math co-processors. |
| | -20 | Input | Refers to equipment and devices within the electronic/automated software system which provide a means of inputting digital data. It includes, for example, punched tape readers, keyboards, digital joysticks, mice and image scanners. |
| | -30 | Output | Refers to equipment and devices within the electronic/automated software system which provide a means of outputting digital data. It includes, for example, printers, plotters and monitors. |
| | -40 | Data storage | Refers to equipment and devices (other than memory) within the electronic/automated software system which retain data and/or instructions. It includes, for example, floppy, hard and optical disks, magnetic tape and CD-ROM. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Memory | Refers to equipment and devices within the electronic/automated software system which store data or instructions. It includes, for example, RAM, ROM and bubble memory |
| | -60 | Control | Refers to equipment and devices within the electronic/automated software system which control internal and/or external processes. |

*Table 50 System L5 - Optoelectronics - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L5 | -00 | **Optoelectronics - General** | Refers to equipment and devices within the electronic/automated software system which generate or detect radiation above the radio spectrum (including infra-red, ultra-violet and x-rays). It applies to elements not specifically included in other groups. |
| | -10 | Fiber-optic | Refers to equipment and devices within the electronic/automated software system which interface to and/or enhance the performance of fiber optic cables. It includes, for example, adapters, drivers, repeaters and ITLs. |
| | -20 | Measurement | Refers to equipment and devices within the electronic/automated software system which measure light. It includes, for example, photometers. |
| | -30 | Detection | Refers to equipment and devices within the electronic/automated software system which detect light. It includes, for example, photo-cells and cameras. |
| | -40 | Emission | Refers to equipment and devices within the electronic/automated software system which emit light. It includes, for example, bulbs, lasers and LEDs. |
| | -50 | Switching | Refers to equipment and devices within the electronic/automated software system which switches light. It includes, eg, beam splitters and resonating mirrors. |

*Table 51 System L6 - Oscillators/waveform generators - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L6 | -00 | **Oscillators/ waveform generators - General** | Refers to equipment and devices within the electronic/automated software system which produce varying or switched waveforms. It includes, for example, oscillating devices, timing subsystems and station clocks. It applies to elements not specifically included in other groups. |
| | -10 | Astable | Refers to equipment and devices within the electronic/automated software system which continually switch or oscillate from one state to another. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Bistable | Refers to equipment and devices within the electronic/automated software system which can switch between two states. |

### 2.2.12 System M - Auxiliary systems - General

*Table 52 System M - Auxiliary systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M0 | -00 | **Auxiliary systems - General** | Refers to equipment and devices within the electronic/automated software system which provide services and/or support to the main systems or equipment. It applies to elements not specifically included in other groups. |

*Table 53 System M1 - Adapter kits - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M1 | -00 | **Adapter kits - General** | Refers to equipment and devices within the electronic/automated software system which adapt the system to particular applications. |

*Table 54 System M2 - Fire - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M2 | -00 | **Fire - General** | Refers to equipment and devices within the electronic/automated software system which provide a means of alerting and/or dealing with fire hazards. It includes, for example, detection and extinguishing facilities. |
| | -10 | Detecting | Refers to equipment and devices within the electronic/automated software system which is used to sense the presence of excessive heat, smoke or flame. |
| | -20 | Indicating | Refers to equipment and devices within the electronic/automated software system which is used to indicate the presence of excessive heat, smoke or flame. |
| | -30 | Protection | Refers to equipment and devices within the electronic/automated software system which is used to extinguish fires. |

### 2.2.13 System N - Survivability - General

*Table 55 System N - Survivability - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N0 | -00 | **Survivability - General** | A system or equipment used to provide hazard detection, protection, survivability and escape facilities. |

*Table 56 System N1 - Surface finish - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N1 | -00 | **Surface finish - General** | Refers to equipment and devices within the electronic/automated software system which provides protection against corrosion. It includes, for example, painting, plating, dip coating and laminating. |

*Table 57 System N2 - Intrusion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N2 | -00 | **Intrusion - General** | Refers to equipment and devices within the electronic/automated software system which provide a means of detecting and indicating an intrusion. |
| | -10 | Detecting | Refers to equipment and devices within the electronic/automated software system which provide a means of detecting an intrusion. |
| | -20 | Indicating | Refers to equipment and devices within the electronic/automated software system which provide a means of indicating an intrusion. |
| | -30 | Protection | Refers to equipment and devices within the electronic/automated software system which provide a means of protecting against an intrusion. |

*Table 58 System N3 - Nuclear, biological, chemical*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N3 | -00 | **Nuclear, biological, chemical** | Refers to equipment and devices within the electronic/automated software system which provide nuclear, biological and chemical detection, protection and survivability. It applies to elements not specifically included in other groups and includes positive pressure and purification systems, NBC detection and warning devices, decontamination equipment and chemical resistant coatings. It can also include environmental control equipment, such as heaters, coolers, etc. |
| | -10 | Detecting | Refers to equipment and devices within the electronic/automated software system which detects an NBC hazard. |
| | -20 | Indicating | Refers to equipment and devices within the electronic/automated software system which indicates an NBC hazard. |
| | -30 | Protection | Refers to equipment and devices within the electronic/automated software system which provides a means of protection against an NBC hazard. |

### 2.2.14 System P - Special Equipment - General

*Table 59 System P - Special equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P0 | -00 | **Special equipment - General** | A system or equipment used to provide a special mission capability. |

*Table 60 System P1 - Special equipment/systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P1 | -00 | **Special equipment/ systems - General** | Refers to equipment and devices within the electronic/automated software system which can be used to provide a special capability for the system. |
| | -10 | Special recovery equipment | This element refers to that special recovery equipment to enable the achievement of a recovery capability. It includes cranes and towing equipment. |
| | -20 | Launcher special fit equipment | This element refers to that special fit equipment to enable the achievement of a specialized capability. It will include supply, DROPS, lift trucks, side loaders, etc. |
| | -30 | Launcher special purpose equipment | This element refers to that special-to-purpose equipment for the achievement of a special mission purpose. It covers, for example, ISO container bodies and equipment and other special purpose vehicles. |
| | -40 | Installation kit | The installation kit element refers to the equipment for installation of the system related to a particular application. |
| | -50 | Portability kit | The portability kit refers to that equipment required to prepare the system for transportation, other than its prime means of movement. |
| | -60 | Winterization kit | The winterization kit element refers to the equipment for protection of the equipment and/or crew, in adverse weather conditions. |

*Table 61 System P2 - Software - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P2 | -00 | **Software - General** | Refers to software and associated items for the electronic/automated software system which cannot be linked to other areas within the SNS. |

### 2.2.15 System Q - Outfit and furnishings - General

*Table 62 System Q - Outfit and furnishings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q0 | -00 | **Outfit and furnishings - General** | A function or equipment used to provide habitability or operability that is not specifically included in other systems. |

*Table 63 System Q1 - Stowage - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q1 | -00 | **Stowage - General** | Refers to provision for stowage of operational and/or personnel equipment. |

*Table 64 System Q2 - Complete equipment schedule (CES) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q2 | -00 | **Complete equipment schedule - General** | This element refers to lists detailing the equipment required by the user to operate and maintain the system. It includes, for example, both fitted and loose items, spares, tools and operator manuals. |
| | -10 | Production CES | This element refers to the production version of the CES. |
| | -20 | Service CES | This element refers to the service version of the CES. |
| | -30 | Complex CES | This element refers to the complex version of the CES. |

### 2.2.16 System R - Training - General

*Table 65 System R - Training - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R0 | -00 | **Training - General** | The training element is defined as the deliverable training services, devices, accessories, aids, equipment and facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the electronic/automated software system with maximum efficiency. This element includes all effort associated with design, development and production of deliverable training equipment as well as the execution of training services. |

*Table 66 System R1 - Training services - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R1 | -00 | **Training services - General** | Refers to the deliverable training services used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -10 | Training devices/ accessories/ aids | Refers to the deliverable devices, accessories and aids used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -20 | Training equipment | Refers to the deliverable training equipment used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -30 | Training facilities | Refers to the deliverable training facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |

### 2.2.17 System S - Repair test and support - General

*Table 67 System S - Repair test and support - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S0 | -00 | **Repair test and support - General** | A system, equipment or facilities used to maintain operational capability. |

*Table 68 System S1 - Repair facilities - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S1 | -00 | **Repair facilities - General** | Refers to the facilities which will allow unserviceable electronic/automated software systems to be repaired, programmed, tested, calibrated and returned to service use. |

*Table 69 System S2 - Common support equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S2 | -00 | **Common support equipment - General** | Refers to common equipment and devices required to support and maintain the electronic/automated software system, whilst not directly engaged in the performance of its mission. The common support equipment must presently exist in the MOD inventory for support of other systems (ie GFE). It also includes the acquisition of additional quantities of this equipment, where necessary, to support introduction of the electronic/automated software system into operational service. |

*Table 70 System S3 - Test and measurement - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S3 | -00 | **Test and measurement - General** | Refers to that peculiar or unique test and measurement equipment which allows an operator or maintainer to evaluate operational conditions of the system, including specific diagnostics, screening or QA effort at a unit, intermediate or base level of equipment support. It includes, for example, installation and maintenance test equipment, BIT/BITE, GPTE and STTE. |
| | -10 | Installation | Refers to the test and measurement equipment which is used during the installation and commissioning process of the system. |
| | -20 | Maintenance | Refers to the test and measurement equipment which is required during the performance of both corrective and preventive maintenance of the system. |
| | -30 | BIT/BITE | Refers to the built-in test and measurement equipment which provides a means of monitoring and/or testing the performance and/or condition of the system. |
| | -50 | STTE | Refers to the test and measurement equipment which is special to type. The STTE must not exist in the present MOD inventory for support of other systems (ie. Not GFE). |
| | -40 | GPTE | Refers to the test and measurement equipment which is general purpose. The GPTE must presently exist in the MOD inventory for support of other systems (ie GFE). It also includes the acquisition of additional quantities of this equipment, where necessary, to support introduction of the electronic/automated software system into operational service. |
| | -60 | NDT & specialist testing | Refers to the test and measurement of the structural integrity of structures and devices within the electronic/automated software system, through non-destructive means. It includes, for example, ultrasonic, dye-penetrant and X-ray techniques. |

*Table 71 System S4 - Support and handling equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S4 | -00 | **Support and handling equipment - General** | The support and handling equipment element is defined as the deliverable tools and handling equipment used for support of the electronic/automated software system, eg ground support equipment, mechanical handling equipment and software support equipment. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project or not.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.5

## *Maintained SNS - Air vehicle, engines and equipment*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |
| Chap 8.2.1 | Maintained SNS - Generic |

# 1 General

The SNS is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

This chapter gives the definitions for the systems and subsystems, which relate to systems and subsystems, for Air Vehicle, Engines and Equipment (AVEE). For details on how to use this SNS within the data module code, refer to Chap 4.3.3.

# 2 Air vehicle, engines and equipment SNS

The coding and definitions for the AVEE SNS is appropriate for common and system level information for all Products and is described in Table 2 and shown in Fig 1. However, projects can decide not to use this SNS. Business rules decision points are given at Para 3.

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*Fig 1 Top level breakdown for AVEE (Sheet 1 of 2)*

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*Fig 1 Top level breakdown for AVEE (Sheet 2 of 2)*

## 2.1 System breakdown

### 2.1.1 Main systems

This AVEE SNS is divided into 72 main systems.

*Table 2 Top level breakdown for AVEE*

| System | Title |
|---|---|
| 20 | Standard practices - Airframe systems |
| 21 | Environmental control |
| 22 | Auto flight |
| 23 | Communications |
| 24 | Electrical power |
| 25 | Equipment/furnishings |
| 26 | Fire protection |
| 27 | Flight controls |
| 28 | Fuel |
| 29 | Hydraulic power |
| 30 | Ice and rain protection |
| 31 | Indicating/recording systems |
| 32 | Landing gear |
| 33 | Lights |
| 34 | Navigation |
| 35 | Oxygen |
| 36 | Pneumatic |
| 37 | Vacuum |
| 38 | Water/waste |
| 39 | Attack system management |
| 40 | Operational attack functions |
| 41 | Water ballast |
| 42 | Cross-technical attack functions |
| 42 | Integrated Modular Avionics |
| 43 | Tactical communications |
| 44 | Cabin System |
| 45 | Central maintenance system (CMS) |
| 46 | Systems integration and display |
| 46 | Information system |

| System | Title |
|---|---|
| 47 | Liquid nitrogen |
| 48 | In-flight refueling tanker |
| 49 | Airborne auxiliary power |
| 50 | Cargo and accessory compartment |
| 51 | Standard practices - Structures |
| 52 | Doors |
| 53 | Fuselage |
| 54 | Nacelles/pylons |
| 55 | Stabilizers |
| 56 | Windows and canopies |
| 57 | Wings |
| 58 | Not available for projects |
| 59 | Not available for projects |
| 60 | Standard practices - Propeller/rotor |
| 61 | Propellers/propulsors |
| 62 | Main rotors |
| 63 | Main rotor drives |
| 64 | Tail rotor |
| 65 | Tail rotor drive |
| 66 | Folding blades/pylon |
| 67 | Rotors flight control |
| 68 | Not available for projects |
| 69 | Not available for projects |
| 70 | Standard practices - Engine |
| 71 | Power plant |
| 72 | Engine |
| 72 | Engine turbine/turboprop Ducted fan/unducted fan |
| 72 | Engine reciprocating |
| 73 | Engine fuel and control |
| 74 | Ignition |
| 75 | Air |
| 76 | Engine controls |

| System | Title |
|---|---|
| 77 | Engine indicating |
| 78 | Exhaust |
| 79 | Oil |
| 80 | Starting |
| 81 | Turbines |
| 82 | Water injection |
| 83 | Accessory gearboxes |
| 84 | Propulsion augmentation |
| 85 | Not available for projects |
| 86 | Lift system |
| 87 | Not available for projects |
| 88 | Not available for projects |
| 89 | Not available for projects |
| 90 | Recovery |
| 91 | Air vehicle wiring |
| 92 | Radar |
| 93 | Surveillance |
| 94 | Weapons system |
| 95 | Crew escape and safety |
| 96 | Missiles, drones and telemetry |
| 97 | Image recording |
| 98 | Meteorological and atmospheric research |
| 99 | Electronic warfare |

### 2.1.2 Definitions of systems and subsystems

This SNS is to be supplemented with the generic SNS given at Chap 8.2.1.

### 2.1.3 System 20 - Standard practices - Airframe systems

*Table 3 System 20 - Standard practices - Airframe systems*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 20 | | **Standard practices - Airframe systems** | This System contains those standard mechanical and electrical electric/engineering practices applicable to more than one airframe system task which are not covered in Chapters 21 thru 49. It excludes those practices which are recognized as standard trade practices and also those practices/processes which are only applicable to manufacture. Practices for a particular application must be included in the appropriate airframe system chapter as part of the procedure. |
| | -00 | General | Standard practices applicable to all airframe system chapters. |
| | -10 thru -90 | | Sections -10 thru -90 are used to describe standard practice. The manufacturer or manufacturing partners can assign the section numbers to suit generic standard practices related to more than one airframe system. |

### 2.1.4 System 21 - Environmental control

*Table 4 System 21 - Environmental control*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 21 | | **Environmental control** | Those units and components which furnish a means of pressurizing, heating, cooling, moisture controlling, filtering and treating the air used to ventilate the areas of the fuselage within the pressure seals. Includes cabin supercharger, equipment cooling, heater, heater fuel system, expansion turbine, valves, scoops, ducts, cabin seals, etc. Also includes such systems as canopy/door seals, anti-g, demisting, waveguide pressurization, etc. |
| | -00 | General | |
| | -10 | Compression | That portion of the system and its controls which supplies compressed air. Includes items such as controls and indicating systems related to the compressors, wiring, etc. Does not include the pressure control and indicating system for the cabin pressurization. |
| | -20 | Distribution | That portion of the system used to induct and distribute air. Includes equipment rack cooling, canopy/door seals, anti-g, demisting, waveguide pressurization system and items of such systems like blowers, scoops, ducting, inlets, valves, wiring, etc. Does not include valves which are part of pressurization and temperature control. |
| | -30 | Pressurization control | That portion of the system used to control the pressure within the fuselage. Includes items such as control valves, relief valves, indicators, switches, amplifiers, wiring, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Heating | That portion of the system and its controls which supply heated air. Includes items such as heater units, fuel system and control, ignition indicating systems related to heater operation, wiring, etc. Does not include temperature control and indicating systems. |
| | -50 | Cooling | That portion of the system and its controls which supply cooled air. Includes items such as the cooling unit, indicating systems related to the cooler operation, wiring, etc. Does not include temperature control and indicating systems. |
| | -60 | Temperature control | That portion of the system used to control the temperature of the air. Includes items such as control valves, thermal sensing devices, switches, indicators, amplifiers, wiring, etc. |
| | -70 | Moisture/air contaminant control | That portion of the system used to control moisture in the air, to control ozone concentrations, to filter radioactive debris and chemical/biological contaminants from conditioned air, and to treat the air with deodorizers, insecticides, etc. |
| | -80 | Liquid/gas coolant | Those components required to supply liquid/gas coolant to an equipment cooling system. |
| | -90 | Integrated environmental control system (ECS) | That portion of the system which provides integrated functionality for conditioned, cooled, heated, pressurized air, NBC filtration, and emergency ventilation to sustain crew and component operation over wide range of temperatures. This includes avionics (component racks) cooling. |

### 2.1.5 System 22 - Auto flight

*Table 5 System 22 - Auto flight*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 22 | | **Auto flight** | Those units and components which furnish a means of automatically controlling the flight of the air vehicle. Includes those units and components which control direction, heading, attitude, altitude and speed. |
| | -00 | General | |
| | -10 | Autopilot | That portion of the system that uses radio/radar signals, directional and vertical references, air data (pitotstatic), computed flight path data, or manually induced inputs to the system to automatically control the flight path of the air vehicle through adjustment to the pitch/roll/yaw axis or wing lift characteristics and provide visual cues for flight path guidance ie Integrated Flight Director. This includes power source devices, interlocking devices and amplifying, computing, integrating, controlling, actuating, indicating and warning devices such as computers, servos, control panels, indicators, warning lights, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Speed-attitude correction | That portion of the system that automatically maintains safe flight conditions by correcting for effects of speed and out-of-trim conditions by such means as automatic trim, mach trim or speed stability and mach feel. This includes sensing, computing, actuating, indicating, internal monitoring, and warning devices, etc. |
| | -30 | Auto throttle | That portion of the system that automatically controls the position of the throttles to properly manage engine power during all phases of flight/attitude. This includes engaging, sensing, computing, amplifying, controlling, actuating and warning devices such as amplifiers, computers, servos, limit switches, clutches, gear boxes, warning lights, etc. |
| | -40 | System monitor | That which provides separate or external monitoring/remote readout (for maintenance or other purposes) not directly related to the internal system monitoring (for system integrity flight crew warning). This includes sensing, computing, indicating and warning devices, control panels, etc. |
| | -50 | Aerodynamic load alleviating | The system or portion of the system that automatically corrects/provides for gust loading/ upset, aerodynamic augmentation/ alleviations/ suppression, ride control, etc. This includes sensing, computing, actuating indicating internal monitoring, warning devices, etc. |

### 2.1.6 System 23 - Communications

*Table 6 System 23 - Communications*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 23 | | **Communications** | Those units and components which furnish a means of communicating from one part of the air vehicle to another and between the air vehicle or ground stations. Includes voice, data C-W communicating components, PA system, intercom and tape reproducers-record player. |
| | -00 | General | |
| | -10 | Speech communication | That portion of the system which utilizes voice modulated electro magnetic waves to transmit and/or receive messages from air to air, or air to ground installations. Includes HF, VHF, UHF, etc, in-flight telephone, communication transmitting and receiving equipment. |
| | -15 | SATCOM | That portion of the system which utilizes satellite communication systems (SATCOM). |
| | -20 | Data transmission and automatic calling | That portion of the system which presents information derived from pulse coded transmissions. Includes Teleprinter, Selcal, Calsel, ACARS, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Passenger address and entertainment | That portion of the system used to address and entertain the passengers. Includes items such as amplifiers, speakers, handsets, reproducers, control panels, etc. Also includes items of audio, video and film equipment. |
| | -40 | Interphone | That portion of the system which is used by flight and ground personnel to communicate between areas on the air vehicle. Includes items such as amplifier, handset, etc. Does not include the interphone system within the flight compartment which is part of the integrating system. |
| | -50 | Audio integrating and voice command systems | That portion of the system which controls the output of the communications and navigation receivers into the flight crew headphones and speakers and the output of the flight crew microphones into the communications transmitters. Includes items such as audio selector control panel, microphones, headphones, cockpit loudspeakers, etc. Also includes those items which provide for voice command systems used by the operating crew members. (Not including items which are components of an associated air vehicle system). |
| | -60 | Static discharging | That portion of the system which is used to dissipate static electricity. |
| | -70 | Audio and video monitoring | Those installations that record, or monitor crew or passenger conversation or movement for security of safety purposes. Includes voice recorders, television, monitors, etc. |
| 23 | -80 | Integrated automatic tuning | That portion of the system which maintains integrated control of the operating frequencies of communication and navigation transmitter/receivers after either a manually inserted command or a preprogrammed integrated flight system command. Includes such items as integrated frequency selector panels, digital frequency control computers, integrated frequency display panels, etc. |

### 2.1.7 System 24 - Electrical power

*Table 7 System 24 - Electrical power*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 24 | | **Electrical power** | Those electrical units and components which generate, control and supply AC and/or disassembly code electrical power for other systems, including generators and relays, inverters, batteries etc, through the secondary busses. Also includes those units and components which provide for multiplexing of electrical power and common electrical items such as wiring, switches, connectors, etc. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Generator drive | Mechanical devices that drive the generators at a desired RPM. Includes items such as oil system, connecting devices, indicating and warning systems for the drive, ram air turbine, etc. |
| | -20 | AC generation | That portion of the systems used to generate, regulate, control, and indicate AC electrical power. Includes items such as inverters, AC generators/alternators, control and regulating components, indicating systems etc, all wiring to but not including main busses. |
| | -30 | DC generation | That portion of the systems used to generate, regulate, control and indicate DC electrical power. Includes items such as generators/alternators, transformers, rectifiers, batteries, control and regulating components, indicating systems etc, all wiring to but not including main busses. |
| | -40 | External power | That portion of the system within the air vehicle which connects external electrical power to the air vehicle's electrical system. Includes items such as receptacles, relays, switches, wiring, warning lights, etc. |
| | -50 | AC electrical load distribution | That portion of the system which provides for connection of AC power to using systems. Includes items such as main and secondary busses, main system circuit breakers, power system devices, etc. |
| | -60 | DC electrical load distribution | That portion of the system which provides for connection of DC power to using systems. Includes items such as main and secondary busses, main system circuit brakers, power system devices, etc. |
| | -70 | Electrical monitoring and protection | That portion of the system used to supply aircraft or ground power to use the ground power switching system, avionics low cooling protection system, essential 28 V disassembly code bus monitoring system and system monitoring. Also includes air vehicle grounding receptacles. |
| | -80 | Electrical power multiplexing | Those units or components which provide for multiplexing of electrical power. Includes computers, remote terminals and related interfaces to transmit electrical power control signals. |
| 24 | -90 | Multipurpose equipment | Those units or components which are applicable to more than one system or system interfaces, such as junction boxes, relay panels, terminal blocks, etc. |

### 2.1.8 System 25 - Equipment/furnishings

*Table 8 System 25 - Equipment/furnishings*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 25 | | **Equipment/furnishings** | Those removable items of equipment and furnishings contained in the flight and passenger compartments. Includes emergency, buffet and lavatory equipment. Does not include structures of equipment assigned specifically to other chapters. |
| | -00 | General | |
| | -10 | Flight compartment | The compartment above the floor and between the forward passenger partition and the forward pressure dome. Includes items such as flight crew seats, tables, pilot check lists and food containers, wardrobes, curtains, manuals, electronic equipment rack, spare bulbs, fuses, etc. Does not include cargo compartments. |
| | -20 | Passenger/operating crew compartment | The areas in which the passengers/operating crew are accommodated. Includes lounges but not dressing rooms. Includes items such as seats, consoles, equipment racks, berths, overhead storage compartments, curtains, wall coverings, carpets, magazine racks, movable partitions, wall type thermometers, spare bulbs, fuses, etc. |
| | -30 | Buffet/galley | The areas in which food and beverages are stored and prepared. Includes items such as removable and fixed cabinets, ovens, refrigerators, garbage containers, dish racks, coffee maker and dispensers, containers, electrical outlets, wiring, etc. |
| | -40 | Lavatories | The toilet and dressing room areas containing wash basins, dressing tables and water closet. Includes items such as mirrors, seats, cabinets, dispensing equipment, electrical outlets, wiring, etc. Wash basins and water closets are included in System 38. |
| | -50 | Additional compartments | Those additional compartments for the use of passengers and/or crew. Includes such compartments as crew rest compartments, sleeping compartments etc. |
| | -60 | Emergency | Those items of equipment carried for use in emergency procedures. Includes items such as evacuation equipment, life rafts, life jackets, emergency locator transmitters, underwater locator devices, first aid kit, incubators, oxygen tents, medical stretchers, landing and signal flares, drag parachutes, evacuation signaling systems, etc. Does not include fire extinguishers, oxygen equipment or masks. |
| | -70 | Available for projects | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Insulation and lining | Those blankets which are used for heat and sound insulation. Includes flight compartments, passenger compartment, additional compartment insulation etc. |

### 2.1.9 System 26 - Fire protection

*Table 9 System 26 - Fire protection*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 26 | | **Fire protection** | Those fixed and portable units and components which detect and indicate fire or smoke and store and distribute fire extinguishing agent to all protected areas of the air vehicle; including bottles, valves, tubing, etc. |
| | -00 | General | |
| | -10 | Detection | That portion of the system which is used to sense and indicate the presence of overheat, smoke or fire. |
| | -20 | Extinguishing | That portion of those fixed or portable systems which is used to extinguish fire. |
| | -30 | Explosion suppression | That portion of the system which is used to sense, indicate and extinguish a flame propagating into the fuel system to prevent an explosion. |

### 2.1.10 System 27 - Flight controls

*Table 10 System 27 - Flight controls*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 27 | | **Flight controls** | Those units and components which furnish the means of controlling the flight attitude characteristics of the air vehicle. Also includes the functioning and maintenance of the primary and secondary flying control surfaces and lift augmenting systems but not the maintenance of the structure of control surfaces which is covered in the structure system. Includes items such as control stick grips, rudder pedals, gearboxes, control rods and cables, linkages, hydraulic valves, actuators, control units, controls and indicators, computers, transducers, transformers, sensor units, displays, gyros, accelerometers, servos, warning systems and control locking devices. This includes rotorcraft rotor controls which are covered in the rotor systems. |
| | -00 | General | |
| | -10 | Roll control | That portion of the system which controls the roll axis of the aircraft. Includes items such as the control wheels, cables, booster, linkages, control surfaces, indicators, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Yaw control | That portion of the system which controls the yaw axis of the aircraft. Includes items such as the rudder pedals, tab control wheel, cables, boosters, linkages, control surfaces, position indicators, etc. |
| | -30 | Pitch control | That portion of the system which controls the pitch axis of the aircraft. Includes items such as the control column, stickshaker units, automatic stall recovery devices, tab control wheels, cables, boosters, linkages, control surfaces, position indicators, stall warning systems etc. |
| | -40 | Horizontal stabilizers | That portion of the system which controls the position and movement of the horizontal stabilizer/canard. Includes items such as control handle, cables, jackscrews, motors, warning systems, linkages, control surfaces, position indicators, etc. |
| | -50 | Flaps | That portion of the system which controls the position and movement of the trailing edge flaps. Includes items such as control handles, cables, actuators, warning systems, linkages, control surfaces, position indicators, etc. |
| | -60 | Spoilers, drag devices and variable aerodynamic fairings | That portion of the system which controls the position and movement of the spoilers, drag devices and variable aerodynamic fairings. Includes items such as control handles, cables, warning systems, linkages, spoilers, drag devices, position indicators, etc. |
| | -70 | Gust lock and damper | That portion of the system which protects the control surfaces from movement by wind while the aircraft is on the ground. Does not include locking the control by means of flight control boost system. |
| | -80 | Lift augmenting | That portion of the system which controls the position and movement of variable opening wings slots, leading edge wing flaps and similar auxiliary devices used for increasing aerodynamic lift. Includes items such as control handles, cables, actuators, linkages, warning systems, control surfaces, position indicators, etc. This does not include not include trailing edge flaps. |

### 2.1.11 System 28 - Fuel

*Table 11 System 28 - Fuel*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 28 | | **Fuel** | Those units and components which store and deliver fuel to the engine. Includes engine driven fuel pumps for reciprocating engines, includes tanks (bladder), valves, boost pumps etc, and those components which furnish a means of dumping fuel overboard. Includes integral and tip fuel tank leak detection and sealing. Does not include the structure of integral or tip fuel tanks and the fuel cell backing boards which are covered in the structures chapters, and does not include fuel flow rate sensing, transmitting and/or indicating, which are covered in System 73. |
| | -00 | General | |
| | -10 | Storage | That portion of the system which stores fuel. Includes tank sealing, bladder type cells, venting system, drainage provisions for tank pumps, cell and tank inter-connectors, over wing filler necks and caps, etc. Also includes reservoir feed pumping systems and reservoirs within the tanks which are not part of the distribution system. |
| | -20 | Distribution | That portion of the system which is used to distribute fuel from the filler connector to the storage system and from the storage system to and including the power plant fuel quick disconnect. Includes items such as plumbing, pumps, valves, controls, etc. |
| | -30 | Dump | That portion of the system which is used to dump fuel overboard during flight. Includes items such as plumbing, valves, controls, chutes, etc. |
| | -40 | Indicating | That portion of the system which is used to indicate the quantity, temperature and pressure of the fuel. Includes pressure warning systems for pumping systems within the tank, etc. Does not include engine fuel flow or pressure. |
| | -50 | In-flight refueling | That portion of the system which provides the means of accepting in-flight refueling. This will include access door controls/actuators, fuel receptor, distribution system to fuel storage or interface with standard fuel distribution system, flow controls and indicators, and audio interconnections with the tanker aircraft. Includes manual transfer and refueling controls but excludes automatic systems based on fuel quantity and c.g. constraints which are covered in Fuel/c.g. Management (System 28-60) on air vehicles so equipped. |
| | -60 | Fuel/centre of gravity management | That portion of the system which controls fuel distribution during aerial and ground refueling to maintain a safe c.g. configuration. Utilizes fuel quantity and stores data to compute air vehicle c.g. Includes fuel quantity and c.g. indication for in-flight and ground refueling operations. |

### 2.1.12 System 29 - Hydraulic power

*Table 12 System 29 - Hydraulic power*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 29 | | **Hydraulic power** | Those units and components which furnish hydraulic fluid under pressure (includes pumps, regulators, lines, valves etc) to a common point (manifold) for redistribution to other defined systems. |
| | -00 | General | |
| | -10 | Main | That portion of the system which is used to store and deliver hydraulic fluid to using systems. Includes items such as tanks, accumulators, valves, pumps, levers, switches, cables, plumbing, wiring, external connectors, etc. Does not include the supply valves to the using systems. |
| | -20 | Auxiliary | That portion of the system which is classified as auxiliary, emergency or standby, and which is used to supplement or take the place of the main hydraulic system. Includes items such as tanks and accumulators which are separate from the main system, hand pumps, auxiliary pumps, ram air turbine, valves, plumbing, wiring, etc. |
| | -30 | Indicating | That portion of the system which is used to indicate the quantity, temperature and pressure of the hydraulic fluid. Includes items such as transmitters, indicators, wiring, warning systems, etc. |

### 2.1.13 System 30 - Ice and rain protection

*Table 13 System 30 - Ice and rain protection*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 30 | | **Ice and rain protection** | Those units and components which provide a means of preventing or disposing of formation of ice and rain on various parts of the aircraft. Includes alcohol pump, valves, tanks, propeller/rotor anti-icing system, wing heaters, water line heaters, pitot heaters, scoop heaters, windshield wipers and the electrical and heated air portion of windshield ice control. Does not include the basic windshield panel.<br><br>For turbine type power plants using air as the anti-icing medium, engine anti-icing is contained in System 75. |
| | -00 | General | |
| | -10 | Airfoil | That portion of the system which is used to eliminate or prevent the formation of ice on all airfoil surfaces. Includes wings, airfoil sections of the empennage and pylons. |
| | -20 | Air intakes | That portion of the system which is used to eliminate or prevent the formation of ice in or around air intakes. Includes power plant cowling anti-icing. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Pitot and static | That portion of the system which is used to eliminate or prevent the formation of ice on the pitot and static systems. |
| | -40 | Windows, windshields, canopies and doors | That portion of the system which is used to eliminate or prevent the formation and accumulation of ice, frost or rain on the windows, windshields, canopies and doors. |
| | -50 | Antennas and radomes | That portion of the system which is used to eliminate or prevent the formation of ice on antennas and radomes. |
| | -60 | Propellers/rotors | That portion of the system which is used to eliminate or prevent the formation of ice on propellers or rotors. Includes all components up to but not including rotating assembly. |
| | -70 | Water lines | That portion of the system which is used to prevent the formation of ice in water supply and drain lines. |
| | -80 | Detection | That portion of the system which is used to detect and indicate the formation of ice. |

### 2.1.14 System 31 - Indicating/recording systems

*Table 14 System 31 - Indicating/recording systems*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 31 | | **Indicating/recording systems** | Pictorial coverage of all instruments, instrument panels and controls. Procedural coverage of those systems which give visual or aural warning of conditions in unrelated systems. Includes units which record, store or compute data from unrelated systems and those units/systems that integrate indicating instruments into a central display system and instruments not related to any specific system. |
| | -00 | General | |
| | -10 | Instrument and control panels | Coverage of all panels fixed or movable with their replaceable components such as instruments, switches, circuit breakers, fuses, etc. Also includes general coverage of instrument panel vibrators and other panel. |
| | -20 | Independent instruments | Those instruments, units and components which are not related to specific systems. Includes items such as inclinometers, clocks, etc. |
| | -30 | Recorders | Those systems and components used for recording data not related to specific systems. Includes items such as flight recorders, performance or maintenance recorders, VG recorders, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | General computers | Those systems and components used for computing data from a number of different sources without a preponderance of functions in any one system. Includes items such as Digital Core Avionic System (DCAS), stored check list, emergency procedures, company regulations etc, for call up on a display, integrated instrument systems such as engine, air vehicle power and central warning indicators when combined into a central display. |
| | -50 | Central warning systems | Those systems and components which give audible or visual warning of conditions in unrelated systems. Includes items such as master warning or flight warning systems, central instrument warning or caution and warning systems, tone generators, annunciators, etc. |
| | -60 | Central display systems | Those systems and components which give visual display of conditions in unrelated systems. |
| | -70 | Automatic data reporting systems | Those systems and components used for collating and computing data from unrelated systems and transmitting same automatically. Includes ASDAR systems and components. |

### 2.1.15 System 32 - Landing gear

*Table 15 System 32 - Landing gear*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 32 | | **Landing gear** | Those units and components which furnish a means of supporting and steering the air vehicle on the ground or water, and make it possible to retract and store the landing gear in flight. Includes tail skid assembly, arresting hooks, landing assistance equipments, drag chutes, brakes, wheels, floats, skids, skis, doors, shock struts, tires, linkages, position indicating and warning systems. Also includes the functioning and maintenance aspects of the landing gear doors but does not include the structure which is covered in System 52. |
| | -00 | General | |
| | -10 | Main gear and doors | That portion of the system which provides the major support for the air vehicle while on the ground. Includes items such as shock struts, bogie axles, drag struts, doors, linkages, attach bolts, etc. |
| | -20 | Nose/tail gear and doors | That portion of the system which supports the nose/tail of the air vehicle while the air vehicle is on the ground. Includes items such as shock struts, drag struts, doors, linkages, attach bolts, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Extension and retraction | That portion of the system which is used to extend and retract the landing gear and open and close the landing gear doors. Includes items such as actuating mechanisms, bogie trim, bungees, up and down latches, operating controls, valves and motors, cables, wiring, plumbing, etc. |
| | -40 | Wheels and brakes | That portion of the system which provides for rolling and stopping the air vehicle while on the ground and stopping wheel rotation after retraction. Includes items such as bearings, tires, valves, de-boosters, swivel glands, anti-skid devices, pressure indicators, plumbing, etc. |
| | -50 | Steering | That portion of the system which is used to control the direction of movement of the air vehicle on the ground. Includes items such as actuating cylinders, controls, bogie swivel unlock, etc. |
| | -60 | Position and warning | That portion of the system which is used to indicate and warn of the position of the landing gear/doors. Includes items such as switches, relays, lights, indicators, horns, wiring, etc. |
| | -70 | Supplementary gear | Devices used to stabilize the air vehicle while on the ground and prevent damage by ground contact. Includes items such as shock strut, ski block, wheels, etc. |
| | -80 | Drag chute | That portion of the system used to aid in slowing the speed of the air vehicle when landing. |
| | -90 | Arresting hook/landing assistance equipment | That portion of the system which is used to extend, retract and indicate the position of an arresting hook. Alternatively, those items providing landing assistance, such as helicopter winch-down systems and Harpoon system. |

### 2.1.16 System 33 - Lights

*Table 16 System 33 - Lights*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 33 | | **Lights** | Those units and components (electrically powered) which provide for external and internal illumination such as landing lights, taxi lights, position lights, rotating lights, ice lights, master warning lights, passenger reading and cabin dome lights, etc. Includes light fixtures, switches and wiring. Does not include warning lights for individual systems or self illuminating signs. Does not include lamps/bulbs which are covered in System 25.<br><br>**Note:**<br>For those aircraft that do not contain passenger compartments, and where the flight compartment(s) can be reasonably divided, subsystem - 20 can be used to aid in defining such division. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Flight compartment | The lighting subsystems in the compartment above the floor and between the forward passenger partition and the forward pressure dome. Does not include cargo compartment. Includes primary and secondary lighting and lighting control of work areas, panels, instruments, night vision goggles (NVG), lighting mode selection and lamp test operation. Includes master warning light and warning light dimming systems, where not integrated with a central audio or visual system under System 31-50. |
| | -20 | Passenger compartments | The lighting subsystems in the areas in which the passengers are seated and in buffet/galley, lavatories, lounges and coat rooms. Includes items such as direct and indirect illumination, passenger call system, lighted signs, etc. |
| | -30 | Cargo and service compartments | The lighting subsystems in the compartments for stowage or cargo and the housing of various components of accessories. |
| | -40 | Exterior | The lighting subsystems used to provide illumination outside of the aircraft. Includes lights such as landing, navigation, position indicating, wing illumination, rotating, courtesy, taxi, etc. |
| | -50 | Emergency lighting | The separate and independent subsystems used to provide illumination in case of primary electrical power failure. Includes items such as inertia flashlights, lanterns, etc. |

### 2.1.17 System 34 - Navigation

*Table 17 System 34 - Navigation*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 34 | | **Navigation** | Those units and components which provide air vehicle navigational information. Includes VOR, pitot, static, ILS, flight director, compasses, indicators, etc. |
| | -00 | General | |
| | -10 | Flight environment data | That portion of the system which senses environmental conditions and uses the data to influence navigation. Includes such items as Central Air Data Computers, pitot/static systems, air temperature, rate-of-climb, airspeed, high speed warning, altitude, altitude reporting, altimeter correction system, air disturbance detection system, etc. |
| | -20 | Attitude and direction | That portion of the system which uses magnetic or inertia forces to sense and display the direction or attitude of the air vehicle. This includes sensing, computing, indicating and warning devices such as magnetic compasses, vertical and directional references, magnetic heading systems, attitude director systems, symbol generators, turn and bank, rate of turn, amplifiers, indicators, etc. Includes Flight Director when it is not integral with the auto pilot computation. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Landing and taxiing aids | That portion of the system which provides guidance during approach, landing and taxiing. Includes items such as localizer, glide slope, ILS, markers, paravisual director ground guidance systems, etc. |
| | -40 | Independent position determining | That portion of the system which provides information to determine position and is mainly independent of ground installations or orbital satellites. Includes items such as inertial guidance systems, weather radar, Doppler, electronic/radar altimeter, proximity warning, collision avoidance, star tracker, etc. Also includes sextants/octants, etc. |
| | -50 | Dependent position determining | That portion of the system which provides information to determine position and is mainly dependent on ground installations or orbital satellites. Includes items such as DME, transponders, radio compass, LORAN, VOR, ADF, OMEGA, GLOBAL POSITIONING, IFF, etc. |
| | -60 | Flight management computing | That portion of the system which combines navigational data to compute or manage the air vehicle's geographical position or theoretical flight path. Includes items such as course computers, flight management computers, performance data computers and associated control display units, warning annunciators, etc. |

### 2.1.18 System 35 - Oxygen

*Table 18 System 35 - Oxygen*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 35 | | **Oxygen** | Those units and components which store, generate, regulate, indicate, deliver and control oxygen to the passengers and crew, including bottles, relief valves, shut-off valves, outlets, regulators, masks, walk-around bottles, etc. |
| | -00 | General | |
| | -10 | Crew | That portion of the system which furnishes oxygen to the crew. |
| | -20 | Passenger | That portion of the system which furnishes oxygen to the passengers. |
| | -30 | Portable | That portion of the system which has an independent oxygen supply and which can be transported about the airplane. |
| | -40 | On board oxygen generating system | That portion of the system which generates oxygen for distribution in the other subsystems. |

### 2.1.19 System 36 - Pneumatic

*Table 19 System 36 - Pneumatic*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 36 | | **Pneumatic** | Those units and components (ducts and valves) which deliver large volumes of compressed air from a power source to connecting points for such other systems as air conditioning, pressurization, deicing, etc. |
| | -00 | General | |
| | -10 | Distribution | That portion of the system which is used to distribute high or low pressure air to using systems. Includes items such as ducts, valves, actuators, heat exchangers, controls, etc. Does not include the supply valves to the using systems. |
| | -20 | Indicating | That portion of the system which is used to indicate temperature and pressure of the pneumatic system. Includes temperature and pressure warning systems. |

### 2.1.20 System 37 - Vacuum

*Table 20 System 37 - Vacuum*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 37 | | **Vacuum** | Those units and components used to generate, deliver and regulate negative air pressure, including pumps, regulators, lines etc through and including the manifold. |
| | -00 | General | |
| | -10 | Distribution | That portion of the system which is used to distribute negative pressure air to using systems. |
| | -20 | Indicating | That portion of the system which is used to indicate pressure. Includes pressure warning system. |

### 2.1.21 System 38 - Water/waste

*Table 21 System 38 - Water/waste*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 38 | | **Water/waste** | Those fixed units and components which store and deliver for use, fresh water, and those fixed components which store and furnish a means of removal of water and waste. Includes wash basins, toilet assemblies, tanks, valves, etc. |
| | -00 | General | |
| | -10 | Potable | That portion of the system which is used to store and deliver fresh drinking water. Includes wash water system if the potable water is also used for washing. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Wash | That portion of the system which is used to store and deliver wash water which is not potable. |
| | -30 | Waste disposal | That portion of the system which is used for disposal of water and waste. Includes items such as wash basins, water closets, flushing systems, etc. |
| | -40 | Air supply | That portion of the system common to more than one subsystem which is used for pressurizing supply tanks to insure fluid flow. |

### 2.1.22 System 39 - Attack system management

*Table 22 System 39 - Attack system management*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 39 | | **Attack system management** | Those functions and hardware used for attack system management. That includes digital information networking, crew-machine communication management (including knowledge-based help), stores management etc. |
| | -00 | General | |
| | -10 | Architecture management | General organization and its management depending on missions and their phases. |
| | -20 | Attack system functions | Management of the different functions of the attack system depending on type of the missions and the different phases. In this section, the classification of these functions is indicated with the management of their activity during the missions. |
| | -30 | Attack system resources | All the contributing resources of the attack system are listed and their role is presented depending on the missions and their different phases. |
| | -40 | General rules of man-machine communication | Management of the man-machine communication by the system side (including knowledge based functions). |
| | -50 | Digital networks | Hardware and software related to digital networks as eg MIL-1553B or Stanag-3810. Management of exchanges by these means are also to be presented. |
| | -60 | Other information networks | These other networks needed in attack systems eg network for video signals, network for blanking signals, etc. |
| | -70 | Stores management | Hardware and software within the air vehicle itself used for stores management. |

### 2.1.23 System 40 - Operational attack functions

*Table 23 System 40 - Operational attack functions*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 40 | | **Operational attack functions** | Those functions and hardware used for attack system operational aim. Links of these functions with technical functions are included. |
| | -00 | General | |
| | -10 | Navigational functions | Include localization (with updating), flight management, approach and landing management etc. |
| | -20 | Nap of the earth flight | Terrain following and obstacle avoidance management. |
| | -30 | Self protection | Defensive maneuvers and tactics elaboration against threats. |
| | -40 | Information exchange and cooperation | Elaboration of pieces of information to be exchanged for cooperation with other air vehicles including AWACS-type air vehicles and ground or surface weapons systems. |
| | -50 | Identification | Aerial and surface objects identification based on autonomous but also external (available through cooperation) identification means. |
| | -60 | Air-to-air functions | Fire control functions related to air-to-air attacks. These sections can be divided as required to deal with bullet gun firing, short range missiles, medium range or beyond visual range missiles firing (for single or multiple targets attack). These functions are generally spread between weapons seekers and computers and aircraft sensors, computers, etc.<br><br>This also includes air-to-air management after weapon launch (to guide or help the weapon for the target hitting). |
| | -70 | Air-to-surface functions | Fire control functions related to air-to-surface attacks. These sections can be divided as required to deal with bombs delivery, rockets or missiles firing (either short range, medium range or of fire and forget type). These weapons can be guided or not. These functions are generally spread between weapons seekers, computers, and aircraft sensors, computers, etc.<br><br>Management of guidance when made onboard is also to consider in these sections. |

### 2.1.24 System 41 - Water ballast

*Table 24 System 41 - Water ballast*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 41 | | **Water ballast** | Those units and components provided for the storage, balancing, control, filling, discharge and dumping of water ballast. Does not include units or components covered in System 38. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | |
| | -10 | Storage | That portion of the system which stores water solely for the purpose of providing airship ballast. Includes removable tanks (bladder cells), interconnecting balance pipes, filler valves, etc. |
| | -20 | Dump | That portion of the system used to dump water ballast during flight. Includes valves (remote/direct) manual/automatic controls, etc. |
| | -30 | Indication | That portion of the system used to indicate quantity, condition and relative distribution of the water ballast. |

### 2.1.25 System 42 - Cross-technical attack functions

*Table 25 System 42 - Cross-technical attack functions*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 42 | | **Cross-technical attack functions** | Those functions and hardware used for attacks execution. These technical functions considered in this System are common to many attack system operational functions, and therefore within the "crossroad" of the attack system. |
| | -00 | General | |
| | -10 | Mission system control and management | Functions in charge of scheduling and deciding about planned actions, priority management for resources consumption, etc. |
| | -20 | Trajectory management | Functions dealing with trajectory constraints given by execution of operational functions and in charge of determination of the exact trajectory to follow (by autopilot) or to indicate (to the pilot). |
| | -30 | Attack system compatibilities management | Function in charge of all the aspects related to electromagnetic compatibility between all the transmitters and receivers (including radios, ECM, radars, external stores, lasers, etc). |
| | -40 | Tactical situation awareness | Functions in charge of establishing knowledge about tactical environment and its distribution to other functions eg fire control. The tactical situation awareness is based on information received from aircraft sensors, weapons seekers, cooperation, etc. |
| | -50 | Mission preparation | Embedded functions dedicated to deal with data given before flight and dispatch them to the other attack functions. |
| | -60 | Mission restitution | Embedded functions dedicated to take care of all the data needed to replay the whole or part of the mission later on. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | Cautions and warnings management | Functions in charge of telling crew or ground personal bad events. Here is to consider only the result of each system warning and caution activity and mainly the filtering process (including knowledge based filters) to provide crew only with accurate messages depending on mission phases or aircraft status. |

### 2.1.26 System 42 - Integrated modular avionics

**Note**

For this system the material item category code must be used in accordance with Chap 4.3.3.

*Table 26 System 42 - Integrated modular avionics*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 42 | | **Integrated modular avionics** | Generalize computing devices that can host software applications for system functions that had traditionally been implemented in dedicated hardware. The actual system functions are covered in their respective systems. |
| | -00 | General | |
| | -20 | Core System | |
| | -30 | Network Components | |

### 2.1.27 System 43 - Tactical communications

*Table 27 System 43 Tactical communications*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 43 | | **Tactical communications** | Those units and components that furnish the crew with a means of communicating within the air vehicle, one air vehicle to another, and from the air vehicle to ground stations. Includes voice, C-W communicating components, PA system, intercom and recorder/record player. |
| | -00 | General | |
| | -10 | Ultra, super and extra high frequencies (UHF/SHF/EHF) | That portion of the system which is used for communications utilizing UHF/SHF/EHF carriers. Includes items such as transmitters, receivers, control panel, selcal decoder, antenna, etc. |
| | -20 | Very high frequency (VHF) | That portion of the system which is used for communications utilizing VHF carriers. Includes items such as transmitters, receivers, control panel, selcal decoder, antenna, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | High frequency (HF) | That portion of the system which is used for communications utilizing HF carriers. Includes items such as transmitters, receivers, power supply, control panel, antenna, coupler, etc. |
| | -40 | Low and very low frequency (LF/VLF) | That portion of the system which is used for communications utilizing LF/VLF carriers. Includes items such as transmitters, receivers, power supply, control panel, antenna, coupler, etc. |
| | -50 | Audio integrating | That portion of the system which controls the output of the communications and navigation receivers into the crews' headphones and speakers and the output of the crews' microphones into the communications transmitter. Includes items such as audio selector control panel, microphones, headphones, loudspeakers, etc. |
| | -60 | Digital | That portion of the system which is used for air vehicle to air vehicle or air vehicle to ground stations utilizing C-W. Includes items such as teletypewriters, modems, keyers, encryption devices, etc. |
| | -70 | Multiplex and audio switching | That portion of the system which is used for telephone communications between air vehicles or ground stations. Includes items such as telephones and multiplexing equipment. |
| | -80 | Interphone and passenger address | That portion of the system used to address the passengers and which is used by the crew to communicate between areas of the air vehicle. Includes items such as amplifiers, speakers, handsets, control panels, audio, video and film equipment. Does not include the interphone system within the flight compartment which is part of the integrating system. |
| | -90 | Satellite communications | That portion of the system which is used for air vehicle to satellite communications. Includes items such as receivers, transmitters, modems, amplifiers, etc. |

### 2.1.28 System 44 - Cabin Systems

*Table 28 System 44 - Cabin systems*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 44 | | **Cabin Systems** | Those units and components which furnish a means of entertaining the passengers and providing communication within the aircraft and between the aircraft cabin and ground stations. Includes voice, data, music and video transmissions. Does not include SATCOM, HF, VHF, UHF, and all transmitting/receiving equipment, antennas, etc, which are covered in System 23 or System 46. |
| | -00 | General | |

| | | |
|---|---|---|
| -10 | Cabin core system | That portion of the system used to accomplish the integrated functional control, operation, testing and monitoring of cabin systems and the increase cabin comfort (such as active noise control). Includes items such as controllers, cabin control panels, handsets, signs, loudspeakers, etc. |
| -20 | Inflight entertainment system | That portion of the system used to entertain the passengers with music, video, information, games, etc. Includes items such as controllers, cabin control panels, audio and video equipment, etc. |
| -30 | External communication system | That portion of the system used by passengers and cabin crew to transmit and/or receive data/messages from air to air or from air to ground installations. Includes items such as telephones, telefaxes, modems, AM/FM radio units, etc. |
| -40 | Cabin mass memory system | That portion of the system used to store and process cabin related data, such as systems configuration data, multimedia programs, etc. Includes items such as controllers, terminals, keyboards, disk drives, printers, modems, etc. |
| -50 | Cabin monitoring system | The portion of the system used to monitor parts of the cabin area. Includes items such as surveillance cameras, monitors, etc. Does not include external anti-hijack devices or external video monitoring which are covered in System 23. |
| -60 | Miscellaneous cabin system | That portion of the system used to support miscellaneous cabin functions. |

### 2.1.29 System 45 - Central maintenance system (CMS)

*Table 29 System 45 - Central maintenance system (CMS)*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 45 | | **Central maintenance system (CMS)** | Those units, components and associated system which interfaces with multiple air vehicle systems. Contains checkout and fault isolation procedures using a central computer complex and/or standard fault isolation procedures to locate a single system or component malfunction. |
| | -00 | General | |
| | -04 thru -19 | CMS/Air vehicle general | CMS interfaces with general air vehicle systems and identification of maintenance functions related to air vehicles. |
| | -20 thru -44 and -46 thru -49 | CMS/Airframe systems | CMS interfaces with airframe systems and identification of maintenance functions related to airframe systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -45 | Central maintenance system | That portion of the system which interfaces with other airplane systems, flight line mechanics and radio communications. Includes computers, storage devices, control and display devices. |
| | -50 thru -59 | CMS/structures | CMS interfaces with structures and identification of maintenance functions related to structures. |
| | -60 thru -69 | CMS/propellers | CMS interfaces with propeller and identification of maintenance functions related to propellers. |
| | -70 thru -89 | CMS/power plant | CMS interfaces with power plant and identification of maintenance functions related to power plant. |
| | -91 thru -99 | CMS/military systems | CMS interfaces with military systems and identification of maintenance functions related to military systems. |
| | | | **Note:**<br>Subsystem/Section code is selected to match applicable system interface. For example, 45-21-XX identifies all air conditioning monitoring and testing provided by the CMS and provides directions for using the CMS to execute those maintenance functions. Detailed testing not capable of coverage in System 45 is appropriately cross referenced and provided in System 21. Similarly, 45-32-XX identifies landing gear monitoring and testing provided by the CMS. 45-45-XX identifies the CMS itself. |

### 2.1.30 System 46 - Systems integration and display

*Table 30 System 46 - Systems integration and display*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 46 | | **Systems integration and display** | The primary air vehicle system used to provide central acquisition, processing and display of data from multiple sources such as flight controls, navigation computation, air data computation, warnings, engine parameters, etc. |
| | -00 | General | |
| | -10 | Acquisition | Those units and components used to acquire data for integration and processing. Excludes components which are covered by the chapter dealing with the system/subsystem from which the data is being obtained. |
| | -20 | Processing and integration | Those units and components used to integrate and process data acquired from a variety of sources and output signals to display or warning devices. Includes such items as interfaces, central processing units, data bus controls. |

| | | |
|---|---|---|
| -30 | Display | Those units which display data warning units, remote displays, etc. |
| -40 thru -79 | Systems integration, software packages | These sections are used to provide information about those software packages which are applicable to more than one system of the air vehicle and can be classified as multi-system applicable software. This can be taken to mean software for computers which, in the event of failure of the computer(s) in another system, assume responsibility for the management of that system and thus provides backup to the failed systems, even though the computer which is providing backup normally has no connection with the system for which it is the backup. |

### 2.1.31 System 46 - Information system

**Note**

For this system the material item category code must be used in accordance with Chap 4.3.3.

*Table 31 System 46 - Information system*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 46 | | **Information systems** | Those units and components, which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm, or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the Electronic Library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display. |
| | -00 | General | |
| | -10 | Airplane general information systems | |
| | -20 | Flight deck information systems | That portion of the onboard information system that supports the flight deck systems, flight deck crew and flight operations. |
| | -30 | Maintenance information systems | That portion of the onboard flight information system that supports all onboard maintenance system functions, maintenance technicians, and any ground based maintenance activity. |
| | -40 | Passenger cabin information systems | That portion of the onboard information system that supports the passenger cabin, cabin operations, and flight attendants. |
| | -50 | Miscellaneous information systems | That portion of the onboard information system that supports other functions, as defined by the user that cannot be related to the flight deck, passenger cabin, or maintenance. |

### 2.1.32 System 47 - Liquid nitrogen

*Table 32 System 47 - Liquid nitrogen*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 47 | | **Liquid nitrogen** | Those units and components used to generate, store, deliver and regulate liquid nitrogen to 2 or more using systems. Includes regulators, lines, manifolds, etc. Does not include liquid nitrogen handling components of the using system ie System 21-80. |
| | -00 | General | |
| | -10 | Generation/storage | That portion of the system which generates and/or stores nitrogen. Includes tanks, cells reservoirs, accumulators, etc. Does not include plumbing, pumps, valves, controls, etc. |
| | -20 | Distribution | That portion of the system which is used to distribute nitrogen to the using systems. Includes plumbing, pumps, valves, regulators, etc. |
| | -30 | Controlling | The nitrogen controls which meter the nitrogen to the distribution components and into the using systems. Includes items such as levers, switches, cables, etc. |
| | -40 | Indicating | That portion of the system which is used to indicate the flow rate, temperature and pressure of the nitrogen. Includes items such as transmitters, indicators, etc. |

### 2.1.33 System 48 - In-flight refueling tanker

*Table 33 System 48 - In-flight refueling tanker*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 48 | | **In-flight refueling tanker** | Those units and components which store, and deliver fuel to a receiver vehicle while in flight. Includes fuel storage units, distribution system, controls, sensors etc specifically used for in-flight refueling supply. Includes interfaces with other systems but does not include any dual purpose item that is identified with another system.<br><br>**Note:**<br>When systems and components serve both the operational and refueling system they are identified with the operational fuel system (System 28-00). |
| | -00 | General | |
| | -10 | Storage | That portion of the system which stores fuel specifically for the purpose of in-flight refueling. Includes tank sealing, bladder type cells, ventilating system, cell and tank inter-connectors, over wing filler necks and caps, etc. Also includes reservoir feed pumping systems and reservoirs within the tanks which are not part of the distribution system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Distribution | That portion of the system which is used to distribute fuel from the filler connector to the storage system and from the storage system to and including the interface with the vehicle to vehicle transfer system. Includes such items as plumbing, pumps, valves, controls, etc. |
| | -30 | Delivery | That portion of the system that accepts the fuel from the distribution portion and conducts it to the receiving vehicle. Includes refueling boom and nozzle or hose and drogue, boom control surfaces, actuators and hoist and stowage system. Does not include operator controls. |
| | -40 | Controls | That portion of the system which is used to control the transfer of fuel from tanker to receiving vehicle. Includes operator controls, indicators, inter vehicle communications. |
| | -50 | Indicating | That portion of the system which is used to indicate fuel quantity, temperature and pressure. Includes pressure warning systems for pumping within the storage and distribution areas. |
| | -60 | Dump | That portion of the system which is used to dump fuel overboard during flight. When the tanker vehicle dump system (System 28-30) is used, the interface with it is identified in this system. Includes such items as plumbing, controls, indicators, chutes, etc. |

### 2.1.34 System 49 - Airborne auxiliary power

*Table 34 System 49 - Airborne auxiliary power*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 49 | | **Airborne auxiliary power** | Those airborne power plants (engines) which are installed on the air vehicle for the purpose of generating and supplying a single type or combination of auxiliary electric, hydraulic, pneumatic or other power. Includes power and drive section, fuel, ignition and control systems; also wiring, indicators, plumbing, valves and ducts up to the power unit. Does not include generators, alternators, hydraulic pumps etc or their connecting systems which supply and deliver power to their respective air vehicle systems. |
| | -00 | General | |
| | -10 | Power plant | For definitions see System 71. |
| | -20 | Engine | For definitions see System 72. |
| | -30 | Engine fuel and control | For definitions see System 73. |
| | -40 | Ignition/starting | For definitions see System 74 and 80. |
| | -50 | Air | For definitions see System 75. |
| | -60 | Engine controls | For definitions see System 76. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | Engine indicating | For definitions see System 77. |
| | -80 | Exhaust | For definitions see System 78. |
| | -90 | Oil | For definitions see System 79. |

### 2.1.35 System 50 - Cargo and accessory compartment

*Table 35 System 50 - Cargo and accessory compartment*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 50 | | **Cargo and accessory compartment** | Those compartments for storage of cargo and various components and accessories. Includes those systems used to load/unload cargo and other cargo related systems. Does not include aircraft structure which is in System 53. |
| | -00 | General | |
| | -10 | Cargo compartments | Those compartments for storage of cargo. |
| | -20 | Cargo loading systems | Those systems which have components which are or can be mounted on the aircraft and used to load/unload, restrain, guide or service cargo. Includes drive systems rollers, latches, restraint nets, etc. |
| | -30 | Cargo related systems | Those systems which are related to loading/unloading of cargo. Includes aircraft levelling, loader alignment systems etc. Does not include Cargo Loading Systems. |
| | -40 | Aerial delivery | Those items required for air drop of cargo or personnel. Includes platforms, parachutes and drogue chutes, load release mechanisms and load transfer devices, anchor cables, static lines, retrieval winches, jump lines, etc. |
| | -50 | Accessory compartments | Those compartments used for the housing of various components and accessories. Includes wheel wells, tell-hydraulic-electrical/electronic equipment racks, main battery structure, etc. |
| | -60 | Insulation | Those insulation blankets which are used for heat and sound insulation. Includes cargo compartments and accessory compartments, insulation, etc. |

### 2.1.36 System 51 - Standard practices - Structures

*Table 36 System 51 - Standard practices - Structures*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 51 | | **Standard practices - Structures** | This System contains those standard practices, general procedures and typical repairs applicable to more than one structural task which are not specifically covered in Systems 52 thru 57. This excludes those standard practices which are recognized as standard trade practices, also those practices/processes which are only applicable to manufacture. Practices for a particular application are included in the appropriate structural chapter as part of the procedure. |
| | -00 | General | Standard practices applicable to all structural chapters. Air vehicle major structural breakdown and primary and secondary structure diagrams. Principal area and dimensional data. Restricted area diagram. Zoning diagram. Access door and panel identification. Glossary. |
| | -10 | Investigation, cleanup and aerodynamic smoothness | Definition of damage classifications. Cleanup of dents, cracks, scratches, corrosion, etc. Aerodynamic smoothness requirements for the airplane, and permissible contour variations, gaps and mis-match data. |
| | -20 | Processes | Special processes for use in the repair of the airplane. It does not include general engineering practices unless specific deviations are required. Unique processes such as welding specifications, etc., relative to a single repair are to be incorporated in the repair and only referenced here. |
| | -30 | Materials | Description of materials (metallic and non-metallic) including extrusions, formed sections, sheet, sealants, adhesives, and special materials used in airplane repair. Where possible, permissible substitutes and sources of supply will be given. |
| | -40 | Fastners | Description of fastener types, materials, and sizes. Procedures for fastener installation and removal including hole preparation. Fastener strength values and substitution data. |
| | -50 | Support of airplane for repair and alignment check procedures | Procedure for supporting the airplane to relieve loads during repairs. Includes location for supports and contour dimensions for required ground equipment. |
| | -60 | Control-surface balancing | Procedures for adjusting the mass balance of control surfaces after repair. Where applicable, individual repairs will contain their own balancing instructions. |
| | -70 | Repairs | Typical repairs suited for general use, not limited to one S1000D System |
| | -80 | Electrical bonding | Topics concerning the electrical bonding of aircraft structures as well as electrical bonding of subsystems to aircraft structure. |

### 2.1.37 System 52 - Doors

*Table 37 System 52 - Doors*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 52 | | **Doors** | Removable units used for entrance or exit and for enclosing other structure contained within the fuselage. Includes passenger and crew doors, cargo doors, emergency exits, etc. Electrical and hydraulic systems associated with door control are included as appropriate. |
| | -00 | General | |
| | -10 | Passenger/crew | Doors used for entrance and exit of the passengers and crew to and from the air vehicle. Includes items such as structure, latching mechanisms, handles, insulation, lining, controls, integral steps, ramps, handrails, attach/attached fittings, etc. |
| | -20 | Emergency exit | Exit doors used to facilitate evacuation that are normally used for exit. Includes items such as structure, latching mechanisms, handles, insulation, lining, controls, attach/attached fittings, etc. |
| | -30 | Cargo | Exterior doors used primarily to gain access to cargo compartments. Includes items such as structure, latching mechanisms, handles, insulation, lining, controls, integral steps, ramps, handrails, attach/attached fittings, etc. |
| | -40 | Service and miscellaneous | Exterior doors used primarily to gain access for servicing air vehicle systems and equipment. Includes items such as structure, latching mechanisms, handles, insulation, lining, controls, integral steps, handrails, attach/attached fittings, etc. |
| | -50 | Fixed interior | Doors inside the fuselage installed in fixed partitions. Includes items such as structure, latching mechanisms, handles, lining, attach/attached fittings, etc. Does not include doors installed in movable partitions which are covered in System 25. |
| | -60 | Entrance stairs | Stairs which operate in conjunction with but are not an integral part of entrance doors. Stairs whose primary structure is a door are covered under the appropriate topic. Includes items such as structure, actuating mechanisms and controls, handrails, attach/attached fittings, etc. |
| | -70 | Door warning | That portion of the system which is used to indicate whether the doors are closed and properly latched. Includes items such as switches, lights, bells, horns, etc. Does not include landing gear door warning which is covered in System 32. |
| | -80 | Landing gear | Structure of the doors used to enclose the landing gear compartments. Includes items such as structure, latching mechanisms, handles, insulation, lining, controls, attach/attached fittings, etc. |

### 2.1.38 System 53 - Fuselage

*Table 38 System 53 - Fuselage*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 53 | | **Fuselage** | Structural units and associated components and members which make up the compartments for equipment, passengers, crew, cargo, plus the structure of the envelope and gondola of airships. Includes skins, belt frames, stringers, floor beams, floor, pressure dome, scuppers, tail cone, fuselage-to-wing-and-empennage fillets, attach/attached fittings, load curtains, cables, ballonets, etc. Also includes structural and removable pylons used for the carriage of external stores. Does not cover those pylons used for weapons which are covered in System 94-30. |
| | -00 | General | |
| | -10 thru -90 | Fuselage sections | Skins, main structure, secondary structure and fairings of the complete fuselage with any structural differences grouped together and highlighted by fuselage section location. The section locations are defined by manufacturing joints or other suitable demarcations in sequence from front to rear. Does not include movable partitions covered in System 25 nor the functional and maintenance aspects of variable aerodynamic fairings covered in System 27. |

### 2.1.39 System 54 - Nacelles/pylons

*Table 39 System 54 - Nacelles/pylons*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 54 | | **Nacelles/pylons** | Structural units and associated components and members which furnish a means of mounting and housing the power plant or rotor assembly. Includes skins, longerons, belt frames, stringers, clamshells, scuppers, doors, nacelle fillets, attach/attached fittings, etc. Also includes the structure of power plant cowling inclusive of the structural portion of the inlet whether or not integral with the air vehicle. Structural portions of the exhaust systems are excluded where they are not integral with the airframe. |
| | -00 | General | |
| | -10 thru -40 | Nacelle section | Skins, primary structure, secondary structure, fillets and fairings of a complete nacelle with any structural differences grouped together and highlighted by specific nacelle designator. The section locations are defined by manufacturing joints or other suitable demarcations in a logical sequence. |
| | -50 thru -80 | Pylon | Skins, primary structure, secondary structure, fillets and fairings of a complete pylon with any structure differences grouped together and highlighted by specific pylon designator. The section locations are defined by manufacturing joints or other suitable demarcations in a logical sequence. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -90 | Air management | Consists of those components which regulate and direct inlet air flow and/or provide engine air particle separation (EAPS). |

### 2.1.40 System 55 - Stabilizers

*Table 40 System 55 - Stabilizers*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 55 | | **Stabilizers** | Horizontal and vertical stabilizers. Includes the structure of the elevator, rudder, auxiliary stabilizers and strakes. |
| | -00 | General | |
| | -10 | Horizontal stabilizer or canard | The horizontal airfoil of the tail or nose section to which an elevator can be attached. Includes items such as spars, ribs, stringers, skins, access covers, tips, attach/attached fittings, etc. |
| | -20 | Elevator | Removable airfoil which is attached to the horizontal stabilizer or canard and used for pitch control. Includes items such as spars, ribs, stringers, skins, access covers, tabs, balance devices, attach/attached fittings, etc. |
| | -30 | Vertical stabilizer | Vertical airfoil to which the rudder is attached. Includes items such as spars, ribs, stringers, skins, access covers, tips, attach/attached fittings, etc. |
| | -40 | Rudder | Removable airfoil which is attached to the vertical stabilizer and used for yaw control. Includes items such as spars, ribs, stringers, skins, access covers, tabs, balance devices, attach/attached fitting, etc. |
| | -50 | Auxiliary stabilizers and strakes | Fuselage mounted auxiliary stabilizers and strakes includes items such as spars, ribs, stringers, skins, access covers. |

### 2.1.41 System 56 - Windows and canopies

*Table 41 System 56 - Windows and canopies*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 56 | | **Windows and canopies** | Fuselage and crew compartment windows and canopies, inclusive of windshield; also those windows installed in doors. Associated electrical/hydraulic/pneumatic actuation systems are to be included. |
| | -00 | General | |
| | -10 | Flight compartment | Compartment in which the crew fly the aircraft. Includes items such as the transparent material and its frame of movable and fixed windows, windshields and canopies, handles, latching mechanisms and associated electrical/hydraulic/pneumatic actuation systems, etc. Does not include doors or inspection/observation windows. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Fuselage compartment | The compartment used for passengers/tactical crew/cargo, etc. Includes lounges, lavatories, buffets/galleys and coatrooms. Includes items such as transparent material, its frame, frost shield, etc. |
| | -30 | Door | Doors in the flight and fuselage compartments. Includes items such as transparent material, its frame, etc. Does not include emergency exit windows. |
| | -40 | Inspection and observation | Windows used for examining compartments and equipment in and about the air vehicle, astrodomes used for celestial navigation, and in-flight refueling operator's windows. Includes items such as transparent material, its frame, etc. |

### 2.1.42 System 57 - Wings

*Table 42 System 57 - Wings*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 57 | | **Wings** | Center wing and outer wing structural units and associated components and members which support the air vehicle in flight. Includes spars, skins, ribs, stringers, clamshells, scuppers etc and integral fuel tank structure of the flaps, slats, ailerons or elevons (complete with tabs) and spoilers. Also includes structural and removable pylons used for carriage of external stores. Does not cover those pylons used for weapons which are covered in System 94-30. |
| | -00 | General | |
| | -10 | Center wing | Skins, primary structure, fillets and fairings of the center wing and attach/attached fittings. |
| | -20 | Outer wing | Skins, primary structure, fillets and fairings of the outer wing and attach/attached fittings. |
| | -30 | Wing tip | Skins and structure of the wing tip and attached fittings. |
| | -40 | Leading edge and leading edge devices | Skins and structure of the wing leading edge and removable leading edge airfoils such as flaps, slats, attach/attached fittings, etc. |
| | -50 | Trailing edge and trailing edge devices | Skins and structure of the wing trailing edge and removable trailing edge ailerons such as flaps and attach/attached fittings. |
| | -60 | Ailerons, elevons and flaperons | The skin and structure of ailerons, elevons, flaperons and tabs including balancing devices and attach/attached fittings, etc. |
| | -70 | Spoilers | Skins and structure of wing-mounted spoilers, airbrakes, lift dumpers, attach/attached fittings, etc. |
| | -80 | Wing folding | System that controls the on-ground movement of any portion of the main wing structure. Includes mechanisms linkages, actuators, locks, indicating/warning systems, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | | | **Note:**<br>This represents the wing stow system and is not to be confused with System 66 Folding blades/pylon. |

### 2.1.43 System 60 - Standard practices - Propeller/rotor

*Table 43 System 60 - Standard practices - Propeller/rotor*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 60 | | **Standard practices - Propeller/rotor** | This chapter contains those standard mechanical and electrical/electronic engineering practices applicable to more than one propeller/rotor which are not covered in Systems 61 thru 69. It excludes those practices which are recognized as standard trade practices, also those practices/processes which are only applicable to manufacture. Practices for a particular application are included in the appropriate propeller/rotor chapter as part of the procedure. |
| | -00 | General | Standard practices applicable to all propeller/rotor chapters. |
| | -10 thru -90 | | Sections -10 thru -90 are used to describe standard practices. The manufacturer or manufacturing partners can assign the section numbers to suit generic standard practices related to more than one propeller or rotor chapter. |

### 2.1.44 System 61 - Propellers/propulsors

*Table 44 System 61 - Propellers/propulsors*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 61 | | **Propellers/propulsors** | The complete mechanical or electrical propeller, pumps, motors, governor, alternators and those units and components external to or integral with the engine used to control the propeller blade angle. Includes propeller spinner synchronizers. Also includes propulsor duct assemblies, including aerodynamic fairing of mechanical components, stators, vectoring systems, etc. |
| | -00 | General | |
| | -10 | Propeller assembly | That portion of the system which rotates except the engine propeller shaft. Includes items such as blades, dome, hub, spinner, slip ring, deicer boot, distributor valve, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Controlling | That portion of the system which controls the pitch of the propeller blades. Includes items such as governor synchronizers, switches, wiring, cables, levers, etc. Does not include any parts which rotate with the propeller assembly. Also includes all those units and components provided for the propulsor vector drive system. Includes flight deck control, drive motors, gearboxes, drive shafts, synchronizing shafts, etc. |
| | -30 | Braking | That portion of the system which is used to decrease run-down time or stop propeller rotation during engine power-off conditions. Includes brake mechanisms, levers, pulleys, cables, switches, wiring, plumbing, etc. |
| | -40 | Indicating | That portion of the system used to indicate operation or activation of propeller/propulsor systems. Includes items such as light, switches, wiring, etc. |
| | -50 | Propulsor duct | The complete duct assembly including vector drive attachment, fairings, stators, gearbox covers, etc. |

### 2.1.45 System 62 - Main rotors

*Table 45 System 62 - Main rotors*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 62 | | **Main rotors** | Rotor head assemblies and rotor blades, including the swash plate assemblies and the rotor shaft units if not an integral part of the gearboxes. Does not include the rotor anti-icing system which is dealt with in System 30, Ice and Rain Protection. |
| | -00 | General | |
| | -10 | Rotor blades | Rotor blade assemblies, including the heating mat (electrical resistors) for anti-icing. |
| | -20 | Rotor heads | Complete rotor heads, including blade folding systems. Includes sleeves, spindles, dampers, rotor head fairings as well as rotor shafts and swash plates if the rotor head and shaft constitute a non dissociable assembly. |
| | -30 | Rotating controls, rotor shafts/swash plate assemblies | Includes pitch change rods and swash plate assemblies if not included in Section -20. |
| | -40 | Indicating | That portion of the system which indicates operation or activation of rotor systems. Includes items such as lights, gauges, switches, wiring, etc. |

### 2.1.46 System 63 - Main rotor drives

*Table 46 System 63 - Main rotor drives*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 63 | | **Main rotor drives** | Includes all components transmitting power to the rotors: engine coupling components, drive shafts, clutch and free wheel units, gearboxes, it's (their) components, systems and securing elements. |
| | -00 | General | |
| | -10 | Engine/gearbox couplings | Drive shafts between engines and main gearboxes, gearbox to gearbox, and, if applicable, clutch and free wheel units. |
| | -20 | Gearboxes | Part of the system driving the rotors. Includes the mechanical power take-offs and accessory drives but does not include the accessories themselves (alternators, hydraulic pumps etc). Includes the gearbox lubricating systems and the rotor brakes if the latter forms part of the gearboxes. |
| | -30 | Mounts and attachments | Suspension bars, vibration damping system providing attachment of the gearboxes to the airframe. |
| | -40 | Indicating | That portion of the system which indicates operation or activation of rotor systems. Includes items such as lights, gauges, switches, wiring, etc. |

### 2.1.47 System 64 - Tail rotor

*Table 47 System 64 - Tail rotor*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 64 | | **Tail rotor** | Assembly that rotates in a plane nearly parallel to the symmetry plane and delivers a thrust opposing to the main rotor torque thus ensuring yaw control. Includes the rotor blades and rotor head. Does not include the rotor anti-icing system which is dealt with in System 30, Ice and Rain Protection. |
| | -00 | General | |
| | -10 | Rotor blades | Blade assemblies, including the heating mats (electrical resistors) for anti-icing.<br>**Note:**<br>For an integral unit, only one section will be used. |
| | -20 | Rotor head | Tail rotor head<br>**Note:**<br>For an integral unit, only one section will be used. |
| | -30 | Rotating controls | Includes pitch control beams, links and associated components. |
| | -40 | Indicating | That portion of the system which indicates operation or activation of rotor systems. Includes items such as lights, gauges, switches, wiring, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | | | **Note:**<br>For an integral unit, only one section will be used. |

### 2.1.48 System 65 - Tail rotor drive

*Table 48 System 65 - Tail rotor drive*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 65 | | **Tail rotor drive** | Includes all the components transmitting power to the tail rotor: drive shafts, bearings, gearboxes. |
| | -00 | General | |
| | -10 | Shafts | Drive shafts, bearings, flexible couplings. |
| | -20 | Gearboxes | Intermediate gearbox. Tail gearbox. |
| | -30 | Not available for projects | |
| | -40 | Indicating | That portion of the system which indicates operation or activation of rotor system. Includes items such as lights, gauges, switches, wiring, etc. |

### 2.1.49 System 66 - Folding blades/pylon

*Table 49 System 66 - Folding blades/pylon*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 66 | | **Folding blades/pylon** | The whole of the system which provides automatic or manual folding and spreading of the rotor blades and/or tail pylon.<br>**Note:**<br>Procedures produced in accordance with this chapter can also affect the components described in other chapters. |
| | -00 | General | |
| | -10 | Rotor blades | Part of the system ensuring rotor blade folding and spreading; includes the mechanical, hydraulic and electrical means permanently fitted on the air vehicle. |
| | -20 | Tail pylon | Part of system ensuring tail pylon folding and spreading; includes mechanical, hydraulic and electrical means permanently fitted on the air vehicle. |
| | -30 | Controls and indicating | Part of the system intended for controlling folding/spreading sequences and for indicating the system operation. Includes the control units, caption lights, indicator, wiring, etc. |

### 2.1.50 System 67 - Rotors flight control

*Table 50 System 67 - Rotors flight control*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 67 | | **Rotors flight control** | The system which provides means of manually controlling the flight attitude of the helicopter. Includes items such as control linkage and control cables for collective pitch, cyclic pitch, directional control, servo-controls and corresponding system. The trim system and the indicating and monitoring system.<br><br>**Note:**<br>This chapter includes the complete rigging of rotor control including the associated items not described under this system, such as auto-pilot, servo-control unit, automatic trim (System 22), blade pitch change rods, beams and swash plates (Systems 62 and 64). |
| | -00 | General | |
| | -10 | Rotor control | That portion of the system which controls the attitude by the angle of attack of the rotor blades. Includes items such as collective pitch lever, cyclic pitch stick and corresponding linkage and cable controls, coupling and mixing units and artificial feel unit systems. Also includes the control position indicating system. |
| | -20 | Anti-torque rotor control (yaw control) | That portion of the controls which control the direction of the helicopter (yaw control). Includes items such as tail rotor control pedals, relevant linkage and cable controls, bell cranks constituting the yaw control channel and the control position indicating system. |
| | -30 | Servo-control system | That portion of the system which from a power source ensures distribution to the rotor servo-control system. Includes items such as pressure relief valves, electro valves, check valves, accumulators and equipment needed for the operation of the servo-control system, the servo-controls, the systems used for monitoring and indicating the operation of the servo-control system. |

### 2.1.51 System 70 - Standard practices - Engine

*Table 51 System 70 - Standard practices - Engine*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 70 | | **Standard practices - Engine** | This chapter contains those standard mechanical, electrical, electronic etc engineering practices applicable to more than one engine task which are not covered in Systems 71 thru 84. It excludes those practices which are recognized as standard trade practices, also those practices/processes which are only applicable to manufacture. Practices for a particular application are included in the appropriate engine chapter as part of the procedure. |

| | | |
|---|---|---|
| -00 | General | Standard practices applicable to all engine and associated systems chapters. |
| -10 | Marking and masking | This section contains marking and masking processes and any required test of process and/or product. |
| -20 | Cleaning and coating removal | This section contains chemical and mechanical cleaning procedures, removal of coating by chemical or mechanical processes. |
| -30 | Inspection | This section contains inspection processes such as hardness measurement, fluorescent penetrant, eddy current, etc. Includes any required test of process and/or product. |
| -40 | Repair principles | This section contains various processes applicable to repair engine parts (eg riveting, machining, heat treatment). Includes any required test of process and/or product. |
| -50 | Surface preparation | This section contains processes to prepare a surface of a part before coating application (eg abrasive blast etching) or to modify the surface hardness (eg glass bead peening) Includes any required test of process and/or product. |
| -60 | Coating application | This section contains processes to apply a coating on engine parts such as nickel plating, oxide film, lubricants paints. Includes any required test of process and/or product. |
| -70 | Assembly | This section contains processes which are applied during engine assembly such as locking method. Includes any required test of process and/or product. |

### 2.1.52 System 71 - Power plant

*Table 52 System 71 - Power plant*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 71 | | **Power plant** | The overall power package including engine, air intake, mount, cowling, scoops, cowl flaps. |
| | -00 | General | This section includes general information, limits and procedures. This section also covers subjects such as engine changes, run-up, externally-mounted spare power plants, etc. This section also covers subjects such as power plant build-up, teardown, etc. |
| | -10 | Cowling | Those removable coverings which extend over and around the power plant assembly. Includes the functioning and maintenance aspects of items such as accessory section cowls, cowl flaps, cowling supports and attach and locking mechanisms, etc. Does not include the structure integral with the airframe which is covered in the applicable structures chapter. |
| | -20 | Mounts | The framework, either of build-up construction or forgings which support the engine and attach it to the nacelle or pylon. Includes items such as engine mounts, vibration dampeners, support links, mounting bolts, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Fire seals | Those fire resistant partitions and seals mounted on or about the power package for the purpose of isolating areas subject to fire. Does not include those fire walls which are included in System 54. |
| | -40 | Attach fittings | Those fittings and brackets which are used for the support of equipment in and about the power package. |
| | -50 | Electrical harness | Those electrical cables, conduits, plugs, sockets etc which serve several power plant systems, but which are banded together to facilitate removal and installation of the power plant. Does not include the wiring which is specifically covered under another system. |
| | -60 | Air intakes | That portion of the power plant system which directs and can or can not vary the mass air flow to the engine. Includes items such as nose ring cowls, scoops, compressor fan cowls, buried engine ducts, vortex generators, actuators, control handles, cables, wiring, plumbing, linkages, doors, warning systems, position indicators, etc. This does not include integral structure with the airframe, which are included in the applicable structures chapter. |
| | -70 | Engine drains | Those components and manifold assemblies which are used to drain off excess fluids from the power plant and its accessories. Includes drain lines, manifolds, tanks, flame arrestors, vents and their supporting brackets, etc. Also includes components that are an integral part of, or fitted to the power plant cowling. |
| 71 | -80 | Engine ancillary systems | Those components and manifold assemblies which are used to deliver compressor wash fluids to the engine. Includes plumbing, valves, controls, air supply lines for closing compressor bleeds etc. |

### 2.1.53 System 72 - Engine

*Table 53 System 72 - Engine*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 72 | | **Engine** | Those units and components which are used to induce and convert fuel-air mixture into power. Includes, for the basic turbine engine:- air inlet, compressor, diffuser, combustion chambers, turbine and exhaust; and for the reciprocating engine:- blower and clutch, clutch control valve, cylinders, cylinder baffles, intake pipes, crankshaft assembly, etc.<br><br>Used to transmit power to the propeller shaft, if any, and accessory drives. Includes reduction gearing, gear trains, extension shaft and torque meter. |

| | |
|---|---|
| | Within the profile of the basic engine, used to supplement the functioning of other defined systems external to the engine. Includes items such as accessory drive, mechanical portion of the spark advance mechanism, oil transfer tubes from the propeller governor pad to the propeller shaft, BMEP section, etc. |
| | Used to control and direct the flow of lubrication through the engine from the inlet fitting to the outlet fitting. Includes engine pumps (pressure and scavenger), pressure relief valves, screens, oil lines (internal and external), etc. |

### 2.1.54 System 72 - Engine turbine/turboprop Ducted fan/unducted fan

*Table 54 System 72 - Engine turbine/turboprop Ducted fan/unducted fan*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 72 | | **Engine turbine/turboprop Ducted fan/unducted fan** | |
| | -00 | General | This section is intended to cover general information, limits and procedures. In the engine manual it includes such subjects as tear down, cleaning, inspection, assembly, testing, etc. |
| | -10 | Reduction gear, shaft section (turboprop and/or front mounted gear driven propulsor) | The section of the engine which contains the propeller shafts and reduction gears. Includes items such as drives for hose mounted accessories, etc. If applicable, the section of the engine which uses mechanical force, through a gear-driven system, to drive front mounted propulsors which provide the majority of the energy generated. Includes items such as propulsor blades, actuation systems, reduction gears, drive-shafts, etc. |
| | -20 | Air inlet section | The section of the engine through which the air enters the compressor. Includes items such as guide vanes, shrouds, cases, etc. |
| | -30 | Compressor section | The section of the engine in which the air is compressed. Includes items such as cases, vanes, shrouds, rotors, diffusers, etc. Also includes the maintenance of stator blades but not the operation of variable stator blades which is covered under System 75-30. Does not include compressor bleed system. |
| | -40 | Combustion section | The section of the engine in which the air and fuel are combined and burned. Includes items such as burner cans, cases, etc. |
| | -50 | Turbine section | The section of the engine containing the turbines. Includes items such as turbine nozzles, turbine rotors, cases, etc. |
| | -60 | Accessory drives | The mechanical power take-offs to drive accessories. Includes items such as engine mounted gear boxes, gears, seals, pumps, etc. Does not include remotely installed gear boxes which are covered in System 83. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | By-pass section | The section of the engine which by-passes a portion of the normal engine airflow (either ram or compressed air) for the prime purpose of adding to engine thrust or reducing specific fuel consumption. |
| 72 | -80 | Propulsor section (rear mounted) | The section of the engine which contains a propulsors and provides the majority of the energy generated. The propulsor can be turbine driven or gear driven. Includes such items as propulsor turbines, propulsor blades, blade actuation, and frames (rotating and/or stationary). |
| | -90 | Multi-system hardware | The section of the engine made up of more than one of the above given subsystems, eg gas generator, core engine. |

### 2.1.55 System 72 - Engine reciprocating

*Table 55 System 72 - Engine reciprocating*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 72 | | **Engine reciprocating** | |
| | -00 | General | This section is intended to cover general information, limits and procedures. In the engine manual this section includes such subjects as tear down cleaning, inspection, assembly, testing, etc. |
| | -10 | Front section | The section of the engine which contains the propeller shafts and reduction gears. Includes items such as drives for nose mounted accessories, etc. |
| | -20 | Power section | The section of the engine which contains the crankshaft, master and link rod assemblies, cams, cam drive gears, tappet guides, rollers, carriers, etc. |
| | -30 | Cylinder section | The section of the engine which contains the cylinders, valves, pistons, push rods, intake pipes, baffles, etc. Also includes rocker arm assembly, valve springs, etc. |
| | -40 | Supercharger section | The section of the engine which contains cases, shroud plates, PRT coupling and gearing, impeller and drives, accessory drives, bushings, etc. |
| | -50 | Lubrication | Those units and components which are used to distribute oil throughout the engine. Includes front and rear pressure and scavenger pumps, sumps, strainers, valves, etc. Also includes those oil lines not included in System 79. Does not include those items which form integral passages within the engine. |

### 2.1.56 System 73 - Engine fuel and control

*Table 56 System 73 - Engine fuel and control*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 73 | | **Engine fuel and control** | For turbine engines, those units and components and associated mechanical systems or electrical circuits which furnish or control fuel to the engine beyond the main fuel quick disconnect and thrust augmenter, fuel flow rate sensing, transmitting and/or indicating units whether the units are before or beyond the quick disconnect.<br><br>It includes coordinator or equivalent, engine driven fuel pump and filter assembly, main and thrust augmenter fuel controls, electronic temperature datum control, temperature datum valve, fuel manifold, fuel nozzles, fuel enrichment system, speed sensitive switch, relay box assembly, solenoid drip valve, burner drain valve, etc.<br><br>For reciprocating engines, those units and components which deliver metered fuel and air to the engine. The fuel portion includes the carburetor/master control from the inlet side to the discharge nozzle, injection pumps, carburetor, injection nozzles and fuel primer. The air portion includes units from the scoop inlet to the vapor vent return and the impeller chamber. |
| | -00 | General | |
| | -10 | Distribution | That portion of the system from the main quick disconnect to the engine, which distributes fuel to the engine burner section and the thrust augmenter. Includes items such as plumbing, pumps, temperature regulators, valves, filters, manifold, nozzles, etc. Does not include the main or thrust augmenter fuel control. |
| | -20 | Controlling | The main fuel control which meters fuel to the engine and to the thrust augmenter. Includes items such as hydro mechanical or electronic fuel control, levers, actuators, cables, pulleys, linkages, sensors, valves, etc which are components of the fuel control units. |
| | -30 | Indicating | That portion of the system which is used to indicate the flow rate, temperature and pressure of the fuel. Includes items such as transmitters, indicators, wiring, etc. Does not include indication, if indication is accomplished as part of an integrated engine instrument system (System 77-40). |

### 2.1.57 System 74 - Ignition

*Table 57 System 74 - Ignition*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 74 | | **Ignition** | Those units and components which generate, control, furnish, or distribute an electrical current to ignite the fuel air mixture in the cylinders of reciprocating engines or in the combustion chambers or thrust augmenters of turbine engines. Includes induction vibrators, magnetos, switches, lead filters, distributors, harnesses, plugs, ignition relays, exciters and the electrical portion of spark advance. |
| | -00 | General | |
| | -10 | Electrical power supply | That portion of the system which generates electrical current for the purpose of igniting the fuel mixture in the combustion chambers and thrust augmenters. Includes items such as magnetos, distributors, booster coils, exciters, transformers, storage capacitors and compositors, etc. |
| | -20 | Distribution | That portion of the system which conducts high or low voltage electricity from the electrical power supply to the spark plugs, or igniters. Includes wiring between magneto and distributor in those systems where they are separate units. Includes items such as ignition harness, high tension leads, coils as used in low tension systems, spark plugs, igniters, etc. |
| | -30 | Switching | That portion of the system which provides a means of rendering the electrical power supply inoperative. Includes items such as ignition switches, wiring, connectors, etc. |

### 2.1.58 System 75 - Air

*Table 58 System 75 - Air*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 75 | | **Air** | For turbine engines, those external units and components and integral basic engine parts which go together to conduct air to various portions of the engine and the extension shaft and torque-meter assembly, if any. Includes compressor bleed systems used to control flow of air through the engine, cooling air systems and heated air systems for engine anti-icing. Does not include aircraft anti-icing, engine starting systems, nor exhaust supplementary air systems. |
| | -00 | General | |
| | -10 | Engine anti-icing | That portion of the system which is used to eliminate and prevent the formation of ice by bleed air in all parts of the engine, excluding power plant cowling which is covered under System 30. Includes items such as valves, plumbing, wiring, regulators, etc. Electrical anti-icing is covered in System 30. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Cooling | That portion of the system which is used to ventilate the engine and accessories. Includes items such as valves, plumbing, wiring, jet pumps, vortex spoilers, etc. |
| | -30 | Compressor control | That portion of the system which is used to control the flow of air through the engine. Includes items such as governors, valves, actuators, linkages, etc. Also includes the operation of variable stator blades, but not the maintenance which is covered under System 72-30. |
| | -40 | Indicating | That portion of the system which is used to indicate temperature, pressure, control positions etc of the air systems. Includes items such as transmitters, indicators, wiring, etc. |
| | -50 | Air intake foreign object removal | That portion of the system which is used to remove foreign objects from the engine air intake. |

### 2.1.59 System 76 - Engine controls

*Table 59 System 76 - Engine controls*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 76 | | **Engine controls** | Those controls which govern operation of the engine. Includes units and components which are interconnected for emergency shutdown. For turbo-prop engines, includes linkages and controls to the coordinator or equivalent and from the coordinator or equivalent to the propeller governor, fuel control unit or other units being controlled. For reciprocating engines, includes controls for blowers. Does not include units or components which are specifically included in other chapters. |
| | -00 | General | |
| | -10 | Power control | That portion of the system which furnishes a means of controlling the main fuel control or coordinator. Includes controls to the propeller regulator on turbo-prop engines. Includes items such as linkages, cables, levers, pulleys, switches, wiring, etc. Does not include the units themselves. |
| | -20 | Emergency shutdown | That portion of the system which furnishes a means of controlling the flow of fluids to and from the engine during emergency procedures. Includes items such as levers, cables, pulleys, linkages, switches, wiring, etc. Does not include the units themselves. |

### 2.1.60 System 77 - Engine indicating

*Table 60 System 77 - Engine indicating*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 77 | | **Engine indicating** | Those units, components and associated systems which indicate engine operation. Includes indicators, transmitters, analyzers, etc. For turbo-prop engines includes phase detectors. Does not include systems or items which are specifically included in other chapters except when indication is accomplished as part of an integrated engine instrument system (System 77-40). |
| | -00 | General | |
| | -10 | Power | That portion of the system which directly or indirectly indicates power or thrust. Includes items such as BMEP, pressure ratio, RPM, etc. |
| | -20 | Temperature | That portion of the system which indicates temperatures in the engine. Includes items such as cylinder head, exhaust (turbine inlet), etc. |
| | -30 | Analyzers | That portion of the system which is used to analyze engine performance or condition by means of instruments or devices such as oscilloscopes, etc. Includes items such as generators, wiring, amplifiers, oscilloscopes, etc. |
| | -40 | Integrated engine instrument systems | That portion of the system which as an integrated concept receives several/all engine operating parameters and then transmits this to a central processor for crew presentation. Includes items such as display units, transmitters, receivers, computers, etc. |

### 2.1.61 System 78 - Exhaust

*Table 61 System 78 - Exhaust*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 78 | | **Exhaust** | Those units and components which direct the engine exhaust gases overboard.<br>For turbine engines, includes units external to the basic engine such as thrust reverser and noise suppressor.<br>For reciprocating engines, includes augmenters, stacks, clamps, etc. Excludes exhaust driven turbines. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Collector/nozzle | That portion of the system which collects the exhaust gases from the cylinders or turbines. Includes item such as collector rings, exhaust ducts, variable nozzles, actuators, plumbing, linkages, wiring, position indicators, warning systems, etc. Does not include power recovery turbines, turbo-superchargers etc nor noise suppressors or thrust reversers where they are not an integral part of the nozzle system. |
| | -20 | Noise suppressor | That portion of the system which reduces the noise generated by the exhaust gases. Includes items such as pipes, baffles, shields, actuators, plumbing linkages, wiring, position indicators, warning systems, etc.<br><br>Use Section -10 where integral part of nozzle system. |
| | -30 | Thrust reverser | That portion of the system which is used to change the direction of the exhaust gases for reverse thrust. Includes items such as clamshells, linkages, levers, actuators, plumbing, wiring, indicators, warning systems, etc.<br><br>Use Section -10 where integral part of nozzle system. |
| | -40 | Supplementary air | That portion of the system which varies and controls supplementary air flow of the exhaust system. Includes items such as tertiary air doors, actuators, linkages, springs, plumbing, wiring, position indicators, warning systems, etc. |
| | -50 | Augmenter | That portion of the system which provides additional thrust for takeoff and in-flight at the command of the pilot. Includes items such as liners, rings, actuators, linkages, wiring, indicators, warning systems, etc. Does not include augmentation external to the power plant which is covered in System 84 Propulsion augmentation. |
| | -60 | Dissipation/deflection | That portion of the system which dilutes and/or redirects engine exhaust away from the aircraft for the purpose of reducing infrared (IR) signature and decreasing exhaust temperatures. |

### 2.1.62 System 79 - Oil

*Table 62 System 79 - Oil*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 79 | | **Oil** | Those units and components external to the engine concerned with storing and delivering lubricating oil to and from the engine. Covers all units and components from the lubricating oil engine outlet to the inlet, including the inlet and outlet fittings, tank, radiator, by-pass valve etc and auxiliary oil systems. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Storage | That portion of the system used for storage of oil. Includes items such as tanks, filling systems, internal hoppers, baffles, tank sump and drain, etc. Does not include tanks which are an integral portion of the engine. |
| | -20 | Distribution | That portion of the system which is used to conduct oil from and to the engine. Includes items such as plumbing, valves, temperature regulator, control systems, etc. |
| | -30 | Indicating | That portion of the system which is used to indicate the quantity, temperature and pressure of the oil. Includes items such as transmitters, indicators, wiring, warning systems, etc. Does not include indication if indication is accomplished as part of an integrated engine instrument system (System 77-40). |

### 2.1.63 System 80 - Starting

*Table 63 System 80 - Starting*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 80 | | **Starting** | Those units, components and associated systems used for starting the engine. Includes electrical, inertia air or other starter systems. Does not include ignition systems which are covered in System 74. |
| | -00 | General | |
| | -10 | Cranking | That portion of the system which is used to perform the cranking portion of the starting operation. Includes items such as plumbing, valves, wiring, starters, switches, relays, etc. |

### 2.1.64 System 81 - Turbines

*Table 64 System 81 - Turbines*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 81 | | **Turbines** | For reciprocating engines only. Includes power recovery turbine assembly and turbo-supercharger unit when external to the engine. |
| | -00 | General | |
| | -10 | Power recovery | The turbines which extract energy from the exhaust gases and are coupled to the crankshaft. |
| | -20 | Turbo-supercharger | The turbines which extract energy from the exhaust gases and drive an air compressor. |

### 2.1.65 System 82 - Water injection

*Table 65 System 82 - Water injection*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 82 | | **Water injection** | Those units and components which furnish, meter and inject water or water mixtures into the induction system, includes tanks, pumps, regulators, etc. |
| | -00 | General | |
| | -10 | Storage | That portion of the system which is used for the storage of water or water mixtures. Includes tank sealing, attachment of bladder type cells, ventilating system, cell and tank interconnections, filling systems, etc. |
| | -20 | Distribution | That portion of the system which is used to conduct water or water mixtures from the tanks or cells to the engine. Includes items such as plumbing, cross feed system, pumps, valves, controls, etc. |
| | -30 | Dumping and purging | That portion of the system which is used to dump injection water and to purge the system. Includes items such as plumbing, valves, controls, etc. |
| | -40 | Indicating | That portion of the system which is used to indicate the quantity, temperature and pressure of the water or water mixtures. Includes items such as transmitters, indicators, wiring, etc. |

### 2.1.66 System 83 - Accessory gearboxes

*Table 66 System 83 - Accessory gearboxes*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 83 | | **Accessory gearboxes** | Those units and components which are remotely installed and connected to the engine by a drive shaft and which drive multiple types of accessories. Does not include those accessory drives which are bolted to and are immediately adjacent to the engine. The latter item is covered under System 72. |
| | -00 | General | |
| | -10 | Drive shaft section | That portion of the system which is used to conduct power from the engine to the gearbox. Includes items such as drive shaft, adapters, seals, etc. |
| | -20 | Gearbox section | The case which contains the gear trains and shafts. Includes items such as gears, shafts, seals, oil pumps, coolers, etc. |

### 2.1.67 System 84 - Propulsion augmentation

*Table 67 System 84 - Propulsion augmentation*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 84 | | **Propulsion augmentation** | Those units and components that, independent of the primary propulsion system, furnish additional thrust of short duration. Includes solid or liquid propellants, controls, indicators, etc. |
| | -00 | General | |
| | -10 | Jet assist takeoff | Those units or components dedicated to jet assist takeoff systems. |

### 2.1.68 System 86 - Lift system

*Table 68 System 86 - Lift system*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 86 | | **Lift system** | Those units and components, which together with the primary propulsion system furnish vectorable vertical thrust allowing the aircraft to achieve short take-off and vertical landing (STOVL). Also includes those units and components which provide the means for stabilizing the aircraft when in the STOVL mode. |
| | -00 | General | |
| | -10 | Fan | That portion of the system that provides lift for the aircraft when operating in a STOVL flight condition. This includes gearboxes, clutches and accessories. |
| | -20 | Drive shaft | That portion of the system that provides a means of transmitting power from the engine to the STOVL lift system. |
| | -30 | Variable area nozzle | That portion of the system that controls and ducts STOVL fan outlet air to provide aircraft STOVL lift. |
| | -40 | Roll control | That portion of the system that ducts and controls main engine generated air for the control of aircraft roll attitude when in a STOVL flight configuration. |

### 2.1.69 System 90 - Recovery

*Table 69 System 90 - Recovery*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 90 | | **Recovery** | This chapter contains those systems, units and components used to recover air vehicles and equipment. |
| | -00 | General | |

| | | | |
|---|---|---|---|
| | -10 | Parachute recovery system | That part of the system that uses a parachute and its deployment devices to recover an air vehicle and equipment from flight. Includes items such as main- and drogue parachute container, ejection assembly, initiation assembly, deployment assembly and release assembly. |
| | -20 | Impact attenuation system | That part of the system which provides a shock for the air vehicle to absorb shock/attenuation. Includes items such as crushable impact attenuators, air bags, retrorocket landing attenuation systems, initiation assembly, deployment assembly and attenuator container. |
| | -30 | Sequencing system | That part of the system that provides the sequencing for the recovery. Includes items such as computer, interfaces, transmitter, electrical signal etc. |
| | -40 | Location system | That part of the system which provides information on the location of the aircraft after landing. Includes items such as computer, transmitter, antenna, etc. |

### 2.1.70 System 91 - Air vehicle wiring

*Table 70 System 91 - Air vehicle wiring*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 91 | | **Air vehicle wiring** | Miscellaneous charts, diagrams and/or lists applicable to more than one system, or to system interfaces, such as wiring charts, spare wire charts, junction boxes charts, disconnect plug charts, conduit and wire routing charts, rigid tube charts, flexible hose charts, system integration diagrams, reusable hose component lists, control cable lists, multi-system consumables lists etc. |

### 2.1.71 System 92 - Radar

*Table 71 System 92 - Radar*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 92 | | **Radar** | Those units and components which comprise multifunction radar systems used on fighters (generally nose-mounted), on maritime patrol air vehicles, on AWACS-type air vehicles, etc. |
| | -00 | General | |
| | -10 | Frequency generation | That portion of the system which gives the original signals used as references (micro-waves, clock signals, etc). |
| | -20 | Transmission | That portion of the system acting for waves output. |
| | -30 | Reception | That portion of the system which collects electro-magnetic signals, transposes the frequencies of collected signals or generates video-frequencies signals. |
| | -40 | Processing | Computing resources used for signals processing, data processing, radar system management or I/O exchanges of information with other air vehicle systems processing functions. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Beam control | That portion of the system which points the beam in any direction of space. This device can be based on mechanical or electronic steering. |
| | -60 | Power supply and safety | That portion of the system in charge of the setting of electrical power and all the safety functions concerning the starting phase and the current functioning states, eg cut-off. |
| | -70 | Conditioning | That portion of the system in charge of cooling and pressurization for the different modules. |
| | -80 | Built-in tests | That portion of the system devoted to failures detection and states reporting.<br>The content of these sections have to be determined in connection with the System 45-92-XX. |

### 2.1.72 System 93 - Surveillance

*Table 72 System 93 - Surveillance*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 93 | | **Surveillance** | Those units and components which furnish a means of sensing the surrounding environment, and then process, display and record the resulting information. |
| | -00 | General | |
| | -10 | Data processing | That portion of the system that provides computation, switching and storage of signals acquired. |
| | -20 | Data display | That portion of the system that provides the data display of information acquired by sensors. |
| | -30 | Recording | That portion of the system that provides recording of information acquired by sensors. |
| | -40 | Identification | That portion of the system that provides identification of information acquired by sensors. |
| | -50 | Infrared sensors | That portion of the system that uses heat sensing devices such as infra-red scanners, infra-red image and detection to acquire information. |
| | -60 | Laser sensors | That portion of the system that uses laser devices to acquire information for distance measuring, identification, etc. |
| | -70 | Surveillance radar | That portion of the system that uses radar for surveillance or mapping purposes. This includes devices such as antennas, receivers, transmitters, indicators, etc.<br>**Note:**<br>System 93-70 is to be used for surveillance oriented radars (eg weather radar on transport aircraft). For large multifunction radars use System 92. |

| | | | |
|---|---|---|---|
| | -80 | Magnetic sensors | That portion of the system that senses magnetic anomalies. This includes devices such as magnetometers, amplifiers, computers, indicators, etc. |
| | -90 | Sonar sensors | That portion of the system that senses objects underwater. This includes devices such as modulators, computers, transducers, indicators, etc. |

### 2.1.73 System 94 - Weapons system

*Table 73 System 94 - Weapons system*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 94 | | **Weapons system** | Those units and components which furnish a means of acquiring a target and releasing stores. |
| | -00 | General | |
| | -10 | Weapon release | The weapon release system consists of all equipment required to release, fire and/or jettison stores. Includes computers, displays, controls, stores management, etc. |
| | -20 | Available for projects | |
| | -30 | Weapon suspension | The weapon suspension system provides interconnecting equipment to transport and release/fire weapons. Includes multipurpose pylons if used for any weapon mounting role, specialist pylons, ejection racks, launchers, etc. |
| | -40 | Available for projects | |
| | -50 | Gunnery | The gunnery system consists of all guns and equipment necessary to fire guns. |
| | -60 | Available for projects | |
| | -70 | Weapon control | Those units and components which furnish a means of designating and acquiring a target. Includes radar, computers, displays etc necessary to provide weapon release decision (aiming cues). |

### 2.1.74 System 95 - Crew escape and safety

*Table 74 System 95 - Crew escape and safety*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 95 | | **Crew escape and safety** | Those units and components which furnish a means of ejecting or jettisoning seats, hatches, canopies, capsules etc from the airframe also includes safety and survival equipment. |
| | -00 | General | |

| | | |
|---|---|---|
| -10 | Ejection seats | That portion of the system which is used to eject flight crew or passenger seats individually from the airframe. |
| -20 | Escape hatches/canopy | That portion of the escape system involving hatches and canopies including miniature detonating cord. Does not include the canopy and its actuating mechanisms which are covered in System 56. |
| -30 | Capsule ejection | That portion of the escape system that provides a protective environment to the flight crew after separation from the airframe. |
| -40 | Available for projects | |
| -50 | Global survival kits | That portion of the system that insures flight crew survivability and/or after unplanned separation landing. |
| -60 | Impact protection and floatation | That portion of the system providing protection to personnel/equipment after impact. |
| -70 | Capsule flight | That portion of the system used to control attitude and direction of the capsule or container after ejecting or jettisoning from the airframe. |

### 2.1.75 System 96 - Missiles, drones and telemetry

*Table 75 System 96 - Missiles, drones and telemetry*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 96 | | **Missiles, drones and telemetry** | Those units and components which furnish a means of launching and controlling drones. |
| | -00 | General | |
| | -10 | Surface to surface missiles | That portion of the system which is used for launching and controlling surface to surface missiles. |
| | -20 | Surface to air missiles | That portion of the system which is used for launching and controlling surface to air missiles. |
| | -30 | Drones | That portion of the system which is used for launching and controlling drones. |
| | -40 | Telemetry | That portion of the system which is used for telemetry, for applications other than missile, drone or decoy usage. |

### 2.1.76 System 97 - Image recording

*Table 76 System 97 - Image recording*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 97 | | **Image recording** | Those units and components which furnish a means of recording events on film, video, disc or tape, etc. Does not cover recording systems which are part of any other system or Subsystem. |
| | -00 | General | |
| | -10 | Strike camera | That portion of the system which is used for recording the results of an air strike. |
| | -20 | Bomb bav system camera | That portion of the system which is used for recording instruments and the dropping of bombs. |
| | -30 | Fire control camera system | That portion of the system which is used for recording rocket or gunfire. |
| | -40 | Instrumentation camera system | That portion of the system which is used for recording meters, dials, CRT display, etc. |
| | -50 | Range camera system | That portion of the system which is used for range camera. Includes installation such as forward and oblique camera systems. |
| | -60 | Reconnaissance camera system | That portion of the system which is used for reconnaissance. |
| | -70 | Image recorder | That portion of the system which is used for storing the images on disc, tape (such as VCR), etc. |

### 2.1.77 System 98 - Meteorological and atmospheric research

*Table 77 System 98 - Meteorological and atmospheric research*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 98 | | **Meteorological and atmospheric research** | Those units and components which furnish a means of providing and recording measurement of natural or man-made atmospheric, gravitation and magnetic phenomena. |
| | -00 | General | |
| | -10 | Weather | That portion of the system which is used to measure and record moisture, temperature, cloudiness, wind, etc. |
| | -20 | Clear air turbulence | That portion of the system which is used to detect, measure and record clear air turbulence. |
| | -30 | Pollutants | That portion of the system which is used to detect, measure and record contaminated particles. |
| | -40 | Magnetic/gravitational | That portion of the system which is used to detect measure and record the earth's magnetic and gravitational force. |

### 2.1.78 System 99 - Electronic warfare

*Table 78 System 99 - Electronic warfare*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 99 | | **Electronic warfare** | Those units and components which furnish a means of detecting, analyzing, jamming, or nullifying the effectiveness of defensive detection devices and communication links (tactical or not). |
| | -00 | General | |
| | -10 | Active, electro-magnetic | That portion of the system operating in the electro-magnetic range of 1 Hz to 100 GHz. This subsystem can have the capability of receiving, analyzing, transmitting, etc. |
| | -20 | Available for projects | |
| | -30 | Passive, electro-magnetic | That portion of the system operating in the electro-magnetic field that has no active or radiating elements eg chaff. |
| | -40 | Available for projects | |
| | -50 | Elint (Electronic intelligence) | That portion of the system tasked with the gathering of electronic information and can include receivers, processors/analyzers and recorders. |
| | -60 | Available for projects | |
| | -70 | Infrared (IR) | That portion of the system operating in the IR range/field and can have the capability of receiving, analyzing and transmitting. |
| | -80 | Laser | That portion of the system operating in the laser range/field and can have the capability of receiving, analyzing and transmitting. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.6

## *Maintained SNS - Tactical missiles*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

This is an SNS, at the top level, for tactical missiles. It is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

Further breakdown will be required for its full use on projects and this breakdown must be applied in accordance with the design of the tactical missile system in question and the information and publication sets to be used.

# 2 Tactical missile SNS

The coding and definitions for the tactical misslie SNS is appropriate for common and system level information for all Products and is described in Table 2. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

The basic structure of this SNS uses an alphanumeric breakdown, which begins with numbers and progresses onto alpha characters where required. This top level breakdown is as shown in Fig 1 and listed in Table 2.

### 2.1.1 Definitions

The following definitions are used:

- **Tactical missile**: A propelled and guided air-vehicle, used for a given point target mission, with the aim of destroying or damaging a determined target. A tactical missile can be launched from an aircraft, a ship or any ground launching system.
- **Tactical ammunition**: A tactical missile in its launching container.

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*Fig 1 Top level breakdown for a tactical missile system (Sheet 1 of 2)*

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*Fig 1 Top level breakdown for a tactical missile system (Sheet 2 of 2)*

## 2.2 System breakdown

### 2.2.1 Main systems

This tactical missile SNS is divided into 13 main systems.

*Table 2 Top level breakdown for a tactical missile system*

| System | Title |
|---|---|
| 00 | Tactical missile (or ammunition) general |
| 01 | Not available for projects |
| 02 | Not available for projects |
| 03 | Not available for projects |
| 04 | Not available for projects |
| 05 | Scheduled/unscheduled maintenance |
| 06 | Not available for projects |
| 07 | Not available for projects |
| 08 | Not available for projects |
| 09 | Handling and transporting |
| 10 | Not available for projects |
| 11 | Placards and markings |
| 12 thru 23 | Not available for projects |
| 24 | Electrical power |
| 25 | Not available for projects |
| 26 | Not available for projects |
| 27 | Not available for projects |
| 28 | Fuel |
| 29 | Not available for projects |
| 30 | Not available for projects |
| 31 | Data acquisition |
| 32 | Not available for projects |
| 33 | Not available for projects |
| 34 | Navigation guidance control |
| 35 thru 43 | Not available for projects |
| 44 | Interconnection |

| System | Title |
|---|---|
| 45 thru 49 | Not available for projects |
| 50 | Structures and dynamics surfaces |
| 51 thru 57 | Not available for projects |
| 58 | Armament and payload |
| 59 thru 71 | Not available for projects |
| 72 | Propulsion |
| 73 thru 84 | Not available for projects |
| 85 | Launching container |
| 86 thru 99 | Not available for projects |

### 2.2.2 System 00 - Tactical missile (or ammunition) - General

*Table 3 System 00 - Tactical missile (or ammunition) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 00 | | **Tactical missile (or ammunition) - General** | General information for the complete tactical missile (or ammunition) including description, main dimensions, etc. |
| | | | Instructions and procedures for tactical missile (or ammunition) safety. |
| | | | Information on the technical publication required to support the tactical missile (or ammunition) |
| | -00 | Tactical missile (or ammunition) description | General description and dimensions with illustrations of tactical missile (or ammunition) including associated missiles such as training missile, dummy missile, etc. |
| | -10 | Available for projects | |
| | -20 | Tactical missile (or ammunition) safety | Those instructions and procedures necessary to make safe the tactical missile (or ammunition) for storage, preparation and maintenance action. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | | | General information on tactical missile (or ammunition) safety such as risk divisions, dangerous components, hazard zones, etc.<br><br>Those instructions necessary for the use or the operation of protective or safety devices such as: protective covers, plugs, safety pins, safety flags, etc. |
| | -30 | Available for projects | |
| | -40 | Technical publication | Information on the technical publication required to support the tactical missile (or ammunition) such as the Lists of Applicable Publications, Publication Guide, the coding system of technical publications, instructions for handling and updating technical publications. |

### 2.2.3 System 05 - Scheduled/unscheduled maintenance

*Table 4 System 05 - Scheduled/unscheduled maintenance*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 05 | | **Scheduled/unscheduled maintenance** | The manufacturer's recommended time limits for inspection, maintenance checks and overhaul.<br><br>General information on maintenance policy of the tactical missile (or ammunition). |
| | -00 | General | |
| | -10 | Time limits | The manufacturer's recommended life limits in utilization and/or in storage of the tactical missile (or ammunition) equipment or components subject to wear or time limitation.<br><br>The manufacturer's recommended maintenance periodicities according to the storage and/or the utilization conditions of the tactical missile (or ammunition). |
| | -20 | Maintenance checks | The manufacturer's recommended maintenance checks and inspections of the tactical missile (or ammunition) according to:<br>- the storage and/or utilization conditions of the tactical missile (or ammunition)<br>- the maintenance level<br>or following:<br>- unusual events<br>- exposure to unusual conditions. |

### 2.2.4 System 09 - Handling and transporting

*Table 5 System 09 - Handling and transporting*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 09 | | **Handling and transporting** | Includes all the necessary procedures for handling the tactical missile (or ammunition) with illustrations showing hoisting and supporting points. |
| | -00 | General | |
| | -10 | Handling | Those procedures for handling the tactical missile (or ammunition) in its storage and transportation container including information on the equipment required such as forklift truck, hoisting system, etc. |
| | -20 | Transporting | Information on transporting the tactical missile (or ammunition) in its storage and transportation container by air/road/rail/sea, with reference to safety information covered in the first chapter. |

### 2.2.5 System 11 - Placards and markings

*Table 6 System 11 - Placards and markings*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 11 | | **Placards and markings** | All placards, labels and markings of the tactical missile, the storage and transportation container, and the launching container in the case of tactical ammunition.<br><br>Includes illustrations showing the place and the meaning of each placard, label or marking. |
| | -00 | General | |
| | -10 | Missile placards and markings | Those placards, labels and markings of the tactical missile, required for ground servicing, identification, handling, cautions, warnings, etc.<br><br>Those placards, labels and markings of the storage and transportation container, required for storage identification, handling, cautions, warnings, etc. of the tactical missile in its container. |
| | -20 | Launching container placards and markings | In the case of tactical ammunition, those placards, labels and markings required for ground servicing, identification, handling, cautions, warnings, etc. |

### 2.2.6 System 24 - Electrical power

*Table 7 System 24 - Electrical Power*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 24 | | **Electrical power** | All the electrical power units which generate, control and adapt disassembly code and/or AC electrical power for other systems of the tactical missile.<br><br>Does not include those electrical units integrated in other systems of the tactical missile. |
| | -00 | General | |
| | -10 | Available for projects | |
| | -20 | AC generation | Electrical units which generate and control AC electrical power such as alternators etc. |
| | -30 | DC generation | Electrical units which generate and control DC electrical power such as batteries, primable batteries, thermal batteries, etc. |
| | -40 thru -80 | Available for projects | |
| | -90 | Voltage adaptation | Those units which adapt and transform electrical power such as inverter, voltage generator, transformer, etc. |

### 2.2.7 System 28 - Fuel

*Table 8 System 28 - Fuel*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 28 | | **Fuel** | All units and components which store and deliver fuel to engines. |
| | -00 | General | |
| | -10 | Storage | Units and components which store fuel such as: tank sealing, bladder type cells, venting system, filling circuit, etc. |
| | -20 | Distribution | Units and components which distribute fuel to engine combustion chamber such as: plumbing, pumps, temperature and pressure regulators, valves, filters, nozzles, etc. |

### 2.2.8 System 31 - Data acquisition

*Table 9 System 31 - Data acquisition*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 31 | | **Data acquisition** | All units and components which furnish the means of measuring, recording and transmitting the functioning data of the tactical missile. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | |
| | -10 thru -20 | Available for projects | |
| | -30 | Recorders | In the case of airborne training and acquisition missile, units and components which record the functioning data of seeker during target detection. Could include other types of recorder if necessary. |
| | -40 thru -60 | Available for projects | |
| | -70 | Telemetry | In the case of drill missile for firing campaign, units and components which measure and transmit to a ground tracking station, the functioning data sequences of the tactical missile during its free flight. |

### 2.2.9 System 34 - Navigation guidance control

*Table 10 System 34 - Navigation guidance control*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 34 | | **Navigation guidance control** | All the units and components which furnish the means of controlling the trajectory of the tactical missile in correlation with target data in order to steer the missile towards its target. Includes units which determine and control position, direction, attitude and altitude of the tactical missile. |
| | -00 | General | |
| | -10 thru -30 | Available for projects | |
| | -40 | Independent position determining | Mechanical and electronic units equipped with sensors able to determine position, direction, attitude and altitude of the tactical missile. Includes all types of sensors and associated electronic boxes such as: inertial guidance systems (inertial guidance units, accelerometers, gyroscopes, gyro meters), altimeters, etc. Includes also global positioning systems (GPS). |
| | -50 | Available for projects | |
| | -60 | Flight management system | Units which combine guidance and navigational data, to compute and/or manage the geographical position of the missile, to determine its theoretical flight and to control the missile trajectory (direction and vertical references, computed or introduced trajectory parameters, maneuvering orders, etc). Includes computers, sequencers, order generators, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | Target acquisition | Units and components which furnish communication means between the missile and the firing control system and/or which participate in target acquisition (detection, location and tracking). Includes radars, seekers, receivers, transmitters, responders, laser offset detectors, wire guided systems, transcoders, etc. |
| | -80 | Mechanical command system | Units and components which transform signals into mechanical actions and furnish the means to command the missile trajectory. Includes all types of actuators (without control surfaces), thrust deflectors, jet interceptors, thrust vector control systems, hydraulic and/or pneumatic control systems, etc. Not including thrust vectoring nozzles which are covered in the propulsion chapter. |
| | -90 | Braking system | Units and components used in some tactical missiles which furnish the means of temporary braking the missile during its free flight. |

### 2.2.10 System 44 - Interconnections

*Table 11 System 44 - Interconnections*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 44 | | **Interconnection** | All the units and components which establish electrical connections (LF, HF, VHF, etc) and cryogenic connections (between units of equipment of the tactical missile). Includes also tactical missile external interfaces. |
| | -00 | General | |
| | -10 | Wirings and circuits | Units and components making electrical connections such as: wires, cables, ribbon cable, ground braid, optic fiber, coax, wave guide, etc. Units and components used to convey very high pressure gas to cool the infrared detection cell of infrared seeker such as: tube, pipe, pressure relief valve, pressure shear valve, etc. |
| | -20 | Interconnection boxes | Units and components that centralize and distribute electrical and cryogenic systems. |

### 2.2.11 System 50 - Structures and dynamic surfaces

*Table 12 System 50 - Structures and dynamic surfaces*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 50 | | **Structures and dynamic surfaces** | All the structural units and associated components which constitute the body of the tactical missile. All the fixed and mobile dynamic surfaces linked to the body of the tactical missile and allowing its motion in the air. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Structures | Skins, tubes, nosecone, tail cone, doors, panels, frames, belts, fastenings, stiffeners, attachment fittings, fairing, air inlet, etc. Not including structural components belonging to structural equipment such as propulsion unit, seeker, etc, which are covered in the corresponding systems. |
| | -20 | Dynamic surfaces | Wings, fins, control surfaces, etc. In case of retractable or folding wings or fins, includes the unfolding or spreading system. |

### 2.2.12 System 58 - Armament and payload

*Table 13 System 58 - Armament and payload*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 58 | | **Armament and payload** | All units and components belonging to the safety, arming, and initiation chain of the warhead of the tactical missile. Includes also autonomous sub-ammunition and other types of autonomous units such as infrared video camera, etc. |
| | -00 | General | |
| | -10 | Conventional warheads and explosive trains | Units and components which contain and initiate high explosive material. Includes all types of warhead, detonators, boosters, etc. |
| | -20 | Safety and arming systems | Mechanical and electric units used for the safety, arming and initiation of the warhead. Includes safety and arming mechanism, electric initiator, safety plug, etc. |
| | -30 | Proximity detection and impact detection | Units such as proximity fuse which initiate the firing of the warhead explosive train after infrared or radio frequency, etc detection in close proximity of the target. Devices which command the firing of the warhead explosive train after impact against the target. |
| | -40 | Nuclear warheads and explosive trains | Units and components which contain and initiate high explosive nuclear material. |
| | -50 | Sub-ammunition | Autonomous sub-ammunition equipped, following the types, with warhead, rocket motor, guidance system, etc and ejected by some tactical missiles in the terminal flight phase. |

### 2.2.13 System 72 - Propulsion

*Table 14 System 72 - Propulsion*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 72 | | **Propulsion** | All units and components used for the propulsion of the tactical missile including vector nozzles. |
| | -00 | General | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Rocket motors | Non-air breathing reaction propulsion motors that consist of a combustion chamber, exhaust nozzles and a solid propellant charge from which hot gases are generated by combustion and expanded through the nozzles. Includes main rocket motors, acceleration rocket motors, ejection motors and their components. |
| | -20 | Turbojet engines | Turbine engines that consist of compressor, diffuser, combustion chamber, turbine and nozzle, from which hot gases are generated by combustion of fuel-air mixture and expanded through the nozzle. Includes the engine and its components. |
| | -30 | Ramjet engines | Engines that consist of injector, combustion chamber and nozzle, in which the air compress by kinetic effect and from which hot gases are generated by combustion of fuel-air mixture and expanded through the nozzle. Includes the engine and its components. |
| | -40 | Reciprocating engines | Engine in which fuel-air mixture is compressed by a piston within a cylinder and ignited to transform linear motion in circular motion to drive a propeller. Includes the engine and its components. |

### 2.2.14 System 85 - Launching container

*Table 15 System 85 - Launching container*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| 85 | | **Launching container** | For tactical ammunition, system which includes all the mechanical, electrical and pyrotechnical, etc units and components used to protect, to maintain, and to launch the tactical missile. |
| | -00 | General | |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.7

## *Maintained SNS - General surface vehicles*

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|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

The SNS is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

This chapter gives the definitions for the systems and subsystems, which relate to systems and subsystems, for general surface vehicles. For details on how to use this SNS within the data module code, refer to Chap 4.3.3.

# 2 General surface vehicles SNS

The coding and definitions for the general surface vehicles SNS is appropriate for common and system level information for all Products and is described in Table 2. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

The basic structure of this SNS uses an alphanumeric breakdown. This top level breakdown is as shown in Fig 1 and listed in Table 2.

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*Fig 1 Top level breakdown of a general surface vehicle*

## 2.1 System breakdown

### 2.1.1 Main systems

This surface vehicle SNS is divided into the 17 main systems shown in Table 2.

*Table 2 Main systems*

| System | Title |
|---|---|
| A0 | Propulsion |
| B0 | Structure |
| C0 | Armaments |
| D0 | Electrical systems |
| E0 | Communications |
| F0 | Navigation |
| G0 | Surveillance |
| H0 | Steering |
| J0 | Ventilation/heating/cooling |
| K0 | Hydraulic systems |
| L0 | Electronic system |
| M0 | Auxiliary |
| N0 | Survivability |
| P0 | Special equipment/systems |
| Q0 | Outfit, furnishings and stowage |
| R0 | Training |
| S0 | Repair, test and support |

### 2.1.2 System A - Propulsion

*Table 3 System A0 - Propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A0 | | **Propulsion - General** | |
| | -00 | General | A system or equipment for producing and delivering power. |

*Table 4 System A1 - Power pack - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A1 | | **Power pack - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | The power pack element refers to a self-contained means for generating and delivering power. It includes such systems as the main engine, transmission and interfaces. Subsystems can include such items as cooling, fuel, air and exhaust, lubrication, auxiliaries and electrical. |
| | -10 | Main engine | Refers to a diesel, petrol, electric, etc fuelled means for generating power and a means whereby this power can be delivered to the transmission. It can include, for example, engine mounted flywheel and clutch assemblies, cooling, fuel, air and exhaust, lubrication, auxiliary and electrical systems. |
| | -20 | Transmission | Refers to a system which transmits power from the engine to the driving member and can include torque converter and gearbox. It can also include flywheel and clutch assemblies, steering and brakes if they are integral to the transmission. Also included are differentials and power takeoffs. |
| | -30 | Power pack Interfaces | Refers to the mounting assemblies connecting the main engine and transmission, together with associated ancillaries, including such systems as cooling, fuel, air and exhaust, lubrication, auxiliary and electrical. It can also include transmission items. |

*Table 5 System A2 - Power unit - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A2 | | **Power unit - General** | |
| | -00 | General | The power unit element refers to a discrete means for generating and delivering power to the transmission. It can include, for example, flywheel and clutch assemblies. |
| | -10 | Engine | Refers to a diesel, petrol, electric, etc fuelled means for generating power and a means whereby this power can be delivered to the transmission. It can include, for example, flywheel and clutch assemblies and engine mounted cooling, fuel, air and exhaust, lubrication, auxiliary and electrical systems. |
| | -20 | Cooling system | Refers to systems designed to maintain the correct operating temperatures for the power unit. It includes, for example, cooling air ducting, coolant pumps, liquid filled radiators, intercoolers, fans and associated heat exchange equipment. |
| | -30 | Fuel systems | Refers to a system or equipment designed to deliver fuel to the power unit. It includes, for example, fuel storage facilities, pumps, filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Air and exhaust systems | Refers to a system which supplies air to, or collects and removes exhaust gasses from the engine. It includes, for example, all pipes, ducting, filters, couplings, gaskets, turbochargers/superchargers, silencers and catalytic converters. |
| | -50 | Lubrication systems | Refers to a system that provides lubrication to the power unit and any external components related to the power unit lubrication system. It includes, for example, delivery and return pipes, pumps, filters, intercoolers and separately mounted heat exchangers. |
| | -60 | Electrical | Refers to a system that provides or uses electrical power associated with the power unit. It includes, for example, starter motors, alternators and generators directly mounted on the power unit. It also includes, for example, ignition system components including spark plugs, distributor, coils and leads. |
| | -70 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the power unit. It includes, for example, engine mountings. |
| | -80 | Hydraulic | Refers to a system that provides or uses hydraulic power associated with the power unit. It includes, for example, hydraulic pumps, valves, pipes, and tanks. It also includes any external components related to the power unit hydraulic systems. |

*Table 6 System A3 - Engine cooling system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A3 | | **Engine cooling system - General** | |
| | -00 | General | This system includes cooling air ducting, coolant pumps, liquid filled radiators, fans and associated heat exchange equipment mounted externally to the power unit/pack. |
| | -10 | Fluid | Refers to fluid (water/oil) filled coolant systems. It includes pumps, radiators, fans, pipes and associated heat exchange equipment. |
| | -20 | Air | Refers to cooling air ducting, fans and associated heat exchange equipment. |

*Table 7 System A4 - Fuel systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A4 | | **Fuel systems - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | Equipment to provide fuel storage facilities, filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors mounted externally to the power unit/pack. |
| | -10 | Storage | Refers to the portion of the system which stores fuel. It includes, for example, tanks, filler necks, seals, valves, vents and drainage. |
| | -20 | Distribution | Refers to the portion of the system which is used to distribute fuel from the storage system. It includes, for example, filters, restrictors, valves, controls and pipes. |
| | -30 | Priming | Refers to the portion of the system which is used to pressurize/pump the fuel. It includes, for example, lift pumps, pressurization pumps, and cold starting systems. |
| | -40 | Fuel injection | Refers to the portion of the system which delivers fuel. It includes, for example, FIP, fuel injectors, fuel pump metering and carburetors. |
| | -50 | Indicating | Refers to the portion of the system which is used to monitor the condition of fuel (quantity, temperature and pressure). It includes, for example, transmitters, indicators, wiring and pressure warning systems. |
| | -60 | Venting and de-fuelling | Refers to the portion of the system which is used to vent fumes from the fuel system and to provide a means for removing/dumping unwanted fuel. |

*Table 8 System A5 - Air and exhaust systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A5 | | **Air and exhaust systems - General** | |
| | -00 | General | Refers to a system which supplies and filters air to the engine and collects and removes exhaust gases from the engine. It includes, for example, all filters, pipes, couplings, silencers, catalytic converters and ducting mounted externally to the power unit/pack. |
| | -10 | Air system | Refers to a system which supplies and filters air to the engine. It includes, for example, pre-filters, main air filters, and associated ducting. It can also include air cooling/heating systems and intercoolers. |
| | -20 | Collector | Refers to that portion of the system which collects exhaust gases from the engine manifold. It includes pipes, joints, gaskets, etc. |
| | -30 | Noise suppression | Refers to that portion of the system which reduces noise produced by the engine exhaust gases. It includes silencers, baffles, shields, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Emission control | Refers to that portion of the system which is designed to reduce or eliminate engine exhaust gas emissions. It includes, for example, catalytic converters and tail pipes. |

*Table 9 System A6 - Lubrication systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A6 | | **Lubrication systems - General** | |
| | -00 | General | This system includes lubrication storage facilities that are external to the engine/power pack. It includes delivery and return pipes, pumps, filters and heat exchangers mounted externally to the power unit/pack. |
| | -10 | Storage | Refers to the part of the system used for storage of engine and/or transmission lubricating oil. It includes tanks, filling systems, sumps, drains, etc. |
| | -20 | Distribution | Refers to the part of the system used for distribution of lubricating oil to and from the engine and/or transmission. It includes pipes, pumps, filters, valves, etc. |
| | -30 | Indicating | Refers to the part of the system used to monitor the condition of engine and/or transmission lubricating oil (quantity, temperature and pressure). It includes transmitters, indicators, wiring, pressure warning systems, etc. |

*Table 10 System A7 - Transmission - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A7 | | **Transmission - General** | |
| | -00 | General | Refers to a means to transmit power from the engine to the driving member and can include clutch, torque converter, and gearbox. It can also include steering and brakes if they are integral to the transmission. Also included are differentials and power takeoffs. |
| | -10 | Gearbox | Refers to a means for varying the speed/torque delivered from the power unit to the driving member. It can include the steering control and brake assemblies. |
| | -20 | Steering control assembly | Refers to a discrete means for varying the drive applied, through the transmission system, to each of the vehicle's driving members (eg tracked vehicles). |
| | -30 | Brake assembly | Refers to a discrete means for applying braking forces through the vehicle transmission (eg tracked vehicles). |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Auxiliary drive/ power takeoff | Refers to an auxiliary means of obtaining an output from the engine. It includes transfer gearboxes which can also include a slip differential. |
| | -50 | Clutch | Refers to a means for engaging/disengaging the transmission to/from the engine, when fitted as a separate assembly (for clutches fitted to a flywheel, see A21000). |
| | -60 | Drive shaft | Refers to the means for connecting power output from the engine to the driving member. It includes muff couplings, propeller shafts, universal joints and final drives. |
| | -70 | Torque converter | Refers to a means for varying the torque delivered from the engine to the driving member. |
| | -80 | Differential | Refers to a means for changing the direction of rotation delivered from the engine to the driving member or wheels. For wheeled vehicles, it includes the driving axles, half shafts, hubs, etc. |

*Table 11 System A8 - Automotive/remote piloting and digital control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A8 | | **Automotive/ remote piloting and digital control systems - General** | |
| | -00 | General | The automotive and remote piloting and Digital Automotive Control System (DACS) element refers to that equipment (hardware/software) installed in the vehicle which is used to plan and control vehicle speed and direction either autonomously or via tele-operation. This includes equipment which senses, processes and displays imagery data such as stereo vision systems, laser scanners, multiple sensor fusion algorithms and processors, image enhancement algorithms and processors etc. This includes, for example, equipment which performs intelligence analysis and planning functions such as automated route planners, image understanding algorithms and processors, computer aided driving algorithms, DACS and processors. |
| | -10 | Control | Refers to processing and control elements. It includes central processors, analogue/digital converters, associated software, memory boards, servo units, actuators, associated wiring, etc. |
| | -20 | Sensors | Refers to sensors which are specifically associated with providing inputs to an automotive/remote piloting system or DACS. |
| | -30 | Indicators | Refers to the part of the system used to indicate/monitor an automotive/remote piloting system or DACS. It includes indicators, wiring, etc. |

*Table 12 System A9 - Controls (drivers) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A9 | | **Controls (drivers) - General** | |
| | -00 | General | Given in this element are the controls required to start, stop, steer and generally control the vehicle commensurate with the mobility role of the equipment. It includes, for example, on-board diagnostic systems. |
| | -10 | Foot controls | Refers to the foot-operated controls to start, stop, steer and generally control the vehicle. It includes, for example, pedal assemblies (clutch, brake, accelerator, etc), associated linkages, cables, hydraulic/pneumatic connections, master and slave cylinders, brake shoes and pads and disks and drums. |
| | -20 | Hand controls | Refers to the hand-operated controls to start, stop, steer and generally control the vehicle. It includes, for example, stop/start, steering (wheel, tiller, etc) and braking controls. |
| | -30 | Ancillary controls | Refers to ancillary controls and associated systems. It includes, for example, such items as screen wash equipment, windscreen wipers and adjustable wing mirrors. |
| | -40 | Propulsion control systems | Refers to systems which monitor and/or control engine speed and performance. |
| | -50 | Instrumentation | Refers to systems (hardware/software) which monitor/report on the operation of vehicle systems. It includes, for example, the drivers instrumentation panel, warning lights and condition monitoring systems |

### 2.1.3 System B - Structure

*Table 13 System B0 - Structure - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B0 | | **Structure - General** | |
| | -00 | General | Framework and/or basic structural housing for a system, including load bearing components. |

*Table 14 System B1 - Hull/frame - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B1 | | **Hull/frame - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | This element refers to the vehicles primary load bearing component which provides the structural integrity to withstand the operational loading stresses generated while traversing various terrain profiles. This element could be a simple wheeled vehicle frame or a more complicated combat vehicle hull which satisfies not only the structural requirements but also provides armor protection. It includes all structural subassemblies and appendages which attach directly to the primary structure. This element, for example, includes towing and lifting fittings, bumpers, hatches and grilles. It also includes provision to accommodate other subsystems such as mountings for suspension, weapons, turret, track body, cab, special equipment, loads etc. |
| | -10 | Internal mountings | Refers to internal fitments mounted on the hull/frame. It includes brackets, stud welding, floors and insulation panels. |
| | -20 | External mountings | Refers to the chassis and external fitments mounted on the hull/frame. It includes brackets, stud welding, steps, bumpers, mud-guards, windows, etc. |
| | -30 | Doors/hatches | Refers to loading/entry hatches and doors in, or directly mounted on, the hull/frame assembly. It includes shell loading doors, driver and passenger doors, hatches, locks, handles, drivers/operators hoods, cowls and windshields, etc. |
| | -40 | Seats | Refers to seating which is directly mounted on the hull/frame. |
| | -50 | Drinking water tank | Refers to a system designed to provide drinking water for the driver and crew, which is directly mounted on the hull/frame. It includes tanks, filler necks, filters, pipes, seals, valves, vents, drainage, etc. |
| | -60 | Access cover plates | Refers to access cover plates directly mounted on the hull/frame. It includes, for example, guards, plugs, drain/inspection covers. It can also include deck area assemblies. |
| | -70 | Gun crutch/ depression rails | Refers to gun crutch and depression rails directly mounted on the hull/frame. |
| | -80 | Skirting plates/ brackets/splash plates | Refers to skirting plates, brackets and splash plates directly mounted on the hull/frame. It includes the plates and associated fittings, brackets, towing attachments, etc. |

*Table 15 System B2 - Body/cab - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B2 | | **Body/cab - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | The body/cab elements refer to the major components to be mated to a chassis or frame to provide a complete vehicle having a defined mission capability. This element includes accommodation for personnel, cargo, and such subsystems as need to be placed in proximity of the operators. |
| | -10 | Internal mountings | Refers to internal fitments mounted on the body/cab. It includes panels, brackets, clips, fascia, instrument panels, stud welding, internal windows, etc. |
| | -20 | External mountings | Refers to external fitments mounted on the body/cab. It includes the external cab assembly, panels, brackets, stud welding, steps, windows, cab tilt and locking mechanism, etc. |
| | -30 | Doors/hatches | Refers to loading/entry hatches and doors in, or directly mounted on, the body/cab. It includes loading doors, driver and passenger doors, hatches, locks, handles, etc. |
| | -40 | Seats | Refers to seating and associated fittings which are directly mounted on the body/cab. It includes, for example, seat belts and harnesses. |
| | -50 | Drinking water tank | Refers to a system designed to provide drinking water for the driver and crew, which is directly mounted on the body/cab. It includes tanks, filler necks, filters, pipes, seals, valves, vents, drainage, etc. |
| | -60 | Access panels | Refers to access panels directly mounted on the body/cab. |
| | -70 | Load bay | Refers to load (or passenger) carrying areas in the body/cab and any soft/hard top covering, supports, etc. |
| | -80 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the body or cab. |

*Table 16 System B3 - Suspension/track/wheels - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B3 | | **Suspension/track/ wheels - General** | |
| | -00 | General | This element refers to the means for generating tractive effort, thrust and lift, generally at or in proximity to the earth's surface and adapting the vehicle to the irregularities of the surface. It includes, for example, wheels, tracks and steering gears for traction and control functions. Also, it includes springs, shock absorbers, skirts and other suspension members such as track adjusting mechanisms. It does not include specific steering mechanisms. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Suspension unit | Refers to the means for adapting the vehicle to irregularities of the surface. It includes hydrogas units, shock absorbers, leaf and coil springs, pneumatic suspension units, etc. Also included is the lift mechanism, skirts, etc, for hovercraft. |
| | -20 | Road wheel hub assembly | Refers to a means for distributing the nominal ground pressure of the vehicle. On wheeled vehicles, it includes wheels that transfer tractive effort to the surface and rolling wheels. It includes road wheels, hub assemblies, tires, valves, inner-tubes, etc. |
| | -30 | Sprocket wheel assembly | Refers to the sprocket drive wheels which transfer tractive effort to the track. |
| | -40 | Track assembly | Refers to the track and associated linkages. |
| | -50 | Idler wheels | Refers to the feed/guide mechanism(s) associated with track laying. It includes idler wheels and track tensioners. |
| | -60 | Roller assembly | Refers to the track roller guide assemblies. |
| | -70 | Axle | Refers to non-driving axles not covered under the transmission system. It includes axle arms, links, bearings, etc. |

*Table 17 System B4 - Turret assembly - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B4 | | **Turret assembly - General** | |
| | -00 | General | The turret assembly refers to the structures and equipment installation required to provide the fighting compartment element of combat vehicles. This element includes turret armor, EMC shielding, turret rings, slip rings, attachments and appendages such as latches and cupolas, and accommodation for personnel, weapons and $C^3I$. |
| | -10 | Internal mountings | Refers to internal fitments mounted in the turret. It includes drinking water installations, periscope mountings, panels, brackets, clips, stud welding, etc. |
| | -20 | External mountings | Refers to external fitments mounted on the turret. It includes brush deflector assemblies, cooler boxes, gun covers, splash curtains, panels, brackets, stud welding, etc. |
| | -30 | Hatches | Refers to loading/entry hatches in, or directly mounted on, the turret. It includes loading hatches, crew hatches and associated locks, handles, fittings, etc. It does not include cupolas. |
| | -40 | Seats | Refers to seating which is directly mounted in the turret. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Ring assembly | Refers to a circular track and roller/ball-race assembly designed to facilitate turret rotation. |
| | -60 | Cupola | Refers to a roof aperture and domed hatch assembly, primarily for observation purposes. It can be capable of rotation, and can also provide access for entry/exit. |
| | -70 | Elevating/ traversing gearbox | Refers to elevating/traversing gearboxes mounted on the turret wall. |
| | -80 | Turntable assembly | Refers to the turret turntable assembly. It includes drive and roller assemblies, RBJ mountings, etc. |
| | -90 | Ancillary | Refers to ancillary controls, items and associated systems in, or directly mounted on, the turret. It includes such items as wash/wipe equipment, turret and elevation locks, position indicators and adjustable mirrors, etc. |

### 2.1.4 System C - Armaments

*Table 18 System C0 - Armaments - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C0 | | **Armaments - General** | |
| | -00 | General | A defensive or offensive system or equipment. |

*Table 19 System C1 - Gun control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C1 | | **Gun control systems - General** | |
| | -00 | General | The gun control element refers to that equipment (hardware/software) installed in the vehicle which provides intelligence necessary to power elevate and traverse the weapons systems and also to control via stabilization systems, and turret and gun drives, including gun position indicators and sensors. |
| | -10 | Installation | Refers to the Gun Control Equipment (GCE) installation. |
| | -20 | Control panel | Refers to control panels associated with FV GCE. |
| | -30 | Power supply | Refers to power supply units associated with FV GCE. |
| | -40 | Switch units | Refers to switch units associated with FV GCE. It includes trimming units, fire control switches, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Gun controller | Refers to control systems associated with GCE. It includes controls for the gun, motor generators, metadynes, amplidynes, magnicons, and power amplifiers. |
| | -60 | Power motors | Refers to gearbox drive motors, associated with GCE. It includes the power, elevation and traverse drive motors. |
| | -70 | Gyroscope assembly | Refers to gyroscope assemblies associated with GCE. |
| | -80 | Ancillary | Refers to ancillary GCE controls and associated systems. It includes such items as turnbuckle assemblies, traverse displacement units, fire control quadrants, inter-connecting boxes, wiring, connectors, etc. |

*Table 20 System C2 - Fire control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C2 | | **Fire control systems - General** | |
| | -00 | General | The fire control element refers to that equipment (hardware/software) installed in the vehicle which provides intelligence necessary for weapons delivery such as launching and firing. This element includes, for example, radar and other sensors necessary for search recognition, meteorological and/or tracking; controls and displays, fire control computers, and computer programs. |
| | -10 | Computer/ interface | Refers to computer interface systems and equipment associated with fire control systems. It includes computer/interface units, program loading facilities, etc. |
| | -20 | Control/monitor | Refers to control and monitoring equipment associated with the fire control systems. |
| | -30 | Filter units | Refers to filter units associated with the fire control systems. |
| | -40 | Sensors | Refers to sensors associated with the fire control systems. It includes sensors for elevation and traverse displacement, trunnion tilt, sighting angle, etc. |
| | -50 | Firing handles | Refers to firing handles associated with the fire control systems. |
| | -60 | Fire control boxes | Refers to control boxes associated with the fire control system. It includes the commander's, and gunner's control boxes, the loader's safety box, etc. |
| | -70 | Ancillary | Refers to ancillary items and associated systems. It includes such items as junction boxes, cables, connectors, services, etc. |

*Table 21 System C3 - Thermal imaging - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C3 | | **Thermal imaging - General** | |
| | -00 | General | This element refers to that equipment (hardware/software) which provides a thermal picture for the crew to use for surveillance and weapon guidance. It includes thermal imaging sensor heads, drive units, processors, power supply units, and display units. |
| | -10 | Sensor | Refers to sensors specifically associated with thermal imaging systems. It includes scanner head assemblies, IR telescopes, tilt sensors, focal telescopes, etc. |
| | -20 | Processing | Refers to processing elements associated with thermal imaging systems. It includes symbology units, processors, etc. |
| | -30 | Display | Refers to the display elements of a thermal imaging system. It includes binocular viewers, commander's and gunner's display units, display drive units, etc. |
| | -40 | Control | Refers to the control elements of a thermal imaging system. It includes servo units, gunner's and commander's control units, etc. |
| | -50 | Converter units | Refers to converter elements of a thermal imaging system. It includes isolating converter units, etc. |
| | -60 | Structure and framework | Refers to framework and/or basic structural housing for a thermal imaging system, including load bearing components. |
| | -70 | Ancillary | Refers to ancillary controls, items and associated systems related to thermal imaging systems. It includes such items as wash/wipe equipment, cables, connectors, services, etc. |

*Table 22 System C4 - Thermal imaging cooling systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C4 | | **Thermal imaging cooling systems - General** | |
| | -00 | General | This element refers to that equipment which provides a cooling medium, for thermal images. It will include, for example, compressors, bottles, pipes, fans, mini coolers, air cleaning columns and sterling cycle cooling machines. |
| | -10 | Compressors | Refers to the part of the system used to pressurize the cooling system. It includes motors, pumps, etc. |
| | -20 | Storage | Refers to the part of the system used for storage of coolant. It includes tanks, filling systems, sumps, drains, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Distribution | Refers to the part of the system used for distribution of coolant. It includes pipes, valves, etc. |
| | -40 | Indicating | Refers to the part of the system used to monitor the condition of coolant (quantity, temperature and pressure). It includes transmitters, indicators, wiring, warning systems, etc. |

*Table 23 System C5 - Optical sighting systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C5 | | **Optical sighting systems - General** | |
| | -00 | General | The optical element refers to the sighting systems for search, observation, identification, tracking, range-finding and will include sensors and displays associated with this system. |
| | -10 | Surveillance | Refers to optical surveillance equipment. It includes such items as observation periscopes, etc. |
| | -20 | Sighting | Refers to optical sighting equipment. It includes such items as sighting and aiming periscopes, etc. |
| | -30 | Reticle image projector | Refers to a means for displaying a reticle image in/on the sighting device. |
| | -40 | Sighting unit | Refers to a means for displaying a reticle image in the sighting device. |
| | -50 | Ancillary | Refers to ancillary controls, items and associated systems related to optical sighting systems. It includes such items as wash/wipe equipment, cables, connectors, services, etc. |

*Table 24 System C6 - Weapon/gun - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C6 | | **Weapon/gun - General** | |
| | -00 | General | The weapon/gun element refers to the means for the launcher to deliver fire on hostile targets or for logistics and other vehicles to exercise self-defense. This element includes, for example, the main gun/elevating mass and secondary armaments such as small arms and mortars. Fire control, gun control, and optical systems are excluded. |
| | -10 | Barrel | The barrel assembly provides initial guidance for launch of projectiles. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Breech, housing and firing mechanism | Refers to a system which provides a means of access for the projectile/case to enter the barrel. It also provides a pressure seal and firing mechanism, together with the means by which the breech and firing mechanism are housed within the equipment. It includes all associated housing items. |
| | -30 | Mountings | Refers to the means for attaching the barrel assembly and can include the mountlet assembly as well as the means to balance the armament system. It also includes tripods and bipods. |
| | -40 | Recoil mechanism | Refers to systems which provide a means for absorbing energy created by projectile launch. It includes recuperator and recoil assemblies, etc. |
| | -50 | Smoke discharger | Refers to a means for dispersing smoke/fumes generated when a round is fired. |
| | -60 | Secondary armaments installation | Refers to systems which provide a secondary armament installation. |
| | -70 | Sights | Refers to a mechanical sighting system used on small arms, machine guns, man-portable launchers, etc. |
| | -80 | Ancillary | Refers to ancillary items and associated systems. It includes, for example, such items as spare barrels and other parts, wallets, cleaning kits and sustained fire kits. |

*Table 25 System C7 - Automatic loading systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C7 | | **Automatic loading systems - General** | |
| | -00 | General | The automatic loading element consists of that equipment (hardware/software) providing the means to select ammunition from a stored position in the vehicle, its transfer to and loading of the armament system. This element also includes the means to eject spent cases and misfired rounds. Components include all ammunition storage racks, transfer/lift mechanisms, ramming and ejecting mechanisms as well as specialized hydraulic and electrical controls. |
| | -10 | Storage (ready round) | Refers to ammunition storage racks, bins, etc. |
| | -20 | Transfer/lift | Refers to the means to select ammunition from a stored position in the vehicle and transfer it to the armament system. It includes transfer and lift mechanisms |
| | -30 | Loading/ramming | Refers to the means to loading the armament system. It includes ramming and ejecting mechanisms. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Control | Refers to the means to control loading the armament system. It includes specialized hydraulic and electrical controls and safety devices. |

### 2.1.5 System D - Electrical systems

*Table 26 System D0 - Electrical systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D0 | | **Electrical systems - General** | |
| | -00 | General | A system or equipment for generation, distribution and/or control of electric power. |

*Table 27 System D1 - Electrical systems (engine/power pack) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D1 | | **Electrical systems (engine/power pack) - General** | |
| | -00 | General | This element refers to the electrical or electronic systems for the engine/power pack. It will include wiring harnesses, line replaceable units (LRUs), sensors, lighting, batteries, generators, etc. |
| | -10 | Generating | Refers to generating systems and equipment in the engine/power pack compartment that are not directly mounted on the engine/power-pack. It includes such items as alternators, dynamos, generator panels, etc. |
| | -20 | Batteries | Refers to battery equipment mounted in the engine/power pack compartment. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment mounted in the engine/power pack compartment. It includes such items as tachometers, speedometers, indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment mounted in the engine/power pack compartment. It includes such items as inspection lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms mounted in the engine/power pack compartment. It includes looms, wires, harnesses, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -60 | Electrical equipment | Refers to electrical equipment mounted in the engine/power pack compartment. It includes, for example, actuators, engine controls and ignition systems. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment mounted in the engine/power pack compartment. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment mounted in the engine/power pack compartment. It includes such items as fuses, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment mounted in the engine/power pack compartment. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 28 System D2 - Electrical systems (hull/frame) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D2 | | **Electrical systems (hull/ frame) - General** | |
| | -00 | General | This element refers to the electrical or electronic systems for the hull and frame. It will include both internal and external wiring harnesses, junction and distribution boxes, line replaceable units (LRUs), sensors and lighting systems. It also includes the interfaces and connectors associated with the engine, power pack, generating and starting systems. |
| | -10 | Internal electrical systems | Refers to the internal electrical or electronic systems mounted in the hull/frame. It will include, for example, wiring harnesses, LRUs, junction and distribution boxes. It also includes the interfaces and connectors associated with the engine, power pack, generating and starting systems. |
| | -20 | Batteries | Refers to battery equipment related to the hull/frame. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Internal lights | Refers to lighting systems mounted internally in the hull/frame. |
| | -40 | External electrical systems | Refers to the electrical or electronic systems mounted externally on the hull/frame. It will include, for example, external lighting systems, horns and flashing beacons. |
| | -50 | Wiring | Refers to wiring, cable looms and clips related to the hull/frame or associated with connecting to the engine/power pack. It includes looms, wires, clips, harnesses, connectors, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -60 | Electrical equipment | Refers to electrical equipment related to the hull/frame. It includes, for example, actuators, wiper controls, heaters, cooking pots, horns, radio fittings and ancillary items. |
| | -70 | Distribution | Refers to electrical distribution and interconnecting systems and equipment related to the hull/frame. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the hull/frame. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the hull/frame. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 29 System D3 - Electrical systems (body/cab) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D3 | | **Electrical systems (body/cab) - General** | |
| | -00 | General | This element refers to the electrical or electronic systems for either the body/cab. It will include wiring harnesses, line replaceable units (LRUs), sensors and lighting systems. |
| | -10 | Generating | Refers to generating systems and equipment related to the body/cab. It includes such items as generator control panels, etc. |
| | -20 | Batteries | Refers to battery equipment related to the body/cab. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment related to the body cab. It includes such items as indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment related to the body cab. It includes such items as inspection lights, head lights, spot lights, tail/side lights, indicators, panel lights, convoy lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms related to the body/cab. It includes looms, wires, harnesses, earthing straps, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the body/cab. It includes, for example, actuators, wiper controls, heaters, cooking pots and horns. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment related to the body/cab. It includes such items as controllers, switches, relays, regulators, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Protection | Refers to electrical protection systems and equipment related to the body/cab. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the body/cab. It includes such items as controllers, switches, relays, regulators, etc. |

*Table 30 System D4 - Electrical systems (turret) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D4 | | **Electrical systems (turret) - General** | |
| | -00 | General | This element refers to the electrical or electronic systems for the turret. It will include wiring harnesses, line replaceable units (LRUs), sensors and lighting systems. |
| | -10 | Generating | Refers to generating systems and equipment related to the turret. It includes such items as generator control panels, etc. |
| | -20 | Batteries | Refers to battery equipment related to the turret. It includes such items as battery containers, lagging kits, battery assemblies, connecting straps, etc. |
| | -30 | Instrumentation | Refers to instrumentation systems and equipment related to the turret. It includes such items as indicating panels, electronic circuit panels, control transmitters, etc. |
| | -40 | Lights | Refers to lighting systems and equipment related to the turret. It includes such items as inspection lights, panel lights, roof lights, spot lights, convoy lights, etc. |
| | -50 | Wiring | Refers to wiring and cable looms related to the turret. It includes looms, wires, harnesses, earthing straps, etc. |
| | -60 | Electrical equipment | Refers to electrical equipment related to the turret. It includes, for example, actuators, wiper controls, heaters and cooking pots. |
| | -70 | Distribution | Refers to electrical distribution systems and equipment related to the turret. It includes such items as controllers, switches, relays, regulators, etc. |
| | -80 | Protection | Refers to electrical protection systems and equipment related to the turret. It includes such items as fuses, fuse panels, fusible links, trip switches, etc. |
| | -90 | Control | Refers to control systems and equipment related to the turret. It includes such items as controllers, switches, relays, regulators, etc. |

### 2.1.6 System E - Communications system

*Table 31 System E0 - Communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E0 | | **Communications - General** | |
| | -00 | General | A system or equipment for transferring information. |

*Table 32 System E1 - Communication systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E1 | | **Communication systems - General** | |
| | -00 | General | The communications element refers to that equipment (hardware/software) which provides the means within the system for commanding, controlling and transmitting/receiving information and data to vehicle crew members and other personnel exterior to the operating vehicle. This element includes radio frequency equipment, microwave and optic communication links, networked equipment for multiple vehicle control and intercoms and external phones systems. It can include navigational system and data displays when these are integral with the equipment of crew stations or drivers for automotive display. |
| | -10 | UHF/SHF/EHF | Refers to that portion of the system used for communications utilizing ultra, super and extra high frequency (UHF, SHF, EHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -20 | VHF | Refers to that portion of the system used for communications utilizing very high frequency (VHF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -30 | HF | Refers to that portion of the system used for communications utilizing high frequency (HF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -40 | LF | Refers to that portion of the system used for communications utilizing low frequency (LF) carriers. It includes transmitters, receivers, control, antennas, etc. |
| | -50 | Audio | Refers to that portion of the system used for voice communications. It includes such items as intercoms, headphones, loudspeakers, switching/control panels, etc. |
| | -60 | Digital | Refers to that portion of the system used for digital/data communications. It includes modems, encryption devices, etc. |
| | -70 | Satellite | Refers to that portion of the system used for communications via satellites. It includes transmitters, receivers, control, antennas, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -80 | Optical | Refers to that portion of the system used for communications via line-of-site. It includes transmitters, receivers, control, signaling devices, etc. |
| | -90 | Ancillary | Refers to ancillary controls and associated systems. It includes such items as wiring, connectors, etc. |

*Table 33 System E2 - Identification friend/foe (IFF) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E2 | | **Identification friend/foe (iff) - General** | |
| | -00 | General | IFF equipment is common to all services and is therefore interactive with many other users. It covers the equipment (hardware software) that identifies friend or foe and transmits that information. It can use the vehicle communication system(s). |
| | -10 | Transmitting | Refers to that part of the system which is used to send data. |
| | -20 | Receiving | Refers to that part of the system which is used to receive IFF data. |
| | -30 | Indicating | Refers to that part of the system which is used to display IFF data. |

### 2.1.7 System F - Navigation system

*Table 34 System F0 - Navigation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F0 | | **Navigation - General** | |
| | -00 | General | A system or equipment used to determine, conduct, manage or plot a position or course for the system. |

*Table 35 System F1 - Navigation systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F1 | | **Navigation systems - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | The navigation element refers to that equipment (hardware/software) installed in the vehicle which permits the crew to determine vehicle location and to plot the course of the vehicle. It includes navigation systems such as dead reckoning, inertial and global positioning systems. Landmark recognition algorithms and processors are also included. |
| | -10 | Independent | Refers to that portion of the system (hardware/software) which provides information to determine position and is independent on ground installations or orbiting satellites. It includes inertial guidance systems, tracking systems, sextants, etc. |
| | -20 | Dependant | Refers to that portion of the system (hardware/software) which provides information to determine position and is mainly dependant on ground installations or orbiting satellites. It includes GPS, radio compass, etc. |
| | -30 | Computing | Refers to that portion of the system (hardware/software) which combines/processes navigational data to compute or manage the vehicle's geographical position. It includes course computers, landmark recognition algorithms, processors, displays, etc. |

### 2.1.8 System G - Surveillance system

*Table 36 System G0 - Surveillance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G0 | | **Surveillance - General** | |
| | -00 | General | A system or equipment used to sense the environment. |

*Table 37 System G1 - Surveillance systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G1 | | **Surveillance systems - General** | |
| | -00 | General | The surveillance element is defined as all equipment (hardware/software) and associated systems used to sense the surrounding environment and then process, display and record the resulting information. This can include, for example, Meteorological equipment. It does not include specific thermal imaging or meteorological/atmospheric systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Control | Refers to the processing, control and recording elements of the sensor systems. It includes central processors, analogue/digital converters, associated software, storage units, etc. |
| | -20 | Indicating | Refers to the part of the system used to indicate/monitor sensor information. It includes data identification, indicators, displays panels, etc. |
| | -30 | Recording | Refers to the part of the system used to record sensor information. |
| | -40 | Optical/infra-red | Refers to that portion of a system that uses optical and/or heat-sensing devices to acquire information. It includes, for example, driver's, commander's and gunner's periscopes, infra-red scanners, heat sensors and image intensifiers. It does not include specific thermal imaging systems or sighting equipment. |
| | -50 | Laser | Refers to that portion of a system that uses laser devices to acquire information. It includes distance measuring, target identification, etc. |
| | -60 | Radar | Refers to that portion of a system that uses radar devices to acquire information. It includes antennas, receivers, transmitters, indicators, etc. |
| | -70 | Magnetic | Refers to that portion of a system that uses magnetic sensors to acquire information. It includes magnetometers, amplifiers, processors, indicators, etc. |
| | -80 | Sonar | Refers to that portion of a system that uses sonar to acquire information. It includes modulators, transducers, processors, indicators, etc. |
| | -90 | Acoustic | Refers to that portion of a system that uses sound to acquire information. It includes listening devices, amplifiers, processors, indicators, etc. |

*Table 38 System G2 - Meteorological/atmospheric research - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G2 | | **Meteorological/ atmospheric research - General** | |
| | -00 | General | Refers to the systems and devices which furnish a means of providing, processing and recording meteorological data. |
| | -10 | Weather | Refers to that portion of a system which is used to detect, measure, process or record weather (moisture, temperature, cloud, wind, etc) data. It includes hygrometers, thermometers, anemometers, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Air turbulence | Refers to that portion of a system which is used to detect, measure, process or record air turbulence data. |
| | -30 | Pollutants | Refers to that portion of a system which is used to detect, measure, process or record contaminated particles. |
| | -40 | Magnetic/ gravitational | Refers to that portion of a system which is used to detect, measure, process or record the earth's magnetic or gravitational forces. |

### 2.1.9 System H - Steering system

*Table 39 System H0 - Steering - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H0 | | **Steering - General** | |
| | -00 | General | A system or equipment used to guide or govern direction. |

*Table 40 System H1 - Steering systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H1 | | **Steering systems - General** | |
| | -00 | General | This element refers to the devices (hardware/software) which are part of the vehicle not contained within the suspension system or driver controls that govern the vehicle's direction. This will include, for example, rudder and thrust devices and trim valves for amphibians. |
| | -10 | Rudders | Refers to rudder devices designed to control the vehicle's direction. |
| | -20 | Trim valves | Refers to trim valves designed to control the vehicle's direction. |
| | -30 | Thrusters | Refers to thrust devices designed to control the vehicle's direction. |

### 2.1.10 System J - Ventilation/heating/cooling system

*Table 41 System J0 - Ventilation/heating/cooling - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J0 | | **Ventilation/ heating/cooling - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | A system or equipment used to provide a controlled environment. |

*Table 42 System J1 - Ventilation/heating/cooling systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J1 | | **Ventilation/ heating/cooling systems - General** | |
| | -00 | General | This element refers to those subassemblies or components which provide a micro-climatic condition (heating or cooling), inside the vehicle, including personnel heating/cooling suits or components. It also covers purification systems not covered by NBC. |
| | -10 | Compression | That portion of the system and its controls which supplies pressurized air/gas. Includes items such as controls and indicating systems related to pressure, gas-filled systems, etc. |
| | -20 | Distribution | That portion of the system used to induct and distribute air. It includes equipment rack cooling, seals, demisting, waveguide pressurization system and items of such systems, like blowers, ducting and inlets. |
| | -30 | Heating | That portion of the system and its controls which supply heated air. It includes items such as heater units, wiring, etc. |
| | -40 | Cooling | That portion of the system and its controls which supply cooled air. Includes items such as the cooling unit, indicating systems related to the cooler operation, wiring etc. It does not include temperature control and indicating systems. |
| | -50 | Temperature control | That portion of the system used to control the temperature of the air. Includes items such as, thermal sensing devices, switches, indicators, wiring etc. |
| | -60 | Moisture/air | That portion of the system used to contaminant control moisture in the air, to control ozone concentrations, to filter radioactive debris and chemical/biological contaminants, etc. |
| | -70 | Liquid coolant | Those components required to supply liquid coolant to a cooling system. |

### 2.1.11 System K - Hydraulic systems system

*Table 43 System K0 - Hydraulic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K0 | | **Hydraulic systems - General** | |
| | -00 | General | A system or equipment for generation, distribution and/or control of hydraulic (or pneumatic) power. |

*Table 44 System K1 - Hydraulics - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K1 | | **Hydraulics - General** | |
| | -00 | General | This element refers to a system or equipment (hardware/software) within the vehicle for the generation, distribution and/or control of hydraulic power. |
| | -10 | Main | Refers to a system or equipment which is used to generate, store, distribute or control hydraulic power. It includes such items as tanks, valves, pumps, oil coolers, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |
| | -20 | Auxiliary | Refers to that portion of the hydraulic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main hydraulic system. |
| | -30 | Indicating | Refers to that part of the hydraulic system which is used to monitor the condition of the hydraulic system or fluid. It includes transmitters, indicators, warning systems, etc. |

*Table 45 System K2 - Pneumatic systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K2 | | **Pneumatic systems - General** | |
| | -00 | General | This element refers to a system or equipment (hardware/software) within the vehicle for the generation, distribution and or control of pneumatic (including vacuum) power. |
| | -10 | Main | Refers to a system or equipment which is used to generate, store, distribute or control pneumatic power. It includes such items as tanks, valves, pumps, plumbing, etc. It does not include user systems classified elsewhere, or their connecting valves. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Auxiliary | Refers to that part of the pneumatic system which is classified as auxiliary, emergency or standby and which is used to supplement, or replace the main pneumatic system. |
| | -30 | Indicating | Refers to that part of the pneumatic system which is used to monitor the condition of the system. It includes transmitters, indicators, warning systems, etc. |

### 2.1.12 System L - Electronic system

*Table 46 System L0 - Electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L0 | | **Electronic system - General** | |
| | -00 | General | A system or equipment using electronic/automated software and/or firmware elements not specifically included in other systems. |

*Table 47 System L1 - Electronics - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L1 | | **Electronics - General** | |
| | -00 | General | This element refers to a system or equipment within the vehicle which uses electronic/automated software and/or firmware elements not specifically included in any other systems. |

### 2.1.13 System M - Auxiliary system

*Table 48 System M0 - Auxiliary - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M0 | | **Auxiliary - General** | |
| | -00 | General | Subsidiary systems that provide services or support to main systems or equipment. |

*Table 49 System M1 - Auxiliary systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M1 | | **Auxiliary systems - General** | |
| | -00 | General | This element refers to subsidiary systems (hardware/software) that provide services or support to main systems or equipment within the vehicle, not covered elsewhere. |

### 2.1.14 System N - Survivability system

*Table 50 System N0 - Survivability - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N0 | | **Survivability - General** | |
| | -00 | General | A system or equipment used to provide hazard detection, protection, survivability and escape facilities. |

*Table 51 System N1 - Fire protection systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N1 | | **Fire protection systems - General** | |
| | -00 | General | This element refers to systems (hardware/software) that provide a warning to the crew that a possible fire hazard exists. It includes the suppression/fire fighting and heat sensors required for this system. |
| | -10 | Detecting | Refers to that part of the system which is used to sense the presence of excessive heat, smoke or fire. |
| | -20 | Indicating | Refers to that part of the system which is used to indicate the presence of excessive heat, smoke or fire. |
| | -30 | Extinguishing | Refers to that part of the system, either fixed or portable, which is used to extinguish fire. |

*Table 52 System N2 - Nuclear, biological, chemical - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N2 | | **Nuclear, biological, chemical - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | The NBC element refers to those subassemblies or components which provide nuclear, biological and chemical detection, protection and survivability to the vehicle or crew, either individually or collectively, during an NBC attack. This includes a positive pressure system, purification system, ventilated face piece (mask), NBC detection and warning devices, decontamination equipment and chemical resistant coatings. It can also include environmental control equipment, such as heaters, coolers, etc. |
| | -10 | Pack | Refers to NBC protection packs. |
| | -20 | Control | Refers to NBC protection controls. |
| | -30 | Pressure relief | Refers to pressure relief devices specifically fitted for NBC protection purposes. |
| | -40 | Door assemblies | Refers to NBC protection fitted to doors and hatches. |
| | -50 | Ancillary | Refers to ancillary controls and associated systems. It can include, for example, such items as wiring, connectors, heaters, coolers and ducting. |

### 2.1.15 System P - Special equipment/systems - General

*Table 53 System P0 - Special equipment/systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P0 | | **Special equipment/ systems - General** | |
| | -00 | General | A system or equipment used to provide a special mission capability. |

*Table 54 System P1 - Special to type equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P1 | | **Special to type equipment - General** | |
| | -00 | General | This element refers to that special equipment (hardware/software) to be mated to a hull/turret or to a chassis/frame/body/cab assembly, to enable the achievement of a special mission capability. It includes blades, booms, cranes, winches, robotic arms, manipulators, etc. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Structure | Refers to that special hardware to be mated to a main assembly (hull, turret, chassis, frame, body or cab). It can include, for example, slide and tilt frames, launch frames and their winches, launch rails, bipods and platforms. |
| | -20 | Electrical systems | Refers to electrical systems associated with special hardware that is mated to a main assembly. It can include, for example, launch/recovery mechanism electrical systems. |
| | -30 | Hydraulics | Refers to hydraulic systems associated with special hardware that is mated to a main assembly. It can include, for example, the generation, distribution and control systems.. |
| | -40 | Handling equipment | Refers to handling equipment or systems that are mated to a main assembly. It can include, for example, cranes, winches, base stabilizers, support tools and actuators. |
| | -50 | Ancillary | Refers to ancillary equipment for a system that is mated to a main assembly. It can include, for example, cradles, special tools, lifting beams and restraints. |
| | -60 | Stowage | Refers to stowage provisions for operational equipment that are provided on a main assembly. |

*Table 55 System P2 - Special recovery equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P2 | | **Special recovery equipment - General** | |
| | -00 | General | This element refers to that special recovery equipment (hardware/software) to be mated to a hull turret or to a chassis/frame/body/cab assembly, to enable the achievement of a recovery capability. It includes cranes and towing equipment. |

*Table 56 System P3 - Special fit equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P3 | | **Special fit equipment - General** | |
| | -00 | General | This element refers to that special fit equipment (hardware/software) to be mated to a hull/turret or to a chassis/frame/body/cab assembly, to enable the achievement of a specialized capability. It will include supply, DROPS, lift trucks, side loaders, etc. |

*Table 57 System P4 - Special purpose equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P4 | | **Special purpose equipment - General** | |
| | -00 | General | This element refers to that special-to-purpose equipment (hardware/software) to be mated to a hull/turret or to a chassis/frame/body/cab assembly, for the achievement of a special mission purpose. It covers, for example, ISO container bodies and equipment for command or repair workshop, medical and other special purpose vehicles. |

### 2.1.16 System Q - Outfit, furnishings and stowage - General

*Table 58 System Q0 - Outfit, furnishings and stowage - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q0 | | **Outfit, furnishings and stowage - General** | |
| | -00 | General | A function or equipment used to provide habitability, operability or stowage facilities that is not specifically included in other systems. |

*Table 59 System Q1 - Stowage - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q1 | | **Stowage - General** | |
| | -00 | General | This element is required to provide for personal equipment stowage as well as operational equipment stowage on the vehicle including hull and turret. |
| | -10 | Charge bin | Refers to charge bin stowage facilities. |
| | -20 | Shell stowage | Refers to shell stowage facilities. |
| | -30 | Ammunition | Refers to stowage facilities for both secondary and personal ammunition. |
| | -40 | Body/cab internal | Refers to stowage facilities within the body or cab. |
| | -50 | Body/cab external | Refers to stowage facilities mounted on the body or cab. |
| | -60 | Hull/frame internal | Refers to stowage facilities mounted internally to the hull or frame. It includes, for example, the drivers, fighting, crew and engine/transmission compartments. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -70 | Hull/frame external | Refers to stowage facilities mounted externally on the hull or frame. |
| | -80 | Turret internal | Refers to stowage facilities mounted internally to the turret. |
| | -90 | Turret external | Refers to stowage facilities mounted externally on the turret. |

*Table 60 System Q2 - Complete equipment schedule (CES) - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q2 | | **Complete equipment schedule (CES) - General** | |
| | -00 | General | This element refers to lists detailing the equipment required by the user to operate and maintain the system. It includes, for example, both fitted and loose items, spares, tools and operator manuals. |
| | -10 | Production ces | This element refers to the production version of the CES. |
| | -20 | Service ces | This element refers to the service version of the CES. |
| | -30 | Complex ces | This element refers to the complex version of the CES. |

### 2.1.17 System R - Training - General

*Table 61 System R0 - Training - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R0 | | **Training - General** | |
| | -00 | General | The training element is defined as the deliverable training services, devices, accessories, aids, equipment and facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. This element includes all effort associated design, development and production of deliverable training equipment as well as the execution of training services. |

*Table 62 System R1 - Training services - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R1 | | **Training services - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | The training services element refers to the deliverable training services, used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -10 | Devices/ accessories/aids | The training devices/accessories/aids element refers to the deliverable devices, accessories and aids used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -20 | Equipment | The training equipment element refers to the deliverable training equipment used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |
| | -30 | Facilities | The training facilities element refers to the deliverable training facilities used to provide instruction through which personnel will acquire sufficient concepts, skills and aptitudes to both operate and maintain the system with maximum efficiency. |

### 2.1.18 System S - Repair Test and Support - general

*Table 63 System S0 - Repair test and support - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S0 | | **Repair test and support - General** | |
| | -00 | General | A system, equipment or facilities used to maintain operational capability. |

*Table 64 System S1 - Power pack repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S1 | | **Power pack repair facility (PPRF) - General** | |
| | -00 | General | This element refers to a facility which will allow unserviceable vehicle power packs to be repaired, including major assembly exchange, tested and returned to service use. PPRFs can be transportable and will include tools, jigs and fixtures commensurate with the type of equipment they are due to repair. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Mobile | This element refers to a mobile facility which will allow unserviceable vehicle power packs to be repaired, including major assembly exchange, tested and returned to service use. This section will not include the basic container body and its associated equipment. |
| | -20 | Fixed | This element refers to a static facility which will allow unserviceable vehicle power packs to be repaired, including major assembly exchange, tested and returned to service use. |

*Table 65 System S2 - Sighting systems repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S2 | | **Sighting systems repair facility - General** | |
| | -00 | General | This element refers to equipment (hardware/software) that enables the repair, test or calibration of the optical sighting equipment, including laser range finders for example. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/or calibration of optical sighting equipment. |
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of optical sighting equipment. |

*Table 66 System S3 - Thermal imaging repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S3 | | **Thermal imaging repair facility - General** | |
| | -00 | General | To provide a transportable facility (hardware/software) whereby thermal imaging equipment including its associated cooling systems can be repaired, tested and returned to service. The equipment covered will include, for example, clean air equipment, jigs, fixtures, computer interface adapters and test equipment. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/or calibration of thermal imaging equipment. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of thermal imaging equipment. |

*Table 67 System S4 - General purpose electronic repair facility - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S4 | | **General purpose electronic repair facility - General** | |
| | -00 | General | This element refers to equipment (hardware/software) that enables unserviceable electrical/electronic items to be repaired, tested and returned to service use. |
| | -10 | Mobile | Refers to mobile (man-portable or vehicle mounted) equipment (hardware/software), which can be in a vehicle container or box body, that enables the repair, test and/r calibration of general purpose electronic equipment. |
| | -20 | Fixed | Refers to static (permanent or temporary) equipment (hardware/software) that enables the repair, test or calibration of general purpose electronic equipment. |

*Table 68 System S5 - Common support equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S5 | | **Common support equipment - General** | |
| | -00 | General | The common support equipment element refers to those items required to support and maintain the system or portions of the systems while not directly engaged in the performance of its mission, and which are presently in the MOD inventory for support of other systems. This element includes all efforts required to assure the availability of this equipment for support of the particular defense product item. It also includes the acquisition of additional quantities of this equipment if caused by the introduction of the defense material item into operational service. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.2.8

## *Maintained SNS - General sea vehicles*

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| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 1.5 | Request for change |
| Chap 4.3.3 | Data module code - Standard numbering system |

# 1 General

The SNS is used in this specification as a method to describe the functional and/or physical breakdown of items of the Product. Its position in the data module code and structure is defined in Chap 4.3.3. This is an SNS that will be maintained by the S1000D Steering Committee and is subject to normal CPF action in accordance with Chap 1.5.

This chapter gives the definitions for the systems and subsystems, which relate to systems and subsystems, for general sea vehicles. For details on how to use this SNS within the data module code, refer to Chap 4.3.3.

# 2 General sea vehicles SNS

The coding and definitions for the general sea vehicles SNS is appropriate for common and system level information for all Products and is described in Table 2 and shown in Fig 1. However, projects can decide not to use this generic SNS. Business rules decision points are given at Para 3.

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*Fig 1 Top level breakdown for a general sea vehicle*

## 2.1 Main systems

This general sea vehicle SNS is divided into the 19 main systems.

*Table 2 Top level breakdown for a general sea vehicle*

| System | Title |
|---|---|
| A0 | Propulsion - General |
| B0 | Structure - General |
| C0 | Armaments - General |
| D0 | Electrical power - General |
| E0 | Communications - General |
| F0 | Navigation - General |
| G0 | Surveillance - General |
| H0 | Steering - General |
| J0 | Ventilation and air conditioning - General |
| K0 | Hydraulics and pneumatics - General |

| System | Title |
|---|---|
| L0 | Electronic systems - General |
| M0 | Auxiliary - General |
| N0 | Survivability - General |
| P0 | Special equipment and systems - General |
| Q0 | Outfit and furnishings - General |
| R0 | Training - General |
| S0 | Repair, test and support - General |
| TO | Management system |
| UO | Meteorological and oceanography system |

## 2.2 Definitions of systems and subsystems

### 2.2.1 System A - Propulsion

*Table 3 System A0 - Propulsion - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A0 | | **Propulsion - General** | |
| | -00 | General | A system or equipment for producing and delivering power. |

*Table 4 System A1 - Power pack - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A1 | | **Power pack - General** | |
| | -00 | Main propulsion drives - General | The propulsion prime mover. It includes, for example, nuclear, electrical, steam, gas turbine and diesel primary propulsion drives. |
| | -10 | Propulsion nuclear | A nuclear fuelled propulsion prime mover |
| | -20 | Propulsion electrical | An electrically powered propulsion prime mover. |
| | -30 | Propulsion steam | A propulsion prime mover driven by steam. It includes, for example, boilers, hoppers and turbines. |
| | -40 | Propulsion gas turbine | A gas turbine powered propulsion prime mover. |
| | -50 | Propulsion diesel | A propulsion prime mover fuelled by diesel. |

*Table 5 System A2 - Secondary propulsion drives - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A2 | | **Secondary propulsion drives - General** | |
| | -00 | Secondary propulsion drives - General | A secondary means of providing propulsion. |

*Table 6 System A3 - Emergency propulsion drives - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A3 | | **Emergency propulsion drives - General** | |
| | -00 | Emergency propulsion drives - General | An emergency means of providing propulsion. |

*Table 7 System A4 - Propulsion transmission systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A4 | | **Propulsion transmission systems - General** | |
| | -00 | Propulsion transmission systems - General | A system that transmits torque (main/secondary/emergency) to the platform's propulsion drive. |
| | -10 | Propulsion gearing | A system that converts torque, speed or rotational direction between the propulsion and the drive system. |
| | -20 | Propulsion clutches and couplings | A system that connects or removes the drive from the propulsion system. |
| | -30 | Propulsion shafting | A means of transmitting drive from the propulsion system. |
| | -40 | Propulsion bearings | A means of support for propulsion shafting. |
| | -50 | Propulsion propulsors/ propellers | A means of converting propulsion energy into movement of the platform. |

*Table 8 System A5 - Propulsion support systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A5 | | **Propulsion support systems - General** | |
| | -00 | Propulsion support systems - General | Ancillary systems in support of a platforms prime mover. |
| | -10 | Circulating and cooling systems | This system includes cooling air ducting, coolant pumps, liquid filled radiators, fans and associated heat exchange equipment. |
| | -20 | Uptakes and down takes | Refers to a system which supplies and filters air to the propulsion system and collects and removes exhaust gases from the propulsion system. It includes, for example, funnels, all filters, pipes, couplings, silencers, catalytic converters, ducting and combustion air systems. |
| | -30 | Propulsion fuel systems | Equipment to provide fuel storage facilities, fuel filters, delivery pipes, drainage and cut-off valves, Fuel Injector Pumps (FIP) and injectors. |
| | -40 | Propulsion lubricating systems | This system includes lubrication storage facilities. It includes delivery and return pipes, sumps and heat exchangers. |
| | -50 | Propulsion lubrication transfer and purification | This system includes lubrication pumps and filters. |

*Table 9 System A6 - Propulsion control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| A6 | | **Propulsion control systems - General** | |
| | -00 | Propulsion control systems - General | Systems designed to control the various propulsion modes of a platform. |
| | -10 | Propulsion control systems automatic | Refers to those systems that automatically control propulsion. |
| | -20 | Propulsion control systems manual | Refers to those systems that manually control propulsion. |

### 2.2.2 System B - Structure

*Table 10 System B0 - Structure - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B0 | | **Structure - General** | |
| | -00 | General | Framework and/or basic structural housing for a system, including load bearing components. |

*Table 11 System B1 - Hull - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B1 | | **Hull - General** | |
| | -00 | Hull - General | Structured contained envelope providing the overall platform for systems, weapons and personnel. |
| | -10 | Hull fittings | Fittings that are permanently attached to the hull of a platform. |
| | -20 | Hydrofoils | A structure designed to raise the hull out of the water when in motion enabling it to travel fast and economically. |

*Table 12 System B2 - Body/cab - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B2 | | **Body/cab - General** | |
| | -00 | Main supporting structures - General | Beams and columns that provide support for load bearing decks/bulkheads. |
| | -10 | Transverse frames | Refers to a frame that runs athwart ships. |
| | -20 | Longitudinal frames | Refers to a frame that runs fore and aft. |
| | -30 | Superstructure | Refers to a structure that is above deck level. This does not include masts, towers, derricks etc. |

*Table 13 System B3 - Special structures - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B3 | | **Special structures - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | Special structures - General | Structures that are not main supporting but are integral to platform design, eg Sonar Domes. |
| | -10 | Structural castings, forgings and welding | Refers to castings, forging and welding which form part of the structure. |
| | -20 | Ballistic plating, sonar domes and stacks | Refers to armour plating, covers for sonar sensors and funnels. |
| | -30 | Special purpose closures and structures | Refers to other structures not covered above. |

*Table 14 System B4 - Bulkheads/decks - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B4 | | **Bulkheads/ decks - General** | |
| | -00 | Bulkheads/ decks - General | Vertical/horizontal structures, which divide the interior of the hull into compartments or spaces with provision for personnel/stores access. |
| | -10 | Watertight/non watertight bulkheads | Refers to all bulkheads. |
| | -20 | Main decks | Refers to all main decks. |
| | -30 | Floors | Refers to a deck in a land-based structure. |

*Table 15 System B5 - Masts - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B5 | | **Masts - General** | |
| | -00 | Masts - General | Exterior vertical structures which carry those items of equipment (or stores) which by their nature require to be given height well above the deck areas of the platform. |
| | -10 | Submarine masts and periscope integration | Refers to masts and periscopes fitted to a submarine. |
| | -20 | Fixed masts | Refers to solid structures that are fixed to a superstructure. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Service platforms | Refers to service platforms that are mounted on masts. |
| | -40 | Towers | Refers to lattice (mast type) structures. |

*Table 16 System B6 - Access - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| B6 | | **Access - General** | |
| | -00 | General | Refers to interior and exterior access points. |
| | -10 | Doors | Refers to hinged or sliding covers for access points in a bulkhead. May be Watertight and/or Airtight. |
| | -20 | Hatches | Refers to square or rectangular access point in the deck. May be Watertight and/or Airtight |
| | -30 | Scuttles | Refers to round watertight openings and covers in a bulkhead. |
| | -40 | Covers | Refers to something that protects hatches or scuttles. May be Watertight and/or Airtight. |
| | -50 | Portable Plates | Refers to Removable Plates and/or Panels which are integral parts of the ships structure that are secured with bolts and/or screws to allow access for maintenance. |

### 2.2.3 System C - Armaments

*Table 17 System C0 - Armaments - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C0 | | **Armaments - General** | |
| | -00 | General | A defensive or offensive system or equipment. |

*Table 18 System C1 - Gun systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C1 | | **Gun systems - General** | |
| | -00 | Gun systems - General | An integrated system for platform protection and destruction of the aggressor. Additionally will include Small Arms for personal protection and aggression. |
| | -10 | Gun mountings | Refers to that part of a weapons system that secures the barrel/breach assembly. |
| | -20 | Directors | Refers to that part of a weapon system that allows for aiming of the gun. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Ancillaries | Refers to that part of a weapon system that is not described above. |
| | -40 | Small arms | Refers to personal weapon systems. |
| | -50 | Portable weapons | Refers to portable weapon systems. |

*Table 19 System C2 - Guided missile systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C2 | | **Guided missile systems - General** | |
| | -00 | Guided missile systems - General | Equipment to deliver a self propelled warhead that can be guided through its flight to a target. |
| | -10 | Control | Refers to that part of the guided weapon system that provides control. |
| | -20 | Aerials | Refers to the aerials of the guided weapon system. |
| | -30 | Radars | Refers to the target acquisition and guidance radar equipment within the guided weapon system. |
| | -40 | Launchers | Refers to the launching equipment within the guided weapon system. |
| | -50 | Ancillaries | Refers to all parts of the guided weapon system not described above. |

*Table 20 System C3 - Rocket systems and pyrotechnics - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C3 | | **Rocket systems and pyrotechnics - General** | |
| | -00 | Rocket systems and pyrotechnics - General | Projectiles which are used as an aid, signal or illumination. |
| | -10 | Signals | Refers to those projectiles used for signaling. |

*Table 21 System C4 - Aircraft related weapon systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C4 | | **Aircraft related weapon systems - General** | |
| | -00 | Aircraft related weapon systems - General | For the protection in the surveillance role and additionally equipment to provide the ability to deliver/fire weapons to selected targets. |
| | -10 | Aircraft weapon systems | Refers to weapon systems mounted on an aircraft. |
| | -20 | Aircraft weapon control | Refers to the control system of a aircraft mounted weapon system. |

*Table 22 System C5 - Fire control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C5 | | **Fire control systems - General** | |
| | -00 | Fire control systems - General | Equipment provided to fire weapons according to the protection or aggression scenario. |
| | -10 | Weapon direction systems and sights | Refers to that part of a weapon system that directs fire to a given target. |
| | -20 | Gun fire control systems | Refers to the control system of a weapon system. |
| | -30 | Missile fire control systems | Refers to the fire control systems for missiles. |
| | -40 | Underwater fire control systems | Refers to fire control systems for underwater weapon Systems. |

*Table 23 System C6 - Torpedo systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C6 | | **Torpedo systems - General** | |
| | -00 | General | The equipment provided for the discharge of torpedoes to their targets in a timely and controlled manner. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Submarine torpedo systems | Refers to the submarine torpedo systems. |
| | -20 | Surface launch torpedo equipment | Refers to the surface launch systems for torpedoes. |
| | -30 | Torpedo handling and stowage | Refers to the handling and stowage facilities for torpedoes. |
| | -40 | Acoustic | That portion of the system that uses sound to acquire information. It includes listening devices, amplifiers, processors, indicators etc |

*Table 24 System C7 - Electronic warfare - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| C7 | | **Electronic warfare - General** | |
| | -00 | General | Those units and components which furnish a means of detecting, analyzing, jamming, or nullifying the effectiveness of defensive detection devices and communication links. |
| | -10 | Active | That portion of the system consisting of receivers, transmitters, repeaters, blanking and modulating devices eg infra-red, laser. |
| | -20 | Passive | That portion of the system that contains no active elements eg chaff. |
| | -30 | Data processing | That portion of the system that processes and analyses received data. |

### 2.2.4 System D - Electrical system

*Table 25 System D0 - Electrical system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D0 | | **Electrical system - General** | |
| | -00 | General | A system or equipment for generation, distribution and/or control of electric power. |

*Table 26 System D1 - Electrical power generation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D1 | | **Electrical power generation - General** | |
| | -00 | General | Power produced to satisfy all electrical power requirements using a generator driven by a prime mover. |
| | -10 | Turbo generators and control equipment | Refers to the control equipment for turbo generators. |
| | -20 | Gas turbine generators and control equipment | Refers to the control equipment for gas turbine generators. |
| | -30 | Diesel generators and control equipment | Refers to the control equipment for diesel generators. |
| | -40 | Motor generators | Refers to motor generators. |

*Table 27 System D2 - Primary supply and distribution systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D2 | | **Primary supply and distribution systems - General** | |
| | -00 | General | Refers to the primary supply and distribution systems of electrical power. |

*Table 28 System D3 - Electrical power converted supplies - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D3 | | **Electrical power converted supplies - General** | |
| | -00 | General | Refers to the converted electrical power supplies. |

*Table 29 System D4 - Electrical power lighting - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D4 | | **Electrical power lighting - General** | |
| | -00 | General | Lighting equipment that is powered from the mains electrical distribution systems. |
| | -10 | Cabling | Refers to the cabling used in electrical power systems. |

*Table 30 System D5 - Electrical power support systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D5 | | **Electrical power support systems - General** | |
| | -00 | General | The equipment that provides alternative/back-up electrical supplies for use with certain electrical circuits in the event of a power failure. |

*Table 31 System D6 - Electrical power emergency supplies - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D6 | | **Electrical power emergency supplies - General** | |
| | -00 | General | Emergency supply systems for use in the event of 'normal' power supply failure. |

*Table 32 System D7 - Electrical control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D7 | | **Electrical control systems - General** | |
| | -00 | General | Systems designed to provide safe and effective control of electrical power requirements. |

*Table 33 System D8 - Batteries - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| D8 | | **Batteries - General** | |
| | -00 | General | Static and limited (dc) electrical power sources used to provide main, secondary, emergency and/or back-up supplies, additionally to provide supplies to certain portable electrical equipment. |
| | -10 | Primary batteries | Refers to all primary batteries. |
| | -20 | Secondary batteries | Refers to all secondary batteries. |
| | -30 | Battery charging systems | Refers to the charging systems for all batteries. |

### 2.2.5 System E - Communications system

*Table 34 System E0 - Communications - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E0 | | **Communications - General** | |
| | -00 | General | The communications element refers to that equipment fitted to a platform which provides the means to receive information from off-ship source, to transmit to off-ship receivers and to distribute information throughout the ship. |

*Table 35 System E1 - SHF/EHF - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E1 | | **SHF/EHF - General** | |
| | -00 | General | The shipboard communications system/equipment using super and extra high frequency carriers. |
| | -10 | Aerials | Refers to the SHF/EHF aerials used in a communications system. |
| | -20 | Aerial multi-couplers and tuners | Refers to the aerial multi-couplers and tuners of an SHF/EHF communications system. |
| | -30 | Receivers | Refers to the receiver equipment of an SHF/EHF communications system. |
| | -40 | Transmitters | Refers to the transmitter equipment of an SHF/EHF communications system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Transceivers | Refers to the transceiver equipment of an SHF/EHF communications system. |
| | -60 | Ancillaries | Refers to all parts of an SHF/EHF communications system not detailed above. It includes, for example, patching facilities, modems and other ancillary equipment. |

*Table 36 System E2 - UHF/VHF - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E2 | | **UHF/VHF - General** | |
| | -00 | General | The shipboard communications system/equipment using very high frequency carriers. |
| | -10 | Aerials | Refers to the UHF/VHF aerials used in a communications system. |
| | -20 | Aerial multi-couplers and tuners | Refers to the aerial multi-couplers and tuners of a UHF/VHF communications system. |
| | -30 | Receivers | Refers to the receiver equipment of a UHF/VHF communications system. |
| | -40 | Transmitters | Refers to the transmitter equipment of a UHF/VHF communications system. |
| | -50 | Transceivers | Refers to the transceiver equipment of a UHF/VHF communications system. |
| | -60 | Ancillaries | Refers to all parts of a UHF/VHF communications system not detailed above. It includes, for example, patching facilities, modems and other ancillary equipment. |

*Table 37 System E3 - HF/MF - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E3 | | **HF/MF - General** | |
| | -00 | General | The communication system/equipment using high and medium frequency carriers. |
| | -10 | Aerials | Refers to the HF/MF aerials used in a communications system. |
| | -20 | Aerial multi-couplers and tuners | Refers to the aerial multi-couplers and tuners of an HF/MF communications system. |
| | -30 | Receivers | Refers to the receiver equipment of an HF/MF communications system. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Transmitters | Refers to the transmitter equipment of an HF/MF communications system. |
| | -50 | Transceivers | Refers to the transceiver equipment of an HF/MF communications system. |
| | -60 | Ancillaries | Refers to all parts of an HF/MF communications system not detailed above. It includes, for example, patching facilities, modems and other ancillary equipment. |

*Table 38 System E4 - LF/VLF - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E4 | | **LF/VLF - General** | |
| | -00 | LF/VLF - General | The shipboard communications system/equipment using low and very low frequency carriers. |
| | -10 | Aerials | Refers to the LF/VLF aerials used in a communications system. |
| | -20 | Aerial multi-couplers and tuners | Refers to the aerial multi-couplers and tuners of an LF/VLF communications system. |
| | -30 | Available for projects | |
| | -40 | Receivers | Refers to the receiver equipment of an LF/VLF communications system. |
| | -50 | Transmitters | Refers to the transmitter equipment of an LF/VLF communications system. |
| | -60 | Transceivers | Refers to the transceiver equipment of an LF/VLF communications system. |
| | -70 | Ancillaries | Refers to all parts of an LF/VLF communications system not detailed above. It includes, for example, patching facilities, modems and other ancillary equipment. |

*Table 39 System E5 - Audio integration - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E5 | | **Audio integration - General** | |
| | -00 | General | The shipboard communications system/equipment that is used for integration distribution and control of communications. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Control outfits | Refers to the control equipment for the shipboard communications system. |

*Table 40 System E6 - Digital - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E6 | | **Digital - General** | |
| | -00 | General | The shipboard communications system/equipment that is used for digital data transmission and reception. It includes, for example, modems, encryption devices and teletypes. |
| | -10 | Cryptographic receivers | Refers to the receiver encryption devices. |
| | -20 | Cryptographic transmitters | Refers to the transmitter encryption devices. |
| | -30 | Teletype/message handling | Refers to the teletype and message handling devices that form part of the shipboard communications system. |
| | -40 | Tele-printers | Refers to the tele-printers used in a shipboard communications system |
| | -50 | Modems | Refers to the modems used in a shipboard communications system. |
| | -60 | Displays | Refers to the visual display equipment used in a shipboard communications system. |

*Table 41 System E7 - Internal - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E7 | | **Internal - General** | |
| | -00 | General | The shipboard communications system/equipment that provides communications within the confines of the platform. |
| | -10 | Broadcasts | Refers to the shipboard broadcasting and public address systems. |
| | -20 | Inter-communication | Refers to the shipboard intercommunications system. |
| | -30 | Networks | Refers to all shipboard networks. It includes, for example, Local Area Networks (LAN), Wide Area Networks (WAN), etc. |
| | -40 | Recreational | Refers to all shipboard domestic electronic devices. It includes, for example, radios, televisions and video recorders, etc. |
| | -50 | Alarms | Refers to the shipboard alarm systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -60 | Control | Refers to the control equipment used for shipboard communications systems. |
| | -70 | Telephones | Refers to the telephone equipment used on shipboard communications systems. |

*Table 42 System E8 - Flight Control and instrument landing systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| E8 | | **Flight control and instrument landing systems - General** | |
| | -00 | General | Communication equipment provided for the safe take-off, operation and landing of aircraft. |

### 2.2.6 System F - Navigation system

*Table 43 System F0 - Navigation - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F0 | | **Navigation - General** | |
| | -00 | General | A system or equipment used to determine, conduct, manage or plot a position or course for the system. |

*Table 44 System F1 - Independent - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F1 | | **Independent - General** | |
| | -00 | General | Refers to the navigation equipment fitted to a platform that is independent of ground stations and orbiting satellites, eg, NATO SINS, Compasses, Log Systems, wind gear, etc. |
| | -10 | Gyro compasses | Refers to compasses using gyro principles. |
| | -20 | Magnetic compasses | Refers to all compasses using magnetic principles. |
| | -30 | Inertial | Refers to all aspects of inertial navigation. It includes, for example, inertial platforms and gyroscope assemblies, etc. |
| | -40 | Speed and distance | Ship speed and distance systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -50 | Depth | Refers to shipboard depth determining systems. |
| | -60 | Wind speed and direction | Systems to measure and indicate wind speed and direction. It includes, for example, standard wind gear and lightweight wind gear. |

*Table 45 System F2 - Dependent - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F2 | | **Dependent - General** | |
| | -00 | General | Refers to the navigation equipment fitted to a platform that is dependent on ground stations and orbiting satellites. It includes, for example, Global Positioning System, Hyper fix, etc. |
| | -10 | Satellite | Refers to the satellite navigation equipment fitted to a platform. |
| | -20 | Radio | Refers to the radio navigation equipment fitted to a platform. |
| | -30 | Radar | Refers to the radar navigation equipment fitted to a platform. |

*Table 46 System F3 - Computing - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| F3 | | **Computing - General** | |
| | -00 | General | Refers to the navigation equipment fitted to a platform which combines/processes navigational data to compute or manage the platforms geographical position. It includes the ship data distribution systems. |
| | -10 | Plotting | Refers to those navigational aids used for plotting. |
| | -20 | Data distribution | Refers to that equipment used for the distribution of navigational data. |
| | -30 | Data retransmission | Refers to the equipment used for the retransmission of navigational data. |

### 2.2.7 System G - Surveillance system

*Table 47 System G0 - Surveillance - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G0 | | **Surveillance - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | Refers to that portion of equipment fitted to a platform which senses, monitors and, where required provides alarms and environmental data. It includes, for example, radar, sonar, thermal, optical and environmental technologies. |

*Table 48 System G1 - Control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G1 | | **Control - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that processes and controls the sensor systems. It includes combat systems. |
| | -10 | Data processing | Refers to the equipment used for the processing surveillance data. |
| | -20 | Displays | Refers to that equipment used to visually display surveillance data. |

*Table 49 System G2 - Radar - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G2 | | **Radar - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that uses radar devices to acquire information. It includes, for example, aerial outfits and surveillance radar. |
| | -10 | Aerials | Refers to the aerials used as part of radar surveillance. |
| | -20 | Receiver | Refers to the receiver equipment used as part of radar surveillance. |
| | -30 | Transmitter | Refers to the transmitter equipment used as part of radar surveillance. |
| | -40 | Ancillaries | Refers to the ancillary equipment used as part of radar surveillance. |
| | -50 | Distribution | Refers to the equipment used to distribute radar surveillance data. |
| | -60 | Displays | Refers to the equipment used to visually display radar surveillance data. |

*Table 50 System G3 - Sonar - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G3 | | **Sonar - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that uses sonar devices to acquire information |
| | -10 | Transducers | Refers to the transducers used as part of sonar surveillance. |
| | -20 | Receiver | Refers to the receiver equipment used as part of sonar surveillance. |
| | -30 | Transmitter | Refers to the transmitter equipment used as part of sonar surveillance. |
| | -40 | Ancillaries | Refers to the ancillary equipment used as part of sonar surveillance. |
| | -50 | Distribution | Refers to the equipment used to distribute radar sonar data. |
| | -60 | Displays | Refers to the equipment used to visually display sonar surveillance data. |

*Table 51 System G4 - Electromagnetic - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G4 | | **Electromagnetic - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that is used to detect and identify EM emissions. |
| | -10 | ESM aerials | Refers to aerials used for Electronic Surveillance Measures (ESM). |
| | -20 | ESM receivers | Refers to receivers used for Electronic Surveillance Measures (ESM). |

*Table 52 System G5 - Optical - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G5 | | **Optical - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that uses optical devices to acquire information. It includes, for example, periscopes and GPEOD. |
| | -10 | Thermal imaging | This element refers to that equipment (hardware/software) which provides a thermal picture surveillance and weapon guidance. It includes thermal imaging sensor heads, drive units, processors, sights, power supply units, and display units. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -20 | Periscopes | Refers to the periscopes used as part of the optical surveillance equipment. |

*Table 53 System G6 - Digital - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G6 | | **Digital - General** | |
| | -00 | General | Refers to that part of the surveillance equipment fitted to a platform that provides data transfer capabilities. It includes, for example, data highways and combat system highways. |
| | -10 | Data highway | Refers to the digital data busses used as part of the surveillance system. |

*Table 54 System G7 - Identification systems (general)*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| G7 | | **Identification systems - General** | |
| | -00 | General | Surveillance equipment provided for the selection and identification of friendly and hostile targets. |
| | -10 | Radar aerials | Refers to the radar aerials used as part of the identification system. |
| | -20 | Integrators transponders | Refers to the shipboard, built-in transponders used as part of the identification system of the surveillance system. |

### 2.2.8 System H - Steering system

*Table 55 System H0 - Steering - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H0 | | **Steering - General** | |
| | -00 | General | Refers to those units and devices within the platform which govern movement and/or direction of assemblies. It includes, for example, motors, gearboxes, drives, thrusters and rudders. |

*Table 56 System H1 - Steering systems and control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H1 | | **Steering systems and control - General** | |
| | -00 | General | The system designed to transmit the requirements given at the steering position, to the receiver that controls the movements of the rudders or other steering mechanisms. |

*Table 57 System H2 - Thrusters - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H2 | | **Thrusters - General** | |
| | 00 | General | Power units fitted in the ship below the surface to give lateral thrust when maneuvering the ship. |

*Table 58 System H3 - Stabilizing systems and control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H3 | | **Stabilizing systems and control - General** | |
| | 00 | General | The equipment provided to minimize the effect of wave movement on a ship. |

*Table 59 System H4 - Diving control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H4 | | **Diving control systems - General** | . |
| | 00 | General | The system designed to control the submerged depth of a submersible |

*Table 60 System H5 - Hydroplanes - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| H5 | | **Hydroplanes - General** | |
| | 00 | General | Equipment provided to control the attitude of a submersible underwater. |

### 2.2.9 System J - Ventilation/heating/cooling system

*Table 61 System J0 - Ventilation/heating/cooling - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J0 | | **Ventilation and air conditioning - General** | |
| | -00 | General | A system or equipment used to provide a controlled environment |

*Table 62 System J1 - Climatic control systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J1 | | **Climatic control systems - General** | |
| | -00 | General | Equipment provided to control climatic/environmental conditions within a given space. |

*Table 63 System J2 - Ventilation systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J2 | | **Ventilation systems - General** | |
| | -00 | General | Air supply and exhaust systems which provide habitable conditions in working and living spaces within a platform. |

*Table 64 System J3 - Air conditioning systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J3 | | **Air conditioning systems - General** | |
| | -00 | General | Systems which control the humidity and temperature of living spaces, and some working spaces within a platform. |
| | -10 | Compartment heating systems | That portion of the system and its controls which supply heat. It includes items such as heater units, wiring, etc. |

*Table 65 System J4 - Oxygen generating system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| J4 | | **Oxygen generating system - General** | |
| | -00 | General | A machinery plant that generates oxygen which can be stored in liquid or gaseous form. |

### 2.2.10 System K - Hydraulic system

*Table 66 System K0 - Hydraulic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K0 | | **Hydraulic system - General** | |
| | -00 | General | A system or equipment for generation, distribution and/or control of hydraulic power. |

*Table 67 System K1 - Main hydraulic power systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K1 | | **Main hydraulic power systems - General** | |
| | -00 | General | Equipment required to provide fluidic power for a prime mover/requirement. |

*Table 68 System K2 - Auxiliary hydraulics power systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K2 | | **Auxiliary hydraulics power systems - General** | |
| | 00 | General | Equipment required to provide fluidic power for the control of engineering systems and machinery. |

*Table 69 System K3 - Pneumatic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| K3 | | **Pneumatic systems - General** | |
| | -00 | General | Systems that are designed to move and store air under pressure. |
| | -10 | Servo air systems | Systems that move under air under pressure. |

### 2.2.11 System L - Electronic system

*Table 70 System L0 - Electronic system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L0 | | **Electronic systems - General** | |
| | -00 | General | A system or equipment using electronic/automated software and/or firmware elements not included in other systems. |

*Table 71 System L1 - Cathodic protection - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L1 | | **Cathodic protection - General** | |
| | -00 | General | A system that uses electrolysis for the protection of a ships hull against wastage caused by the corrosive effect of salt water. |

*Table 72 System L2 - Degaussing - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| L2 | | **Degaussing - General** | |
| | -00 | General | A system designed to neutralize the magnetic field surrounding a platform. |

### 2.2.12 System M - Auxiliary system

*Table 73 System M0 - Auxiliary - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M0 | | **Auxiliary - General** | |
| | -00 | General | Subsidiary systems that provide services or support to main systems or equipment. |

*Table 74 System M1 - Aircraft handling systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M1 | | **Aircraft handling systems - General** | |
| | -00 | General | The equipment provided for the safe movement of aircraft within the hangar or to and from the flight deck or runway. |
| | -10 | Aircraft handling systems servicing and stowage | Aircraft handling and associated support facilities. |
| | -20 | Aircraft recovery support systems | Aircraft recovery and associated support facilities. |

*Table 75 System M2 - Sea water systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M2 | | **Sea water systems - General** | |
| | -00 | General | Systems to provide firefighting, machinery cooling, controlled flooding of watertight compartments and some domestic services. |
| | -10 | Firemain and flushing systems | Piping, firemain and flushing pumps, and controls. |
| | -20 | Sprinkler systems | Sea water sprinkler systems. |
| | -30 | Pre-wetting systems | Countermeasure pre-wetting systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Auxiliary sea water systems | Auxiliary machinery sea water system pumps and associated pipes, controls, etc. |
| | -50 | Scuppers and deck drains | Refers to scuppers, deck drains and associated equipment. |
| | -60 | Plumbing and drainage | Refers to drains, plumbing and associated pipes, control valves, etc. |
| | -70 | Drainage and ballasting systems | Refers to piping, drainage and ballasting system, pumps and controllers. |

*Table 76 System M3 - Fresh water systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M3 | | **Fresh water systems - General** | |
| | -00 | General | Refers to systems provided for domestic purposes and other services, where the corrosive effect of sea water would be unacceptable. |
| | -10 | Distilling plant | Flash type, vapor compression, heat recovery and submerged tube type. |
| | -20 | Auxiliary fresh water cooling | Cooling water, electronics, DW/CW. |
| | -30 | Potable water | Refers to fresh and distilled water services. It includes, for example, drinking water supplies. |

*Table 77 System M4 - Fuels and lubricants systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M4 | | **Fuels and Lubricants Systems - General** | |
| | -00 | General | Refers to systems that are designed to move and store propellant and lubricating fluids. |
| | -10 | Ship fuel and fuel compensating systems | Ship fuel filling and transfer system pumps, fuel transfer systems and associated equipment. |
| | -20 | Aviation and general purpose fuels | Piping aviation and general purpose fuel system pumps, aviation and general purpose fuel MOGAS handling and piping. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Aviation and general purpose lubricating oil | Lubricating oil systems, aviation and general purpose. |
| | -40 | Auxiliary lubrication systems | Lubrication outboard and lubrication inboard. |
| | -50 | Special fuel and lubricants handling and storage | Handling and storage systems for special fuel and lubricants. |

*Table 78 System M5 - Gas systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M5 | | **Gas systems - General** | |
| | -00 | General | Systems that are designed to move and store air and certain gases, under pressure. |
| | -10 | Compressed air systems | This element refers to a system or equipment (hardware/software) for the generation, distribution and/or control of pneumatic power and compressed air. |
| | -20 | Compressed gases | Compressed gas system nitrogen. |
| | -30 | Vacuum systems | This element refers to a system or equipment (hardware/software) for the generation, distribution and/or control of vacuum power. |

*Table 79 System M6 - Cargo handling replenishment systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M6 | | **Cargo handling replenishment systems - General** | |
| | -00 | General | Cargo handling machinery and systems which are used for replenishment. |
| | -10 | RAS systems | RAS Winches, RAS booms, rigging and hardware, control stations. |
| | -20 | Vertical replenishment systems | VETREP systems. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -30 | Ships stores and equipment handling systems | Refers to ships stores and equipment handling systems. |

*Table 80 System M7 - Machinery - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| M7 | | **Machinery - General** | |
| | -00 | General | Any item of machinery other than those directly associated with weapons system not identified elsewhere. |
| | -10 | Engineering and functional machinery | Refers to engineering and functional machinery. |
| | -20 | Domestic machinery | Refers to machinery installed for domestic purposes. |

### 2.2.13 System N - Survivability system

*Table 81 System N0 - Survivability - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N0 | | **Survivability - General** | |
| | 00 | General | A system or equipment used to provide hazard detection, protection, survivability and escape facilities |

*Table 82 System N1 - Damage control - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N1 | | **Damage control - General** | |
| | -00 | General | Equipment for the limitation, control and repair (within the platform resources) of material damage however caused in peace and war. |
| | -10 | Detection systems | Refers to equipment for the detection of material damage. |

*Table 83 System N2 - Escape facilities - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N2 | | **Escape facilities - General** | |
| | -00 | General | The facilities that are fitted specifically to assist in escaping from danger or to prolong life in times of crisis. It includes, for example, BIBS and HIS |

*Table 84 System N3 - Firefighting systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N3 | | **Firefighting systems - General** | |
| | 00 | General | The equipment that provides the ability to limit the spread of fire, extinguish and prevent re-ignition. It includes, for example, detecting, indicating and extinguishing systems. |

*Table 85 System N4 - Nuclear, biological, chemical - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N4 | | **Nuclear, biological, chemical - General** | |
| | -00 | General | The NBC element refers to those subassemblies or components which provide nuclear, biological and chemical detection, protection and survivability to the platform and crew, either individually or collectively, during an NBC attack. This includes positive pressure and purification systems, ventilated face pieces (masks), NBC detection and warning devices, decontamination equipment and chemical resistant coatings. |

*Table 86 System N5 - Salvage systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N5 | | **Salvage systems - General** | |
| | -00 | General | Refers to systems for the performance of salvage operations. |

*Table 87 System N6 - Stability - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| N6 | | **Stability - General** | |
| | -00 | General | Refers to systems for the provision of stability, following damage to or flooding of compartments. |

### 2.2.14 System P - Special equipment/system

*Table 88 System P0 - Special equipment/system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P0 | | **Special equipment/ system - General** | |
| | -00 | General | A system or equipment used to provide a special mission capability. |

*Table 89 System P1 - Special to type equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P1 | | **Special to type equipment - General** | |
| | -00 | General | This element refers to that special equipment (hardware/software) to enable the achievement of a special mission capability. |

*Table 90 System P2 - Special recovery equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P2 | | **Special recovery equipment - General** | |
| | -00 | General | This element refers to that special recovery equipment (hardware/software) to enable the achievement of a recovery capability. It includes cranes, winches and towing equipment. |

*Table 91 System P3 - Special fit equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P3 | | **Special fit equipment - General** | |
| | -00 | General | This element refers to that special fit equipment (hardware/software) to enable the achievement of a specialized capability. |

*Table 92 System P4 - Special purpose equipment - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| P4 | | **Special purpose equipment - General** | |
| | -00 | General | This element refers to that special-to-purpose equipment (hardware/software) for the achievement of a special mission purpose. It covers, for example, equipment for repair workshops, medical and other special purpose platforms. |

### 2.2.15 System Q - Outfit, Furnishings and stowage system

*Table 93 System Q0 - Outfit and furnishings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q0 | | **Outfit and furnishings - General** | |
| | -00 | General | A function or equipment used to provide habitability, operability or stowage facilities that is not specifically included in other systems. |

*Table 94 System Q1 - Preservations and coverings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q1 | | **Preservations and coverings - General** | |
| | -00 | General | Coverings made from weatherproof fabrics, plastics and synthetics to protect items of exposed equipment and machinery from the elements (particularly salt water spray) |

*Table 95 System Q2 - Protective coatings - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q2 | | **Protective coatings - General** | |
| | -00 | General | Protective paint (usually oil based and anti fouling) applied to surfaces which are exposed to sea water or other corrosive elements. |

*Table 96 System Q3 - Storerooms - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q3 | | **Storerooms - General** | |
| | -00 | General | Spaces that are designed to hold stores of a long term or ready use nature (other than weapons, ammunition and food supplies. |
| | -10 | Utility space | Spaces that are designed and specifically fitted out for the storage or provision of utilities. |

*Table 97 System Q4 - Bathrooms and toilets - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q4 | | **Bathrooms and toilets - General** | |
| | -00 | General | Spaces that are designed and specifically fitted out for the provision of bathroom and toilet facilities. |

*Table 98 System Q5 - Workshops - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q5 | | **Workshops - General** | |
| | -00 | General | Spaces that are designed and specifically fitted out for the maintenance of machinery and certain specialized equipment. |

*Table 99 System Q6 - Laboratories - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q6 | | **Laboratories - General** | |
| | -00 | General | Rooms that are used for carrying out scientific tests on items of equipment and some substances. |

*Table 100 System Q7 - Test areas - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q7 | | **Test areas - General** | |
| | -00 | General | Rooms that are used for carrying out tests on items of equipment. |

*Table 101 System Q8 - Galley/pantry scullery - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q8 | | **Galley/pantry scullery - General** | |
| | 00 | General | Rooms that are used for preparation and serving of food and refreshments. |

*Table 102 System Q9 - Commissary - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| Q9 | | **Commissary - General** | |
| | -00 | General | Rooms that are used for storage of food and drink, sometimes with specialized storing requirements such as frozen food. |

*Table 103 System QA - Accommodation spaces - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QA | | **Accommodation spaces - General** | |
| | -00 | General | Spaces that are designed and fitted to provide habitable (living and recreational) accommodation. |

*Table 104 System QB - Offices - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QB | | **Offices - General** | |
| | -00 | General | Spaces in which work of an administrative nature is carried out. |

*Table 105 System QC - Control centers - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QC | | **Control centers - General** | |
| | -00 | General | Rooms that are used for the control of operations and/or processes. |

*Table 106 System QD - Machinery spaces - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QD | | **Machinery spaces - General** | |
| | -00 | General | Spaces that contain permanent and fixed items of machinery. |

*Table 107 System QE - Medical, dental and pharmaceutical spaces - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QE | | **Medical, dental and pharmaceutical spaces - General** | |
| | -00 | General | Rooms that are used for the provision of medical, dental and pharmaceutical facilities. |

*Table 108 System QF - Laundry - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| QF | | **Laundry - General** | |
| | -00 | General | Spaces that are designed and specially fitted for the washing and drying of linen and fabrics. |

### 2.2.16 System R - Training system

*Table 109 System R0 - Training - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| R0 | | **Training - General** | |
| | -00 | General | A system or equipment used to provide training capabilities. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -10 | Training | The training element is defined as the deliverable training services, devices, accessories, aids, equipment and facilities used to enable instruction through which personnel will acquire sufficient concepts, skill and aptitudes to operate and maintain the system with maximum efficiency. This element includes all effort associated with the design, development and production of deliverable training equipment as well as the execution of training services. |
| | -20 | Non weapon trainers and simulators | A system or equipment used to provide training capabilities for non weapon systems and simulators |
| | -30 | Weapon systems trainers and simulators | A system or equipment used to provide training capabilities for weapon systems and simulators. |

### 2.2.17 System S - Repair test and support system

*Table 110 System S0 - Repair test and support - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| S0 | | **Repair test and support - General** | |
| | -00 | General | A system, equipment or facilities used to maintain operational capability. |

### 2.2.18 System T – Management system

*Table 111 System T0 – Management system*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| T0 | | **Management system - General** | |
| | -00 | General | A system, equipment or facilities used to manage the totality of complex integrated management systems. |

*Table 112 System T1 – Platform management system*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| T1 | | **Platform management system - General** | |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -00 | General | A system, equipment or facilities used to monitor and manage the totality of Power systems. |
| | -10 | Operator facilities | Refers to the roles and facilities provided to the operator at the Consoles by the MMI |
| | -20 | Data processing | Refers to equipment fitted to a platform, which combines and processes Power systems data |
| | -30 | Consoles | Refers to the consoles fitted to the platform. |
| | -40 | Monitor | Refers to the equipment fitted to the platform which monitors systems. |
| | -50 | Cabinets | Refers to Equipment Cabinets, which can be configured with equipment units from multiple systems. |
| | -60 | Maintainer facilities | Refers to the Maintainers and Diagnostic facilities fitted to the platform |
| | -70 | Peripheral equipment | Refers to any peripheral support equipment fitted to the platform eg Printers. |

*Table 113 System T2 – Not available for projects*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| T2 | | Not available for projects | |
| | -00 thru -90 | Available for projects | |

*Table 114 System T3 – Combat management and data transfer system - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| T3 | | **Combat management and data transfer system - General** | |
| | -00 | General | A system, equipment or facilities used to a platform which combines, processes, and distributes Central Maintenance System (CMS) Data. |
| | -10 | Operator facilities | Refers to the roles and facilities provided to the operator at the Consoles by the MMI. |
| | -20 | Combat management | Refers to equipment fitted to a platform, which combines and processes CMS data. |
| | -30 | Consoles | Refers to the consoles fitted to the platform. |

| System | Subsystem | Title | Definition |
|---|---|---|---|
| | -40 | Data transfer | Refers to the DTS equipment fitted to the platform which distributes the CMS data. |
| | -50 | Cabinets | Refers to Equipment Cabinets, which can be configured with equipment units from multiple systems. |
| | -60 | Maintainer facilities | Refers to the Maintainers and Diagnostic facilities fitted to the platform |
| | -70 | Peripheral equipment | Refers to any peripheral support equipment fitted to the platform eg Printers. |

### 2.2.19 System U – Meteorological and oceanography system

*Table 115 System U0 – Meteorological and Oceanography systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U0 | | **Meteorological and Oceanography systems – General** | |
| | -00 | General | A platform system, equipment or facilities used to collect, process, and distribute meteorological and oceanographic data. |

*Table 116 System U1 – Meteorological systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U1 | | **Meteorological systems – General** | |
| | -00 | General | A system, equipment or facilities used to collect, process systems, and distribute meteorological data. |

*Table 117 System U2 – Oceanography systems - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U2 | | **Oceanography systems – General** | |
| | -00 | General | A system, equipment or facilities used to collect, process systems and distribute oceanographic data. |

*Table 118 System U3 – Data transmission - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U3 | | **Data transmission – General** | |
| | -00 | General | A system, equipment or facilities used for the transmission and distribution of meteorological and oceanographic (METOC) data, including ship borne Ethernet. |

*Table 119 System U4 – Data processing - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U4 | | **Data processing – General** | |
| | -00 | General | Refers to the equipment used for the collation and processing of METOC data. |

*Table 120 System U5 – Man-Machine Interfaces - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U5 | | **Man-Machine Interfaces – General** | |
| | -00 | General | Refers to the equipment used for receiving non-ship borne (remote) METOC data (eg Consoles, laptops, etc). |

*Table 121 System U6 – Data receivers - General*

| System | Subsystem | Title | Definition |
|---|---|---|---|
| U6 | | **Data receivers - General** | |
| | -00 | General | Refers to the equipment used for receiving non-ship borne (remote) METOC data. |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of this SNS**. The project or the organization must decide whether this SNS is appropriate for their project.

**Definitions**. The project or the organization must allocate definitions to the SNS that is defined as "Available for projects" as defined in Chap 1.3.

# Chapter 8.3

## *SNS information and learn codes - Example SNS*

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*Table 1 References*

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|---|---|
| None | |

## 1 General

To assist in the data module coding strategy, example SNS have been provided on www.s1000d.org. Projects can decide to use these SNS without modification or use part and modify those areas that do not suit their needs. If these example SNS or the maintained SNS do not suit a projects needs, then projects can decide to design their own complete SNS. The examples are not maintained by any of the S1000D committees.

## 2 Example SNS

The example SNS are:

- combat vehicle project
- MIL-STD-1808 based project
- Gerätaufgliederungsplänen (GAPL) based project
- power provision project
- climate control project
- automated handling project
- artillery radar project
- software project
- training project
- electrical project
- communications project
- electronic project
- surveillance project
- navigation project
- deployable airbase project

- medical project
- command post project
- technical publications project

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Use of example SNS**. The project or the organization must decide whether any of the example SNSs are appropriate for their project.

# Chapter 8.4

## *SNS information and learn codes - Information codes*

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*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 8.4.1 | Information codes - Short definitions |
| Chap 8.4.2 | Information codes - Full definitions |

## 1 General

Information codes are used to describe the activity related to the Product about which the data module has been written. Each code has a long definition and a short definition. The short definitions are used to populate the element <infoName>. Projects may decide to modify (or extend) the information name to one that is more suitable, provided the sense of the information code is maintained.

Codes that are defined as "Not available for projects" are controlled by S1000D. Codes that are defined as "Available for projects" are available for use by projects who must agree to their own short and full definitions. It is important, when allocating definitions, that the hierarchy of information codes is maintained and that the new definitions are used in a consistent manner.

The information code is basically defined as numeric. The allocation of alpha characters must be according to the following rules:

- (XXX) as defined in Chap 8.4.1 and Chap 8.4.2
- (XXA) Available for projects (with the exception of "00A" thru "00Z") Refer to Chap 1.3.
- All other information codes are not available for projects. Refer to Chap 1.3.

The use of the detailed information code breakdown is applicable only where the appropriate extensive and detailed information needs to be provided or is needed for the sake of clarity. In simple cases, information must not be broken down unnecessarily. The information must be provided under the next higher information code in a summarized form. Should this still result in

an unnecessary breakdown, all information must be furnished under the appropriate primary information code.

For general technical publications, some of the SNS (eg systems 05 thru 12 of the SNS) already identify the requirement for the type of information for the data module (eg subsystem 05-10 requires time limits) a standard information code "000" is used in these cases.

The hierarchy is organized into primary and secondary codes. The primary codes are defined at Para 2 and the secondary codes are defined at Chap 8.4.1 for short definitions and Chap 8.4.2 for full definitions.

## 2 Primary codes

The primary codes are defined as

- 000 Function, data for plans and description
- 100 Operation
- 200 Servicing
- 300 Examinations, tests and checks
- 400 Fault report and isolation procedures
- 500 Disconnect, remove and disassemble procedures
- 600 Repairs and locally make procedures and data
- 700 Assemble, install and connect procedures
- 800 Storage procedures and data
- 900 Miscellaneous

## 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Definitions**. The project or the organization must allocate definitions, where required, to those information codes that are defined as "Available for projects" as defined in Chap 1.3.

**Allocation of alphabetic characters**. The project or the organization must agree on any needed allocation of alphabetic characters.

# Chapter 8.4.1

## *Information codes - Short definitions*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |

# 1 General

The following tables contain the short definitions for information codes. These short definitions can be used to populate the information name.

# 2 Short definitions

## 2.1 Primary codes

The identification elements are applicable to the Product, engine and equipment data modules.

*Table 2 Primary codes*

| Primary code | Definition |
|---|---|
| 000 | Function, data for plans and description |
| 100 | Operation |
| 200 | Servicing |
| 300 | Examinations, tests and checks |
| 400 | Fault reports and isolation procedures |
| 500 | Disconnect, remove and disassemble procedures |
| 600 | Repairs and locally make procedures and data |
| 700 | Assemble, install and connect procedures |
| 800 | Storage procedures and data |
| 900 | Miscellaneous |

The short definitions are given in Table 3 thru Table 12.

## 2.2 Primary code 000 - Function, data for plans and description

*Table 3 Code 000 - Function, data for plans and description*

| IC | Definition | Remarks |
|---|---|---|
| 000 | Function, data for plans and description | |
| 001 | Title page | |
| 002 | List of pages or data modules | See also code 00R and code 00S |
| 003 | Change record or highlights | See also code 00T and code 00U |
| 004 | Access illustration | |
| 005 | List of abbreviations | |
| 006 | List of terms | |
| 007 | List of symbols | |
| 008 | Technical standard record | |

| IC | Definition | Remarks |
|---|---|---|
| 009 | Table of contents | |
| 010 | General data | |
| 011 | Function | |
| 012 | General warnings and cautions and related safety data | |
| 013 | Numeric index | |
| 014 | Alphabetic and alphanumeric index | |
| 015 | List of special materials | |
| 016 | List of dangerous materials | |
| 017 | List of related data | Refer to code 00V |
| 018 | Introduction | |
| 019 | Supplier list | |
| 020 | Configuration | |
| 021 | Copyright | |
| 022 | Business rules | |
| 023 | Administrative forms and data | |
| 024 thru 027 | Available for projects | |
| 028 | General | Refer to codes 010 and 018 |
| 029 | Data structure | |
| 030 | Technical data | |
| 031 | Electrical standard parts data | |
| 032 | Available for projects | |
| 033 | Technical data (functional breakdown) | |
| 034 | Technical data (physical breakdown) | |
| 035 thru 039 | Available for projects | |
| 040 | Description of how it is made and its function | |
| 041 | Description of how it is made | |
| 042 | Description of function | |
| 043 | Description of function attributed to crew (functional breakdown) | |

| IC | Definition | Remarks |
|---|---|---|
| 044 | Description of function (physical breakdown) | |
| 045 thru 049 | Available for projects | |
| 050 | Diagram/List | |
| 051 | Wiring diagram | |
| 052 | Routing diagram | |
| 053 | Connection list | |
| 054 | Schematic diagram | |
| 055 | Location diagram | |
| 056 | Equipment list | |
| 057 | Wire list | |
| 058 | Harness list | |
| 059 | Maintenance envelope diagram | |
| 060 | Product support equipment, tools and software | |
| 061 | Special support equipment and tools | |
| 062 | Standard support equipment and tools | |
| 063 | Government supplied support equipment and tools | |
| 064 | Locally made support equipment and tools | |
| 065 | Software | |
| 066 | Support equipment and tools data | |
| 067 | Decals and instruction plates | |
| 068 thru 069 | Available for projects | |
| 070 | Consumables, materials and expendables | Supplies = consumables, materials and expendables |
| 071 | Consumables | |
| 072 | Materials | |
| 073 | Expendables | |
| 074 | Data sheet for dangerous consumables and materials | |
| 075 | Parts list | |
| 076 | Fluid | |

| IC | Definition | Remarks |
|---|---|---|
| 077 | Data sheet for consumables and materials | |
| 078 | Fasteners | |
| 079 | Available for projects | |
| 080 | Mixture and solution | |
| 081 | Chemical solution | |
| 082 | Chemical mixture | |
| 083 thru 089 | Available for projects | |
| 090 | Software documentation | |
| 091 thru 095 | Available for projects | |
| 096 | Safety items and parts | |
| 097 thru 099 | Available for projects | |
| 00A | List of illustrations | Normally used in front matter data modules |
| 00B | List of support equipment | Normally used in front matter data modules |
| 00C | List of supplies | Normally used in front matter data modules |
| 00D | List of spares | Normally used in front matter data modules |
| 00E | Functional item numbers technical information repository | |
| 00F | Circuit breakers technical information repository | |
| 00G | Parts technical information repository | |
| 00H | Zones technical information repository | |
| 00J | Access panels and doors technical information repository | |
| 00K | Organizations technical information repository | |
| 00L | Supplies - List of products technical information repository | |

| IC | Definition | Remarks |
|---|---|---|
| 00M | Supplies - List of requirements technical information repository | |
| 00N | Support equipment technical information repository | |
| 00P | Product Cross-reference Table (PCT) | |
| 00Q | Conditions Cross-reference Table (CCT) | |
| 00R | List of effective pages | Refer to code 002 |
| 00S | List of effective data modules | Refer to code 002 |
| 00T | Change record | Refer to code 003 |
| 00U | Highlights | Refer to code 003 |
| 00V | List of applicable specifications and documentation | Refer to code 017 |
| 00W | Applicability Cross-reference Table (ACT) | |
| 00X | Controls and indicators technical information repository | |
| 00Y | List of charts and forms | |
| 00Z | List of tables | |
| 0A1 | Functional and/or physical areas repository | |

## 2.3 Primary code 100 - Operation

*Table 4 Code 100 - Operation*

| IC | Definition | Remarks |
|---|---|---|
| 100 | Operation | |
| 101 | List of consumables associated with operation | |
| 102 | List of materials associated with operation | |
| 103 | List of expendables associated with operation | |
| 104 | List of special support equipment and tools associated with operation | |
| 105 | List of support equipment and tools associated with operation | |
| 106 | List of software associated with operation | |
| 107 | Parts list associated with operation | |
| 108 and 109 | Not available for projects | |
| 110 | Controls and indicators | |

| IC | Definition | Remarks |
|---|---|---|
| 111 | Controls and indicators | This code is used for crew |
| 112 | Modes of operation | This code is used for crew |
| 113 thru 119 | Available for projects | |
| 120 | Pre-operation | |
| 121 | Pre-operation procedure | This code is used for crew |
| 122 | Siting | |
| 123 | Shelter | |
| 124 | Available for projects | |
| 125 | Pre-operation procedures checklist | This code is used for crew |
| 126 thru 129 | Available for projects | |
| 130 | Normal operation | |
| 131 | Normal operation procedure | This code is used for crew |
| 132 and 133 | Available for projects | |
| 134 | Aviation checklist | |
| 135 | Normal operation procedures checklist | This code is used for crew |
| 136 thru 138 | Available for projects | |
| 139 | Nuclear, biological and chemical procedures | |
| 140 | Emergency procedure | |
| 141 | Emergency operation procedure | This code is used for crew |
| 142 | Operation under unusual conditions | |
| 143 | Radio interference suppression | |
| 144 | Jamming and electronic countermeasures (ECM) | |
| 145 | Emergency operation procedures checklist | This code is used for crew |

| IC | Definition | Remarks |
|---|---|---|
| 146 thru 149 | Available for projects | |
| 150 | Post-operation | |
| 151 | Post-operation procedure | This code is used for crew |
| 152 thru 154 | Available for projects | |
| 155 | Post-operation procedures checklist | This code is used for crew |
| 156 thru 159 | Available for projects | |
| 160 | Loading/Unloading procedure | |
| 161 thru 168 | Available for projects | |
| 169 | Mass & Balance | |
| 170 thru 199 | Not available for projects | |

## 2.4 Primary code 200 - Servicing

*Table 5 Code 200 - Servicing*

| IC | Definition | Remarks |
|---|---|---|
| 200 | Servicing | |
| 201 | List of consumables associated with servicing | |
| 202 | List of materials associated with servicing | |
| 203 | List of expendables associated with servicing | |
| 204 | List of special support equipment and tools associated with servicing | |
| 205 | List of support equipment and tools associated with servicing | |
| 206 | List of software associated with servicing | |
| 207 | Parts list associated with servicing | |

| IC | Definition | Remarks |
|---|---|---|
| 208 and 209 | Not available for projects | |
| 210 | Fill | |
| 211 | Refuel | |
| 212 | Fill with oil | |
| 213 | Fill with oxygen | |
| 214 | Fill with nitrogen | |
| 215 | Fill with air | |
| 216 | Fill with water | |
| 217 | Fill with hydrogen | |
| 218 | Fill with other liquid | |
| 219 | Fill with other gas | |
| 220 | Drain liquid and release pressure | |
| 221 | Defuel and drain fuel | |
| 222 | Drain oil | |
| 223 | Release oxygen pressure | |
| 224 | Release nitrogen pressure | |
| 225 | Release air pressure | |
| 226 | Drain water | |
| 227 | Release hydrogen pressure | |
| 228 | Drain other liquid | |
| 229 | Release other gas pressure | |
| 230 | Bleed and prime | |
| 231 | Bleed | |
| 232 | Prime | |
| 233 | Dry | |
| 234 and 235 | Available for projects | |
| 236 | Fill with inert gas/inert liquid | |
| 237 | Evacuate | |
| 238 and 239 | Available for projects | |

| IC | Definition | Remarks |
|---|---|---|
| 240 | Lubrication | |
| 241 | Oil | |
| 242 | Grease | |
| 243 | Dry film | |
| 244 thru 249 | Available for projects | |
| 250 | Clean and apply surface protection | |
| 251 | Clean with chemical agent | |
| 252 | Clean by abrasive blast | |
| 253 | Clean by ultrasonic | |
| 254 | Clean mechanically | |
| 255 | Purge | |
| 256 | Polish and apply wax | |
| 257 | Paint and apply marking | |
| 258 | Other procedure to clean | |
| 259 | Other procedure to protect surfaces | |
| 260 | Remove and prevent ice and remove contamination | |
| 261 | Remove ice | |
| 262 | Prevent ice | |
| 263 | Use disinfectant | |
| 264 | Remove contamination | |
| 265 thru 269 | Available for projects | |
| 270 | Adjust, align and calibrate | |
| 271 | Adjust | |
| 272 | Align | |
| 273 | Calibrate | |
| 274 | Harmonize | |
| 275 thru 277 | Available for projects | |
| 278 | Easily and quickly adjust after a battle damage repair | |

| IC | Definition | Remarks |
|---|---|---|
| 279 | Easily and quickly align after a battle damage repair | |
| 280 | Inspection | |
| 281 | Scheduled inspection | |
| 282 | Unscheduled inspection | |
| 283 | Special regular inspection | |
| 284 | Special irregular inspection | |
| 285 thru 287 | Available for projects | |
| 288 | Overhaul and retirement schedule | |
| 289 | Available for projects | |
| 290 | Change of liquid/gas | |
| 291 | Available for projects | |
| 292 | Change of oil | Code 222 + code 212 |
| 293 | Change of oxygen | Code 223 + code 213 |
| 294 | Change of nitrogen | Code 224 + code 214 |
| 295 | Change of air | Code 225 + code 215 |
| 296 | Change of water | Code 226 + code 216 |
| 297 | Change of hydrogen | |
| 298 | Change of other liquid | Code 228 + code 218 |
| 299 | Change of other gas | Code 229 + code 219 |

## 2.5 Primary code 300 - Examinations, tests and checks

*Table 6 Code 300 - Examinations, test and checks*

| IC | Definition | Remarks |
|---|---|---|
| 300 | Examinations, tests and checks | |
| 301 | List of consumables associated with examinations, tests and checks | |

| IC | Definition | Remarks |
|---|---|---|
| 302 | List of materials associated with examinations, tests and checks | |
| 303 | List of expendables associated with examinations, tests and checks | |
| 304 | List of special support equipment and tools associated with examinations, tests and checks | |
| 305 | List of support equipment and tools associated with examinations, tests and checks | |
| 306 | List of software associated with examinations, tests and checks | |
| 307 | Parts list associated with examinations, tests and checks | |
| 308 and 309 | Not available for projects | |
| 310 | Visual examination | |
| 311 | Visual examination without special equipment | |
| 312 | Examination with a borescope | |
| 313 and 314 | Available for projects | |
| 315 | QA requirements | |
| 316 thru 319 | Available for projects | |
| 320 | Operation test | |
| 321 thru 329 | Available for projects | |
| 330 | Test preparation | |
| 331 | Connection of test equipment | |
| 332 | Removal of test equipment | |
| 333 | Installation of the unit before the test | |
| 334 | Removal of the unit after the test | |
| 335 thru 339 | Available for projects | |
| 340 | Function test | |
| 341 | Manual test | |

| IC | Definition | Remarks |
|---|---|---|
| 342 | Automatic test | |
| 343 | BIT operation | |
| 344 | Compatibility test | |
| 345 thru 349 | Available for projects | |
| 350 | Structure test | |
| 351 | Test for surface cracks with dye penetrant | |
| 352 | Test for surface cracks with magnetic particles | |
| 353 | Test for cracks and other defects with eddy current | |
| 354 | Test for cracks and other defects with X-rays | |
| 355 | Test for cracks and other defects with ultrasonic | |
| 356 | Hardness test | |
| 357 | Gamma ray | |
| 358 | Resonance frequency | |
| 359 | Available for projects | |
| 360 | Design data/tolerances check | |
| 361 | Dimensions check | |
| 362 | Pressure check | |
| 363 | Flow check | |
| 364 | Leak check | |
| 365 | Continuity check | |
| 366 | Resistance check | |
| 367 | Electrical power check | |
| 368 | Signal strength check | |
| 369 | Other check | |
| 370 | Monitor the condition | |
| 371 | Oil analysis | |
| 372 | Vibration analysis | |
| 373 | Tracking check | |
| 374 | Fuel analysis | |
| 375 | Shooting accidental discharge analysis | |
| 376 | Check post application of adhesive | |

| IC | Definition | Remarks |
|---|---|---|
| 377 thru 379 | Available for projects | |
| 380 thru 389 | Not available for projects | |
| 390 | Sample test | |
| 391 thru 399 | Available for projects | |

## 2.6 Primary code 400 - Fault reports and isolation procedures

*Table 7 Code 400 - Fault reports and isolation procedures*

| IC | Definition | Remarks |
|---|---|---|
| 400 | Fault reports and isolation procedures | |
| 401 | List of consumables associated with fault diagnosis | |
| 402 | List of materials associated with fault diagnosis | |
| 403 | List of expendables associated with fault diagnosis | |
| 404 | List of special support equipment and tools associated with fault diagnosis | |
| 405 | List of support equipment and tools associated with fault diagnosis | |
| 406 | List of software associated with fault diagnosis | |
| 407 | Parts list associated with fault diagnosis | |
| 408 and 409 | Not available for projects | |
| 410 | General fault description | |
| 411 | Isolated fault | |
| 412 | Detected fault | |
| 413 | Observed fault | |
| 414 | Correlated fault | |
| 415 thru 419 | Available for projects | |
| 420 | General fault isolation procedure | |

| IC | Definition | Remarks |
|---|---|---|
| 421 thru 428 | Fault isolation procedure | |
| 429 | Diagnostics | |
| 430 | Fault isolation task supporting data | |
| 431 thru 439 | Available for projects | |
| 440 | Index | |
| 441 | Fault code index | |
| 442 | Maintenance message index | |
| 443 thru 449 | Available for projects | |
| 450 thru 499 | Not available for projects | |

## 2.7 Primary code 500 - Disconnect, remove and disassemble procedures

*Table 8 Code 500 - Disconnect, remove and disassemble procedures*

| IC | Definition | Remarks |
|---|---|---|
| 500 | Disconnect, remove and disassemble procedures | |
| 501 | List of consumables associated with removal | |
| 502 | List of materials associated with removal | |
| 503 | List of expendables associated with removal | |
| 504 | List of special support equipment and tools associated with removal | |
| 505 | List of support equipment and tools associated with removal | |
| 506 | List of software associated with removal | |
| 507 | Parts list associated with removal | |
| 508 and 509 | Not available for projects | |
| 510 | Disconnect procedure | |
| 511 thru 519 | Available for projects | |

| IC | Definition | Remarks |
|---|---|---|
| 520 | Remove procedure | |
| 521 | Return to basic configuration | Undressing |
| 522 | Remove support equipment/Remove from support equipment | |
| 523 | Preparation before removal | |
| 524 | Follow-on maintenance | |
| 525 | Ammunition unloading | |
| 526 | Deactivate launching device | |
| 527 thru 529 | Available for projects | |
| 530 | Disassemble procedure | |
| 531 thru 539 | Available for projects | |
| 540 | Open for access procedure | |
| 541 thru 549 | Available for projects | |
| 550 | Unload software procedure | |
| 551 | Fault monitoring storage readout (downloading) | |
| 552 | Data erasing | |
| 553 thru 559 | Available for projects | |
| 560 thru 599 | Not available for projects | |

## 2.8 Primary code 600 - Repairs and locally make procedures and data

*Table 9 Code 600 - Repairs and locally make procedures and data*

| IC | Definition | Remarks |
|---|---|---|
| 600 | Repairs and locally make procedures and data | |
| 601 | List of consumables associated with repairs | |
| 602 | List of materials associated with repairs | |
| 603 | List of expendables associated with repairs | |

| IC | Definition | Remarks |
|---|---|---|
| 604 | List of special support equipment and tools associated with repairs | |
| 605 | List of support equipment and tools associated with repairs | |
| 606 | List of software associated with repairs | |
| 607 | Parts list associated with repairs | |
| 608 and 609 | Not available for projects | |
| 610 | Add material | |
| 611 | Insulation | |
| 612 | Metalize | |
| 613 | Pot | |
| 614 | Remetal | |
| 615 | Retread | |
| 616 thru 619 | Available for projects | |
| 620 | Attach material | |
| 621 | Bond | |
| 622 | Crimp | |
| 623 | Braze | |
| 624 | Rivet | |
| 625 | Solder | |
| 626 | Splice | |
| 627 | Weld | |
| 628 and 629 | Available for projects | |
| 630 | Change the mechanical strength/structure of material | |
| 631 | Anneal | |
| 632 | Case harden | |
| 633 | Cure | |
| 634 | Normalize | |
| 635 | Shot-peen | |

| IC | Definition | Remarks |
|---|---|---|
| 636 | Temper | |
| 637 | Available for projects | |
| 638 | Other treatment | |
| 639 | Other process to change the mechanical strength/structure of material | |
| 640 | Change the surface finish of material | |
| 641 | Anodize | |
| 642 | Buff | |
| 643 | Burnish | |
| 644 | Chromate | |
| 645 | Hone | |
| 646 | Lap | |
| 647 | Plate | |
| 648 | Polish | |
| 649 | Other process to change the surface finish of material | |
| 650 | Remove material | |
| 651 | Abrasive blast | |
| 652 | Bore/drill/ream | |
| 653 | Electrical/electrochemical/chemical etch | |
| 654 | Broach | |
| 655 | Grind | |
| 656 | Mill | |
| 657 | Thread/tap | |
| 658 | Turn | |
| 659 | Other process to remove material | |
| 660 | Structure repair procedure and data | |
| 661 | Permitted damage | |
| 662 | Temporary repair procedure | |
| 663 | Standard repair procedure | |
| 664 | Special repair procedure | |
| 665 | Fly-in repair procedure | |
| 666 | Material classification | |

| IC | Definition | Remarks |
|---|---|---|
| 667 | Structure classification | |
| 668 and 669 | Available for projects | |
| 670 | Locally make procedure and data | |
| 671 thru 679 | Available for projects | |
| 680 | Battle damage repair procedure and data | |
| 681 | Damage repair symbol marking | |
| 682 | Identification of damaged hardware | |
| 683 | Damage assessment | |
| 684 | Utilization degradation | |
| 685 | Repair procedure | |
| 686 | Isolation procedure | |
| 687 | Function test after battle damage repair | |
| 688 | Battle damage repair kit | |
| 689 | Damage repair | |
| 690 | Miscellaneous | |
| 691 | Marking | |
| 692 | Connector repair | |
| 693 thru 699 | Available for projects | |

## 2.9 Primary code 700 - Assemble, install and connect procedures

*Table 10 Code 700 - Assemble, install and connect procedures*

| IC | Definition | Remarks |
|---|---|---|
| 700 | Assemble, install and connect procedures | |
| 701 | List of consumables associated with installation | |
| 702 | List of materials associated with installation | |
| 703 | List of expendables associated with installation | |
| 704 | List of special support equipment and tools associated with installation | |

| IC | Definition | Remarks |
|---|---|---|
| 705 | List of support equipment and tools associated with installation | |
| 706 | List of software associated with installation | |
| 707 | Parts list associated with installation | |
| 708 and 709 | Not available for projects | |
| 710 | Assemble procedure | |
| 711 | Tighten procedure | |
| 712 | Lock procedure | |
| 713 | Pack procedure | |
| 714 thru 719 | Available for projects | |
| 720 | Install procedure | |
| 721 | Build up to usable configuration | Dressing |
| 722 | Install support equipment/Install on support equipment | |
| 723 | Preparation before installation | |
| 724 | Follow-on maintenance | |
| 725 | Ammunition loading | |
| 726 | Activate launching device | |
| 727 thru 729 | Available for projects | |
| 730 | Connect procedure | |
| 731 thru 739 | Available for projects | |
| 740 | Close after access procedure | |
| 741 thru 749 | Available for projects | |
| 750 | Load software procedure | |
| 751 | Available for projects | |
| 752 | Data loading | |

| IC | Definition | Remarks |
|---|---|---|
| 753 thru 759 | Available for projects | |
| 760 thru 799 | Not available for projects | |

## 2.10 Primary code 800 - Storage procedures and data

*Table 11 Code 800 - Storage procedures and data*

| IC | Definition | Remarks |
|---|---|---|
| 800 | Package, handling, storage, and transportation | |
| 801 | List of consumables associated with storage | |
| 802 | List of materials associated with storage | |
| 803 | List of expendables associated with storage | |
| 804 | List of special support equipment and tools associated with storage | |
| 805 | List of support equipment and tools associated with storage | |
| 806 | List of software associated with storage | |
| 807 | Parts list associated with storage | |
| 808 and 809 | Not available for projects | |
| 810 | Preservation procedure | |
| 811 | Preparation for vehicle transportation | |
| 812 | Shipping and storage - General | |
| 813 thru 819 | Available for projects | |
| 820 | Procedure to remove preservation material | |
| 821 thru 829 | Available for projects | |
| 830 | Procedure to put item in containers | |
| 831 | Vehicle loading | |
| 832 thru 839 | Available for projects | |

| IC | Definition | Remarks |
|---|---|---|
| 840 | Procedure to remove item from containers | |
| 841 | Vehicle unloading | |
| 842 thru 849 | Available for projects | |
| 850 | Procedure to keep item serviceable when in storage | |
| 851 thru 859 | Available for projects | |
| 860 | Procedure to move item when in storage | |
| 861 thru 869 | Available for projects | |
| 870 | Procedure to prepare item for use after storage | |
| 871 | Set on condition | |
| 872 thru 879 | Available for projects | |
| 880 | Procedure when item got out of storage | |
| 881 thru 889 | Available for projects | |
| 890 | Life data of item when in storage | |
| 891 thru 899 | Available for projects | |

## 2.11 Primary code 900 - Miscellaneous

*Table 12 Code 900 - Miscellaneous*

| IC | Definition | Remarks |
|---|---|---|
| 900 | Miscellaneous | |
| 901 | Miscellaneous list of consumables | |
| 902 | Miscellaneous list of materials | |
| 903 | Miscellaneous list of expendables | |
| 904 | Miscellaneous list of special support equipment and tools | |
| 905 | Miscellaneous list of support equipment and tools | |

| IC | Definition | Remarks |
|---|---|---|
| 906 | Miscellaneous list of software | |
| 907 | Miscellaneous parts list | |
| 908 and 909 | Not available for projects | |
| 910 | Miscellaneous | |
| 911 | Illustration | |
| 912 | Handling procedure | |
| 913 | General maintenance procedure | |
| 914 | Container data module | |
| 915 | Facilities | |
| 916 | Maintenance allocation | |
| 917 thru 919 | Available for projects | |
| 920 | Change = Remove and install | |
| 921 | Change = Remove and install a new item | |
| 922 | Change = Remove and install the removed item | |
| 923 | Change = Disconnect and connect an item | |
| 924 thru 929 | Available for projects | |
| 930 | Service Bulletin | |
| 931 | Service Bulletin data | |
| 932 | Planning information | |
| 933 | Accomplishment instruction | |
| 934 | Material information | |
| 935 thru 939 | Available for projects | |
| 940 | Provisioning data | |
| 941 | IPD | IPD |
| 942 | Numerical index | IPD |
| 943 thru 949 | Available for projects | |

| IC | Definition | Remarks |
|---|---|---|
| 950 | Generic process | |
| 951 thru 959 | Available for projects | |
| 960 thru 979 | Not available for projects | |
| 980 | Environmental protection, fire-fighting and rescue | |
| 981 | Air cleaning | |
| 982 | Sewage treatment | |
| 983 thru 988 | Not available for projects | |
| 989 | Fire-fighting and rescue | |
| 990 | Neutralization and disposal | |
| 991 | Neutralization of ordnance | |
| 992 | Neutralization of substance | |
| 993 thru 995 | Available for projects | |
| 996 | Disposal of ordnance | |
| 997 | Disposal of product | |
| 998 | Disposal of substance | |
| 999 | Available for projects | |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Definitions**. The project or the organization must agree to definitions before allocating them to the information codes that are defined as "Available for projects" as described in Chap 1.3.

# Chapter 8.4.2

## *Information codes - Full definitions*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 3.9.3 | Authoring - Warnings, cautions and notes |
| Chap 3.9.4 | Authoring - Front matter |
| Chap 5.2.1.5 | Common information sets - Illustrated parts data |

# 1 General

The following tables contain the short definitions for information codes. These short definitions are used to populate the information name.

# 2 Full definitions

## 2.1 Primary codes

The identification elements are applicable to the Product, engine, and equipment data modules.

*Table 2 Primary codes*

| Primary code | Definition |
|---|---|
| 000 | Function, data for plans and description |
| 100 | Operation |
| 200 | Servicing |
| 300 | Examinations, tests and checks |
| 400 | Fault reports and isolation procedures |
| 500 | Disconnect, remove and disassemble procedures |
| 600 | Repairs and locally make procedures and data |
| 700 | Assemble, install and connect procedures |
| 800 | Storage procedures and data |
| 900 | Miscellaneous |

The short definitions are given in Table 3 thru Table 12.

## 2.2 Primary code 000 - Function, data for plans and description

*Table 3 Code 000 - Function, data for plans and description*

| Primary code | Secondary code | Definition |
|---|---|---|
| 000 | | Function, data for plans and description<br>Code 000 data tells the user the function, operation, limits and location (if necessary) of the Product equipment or component. If the data is for more than one configuration or model, the differences are given. The code also includes more general data if this is necessary for operation and/or maintenance persons. This general data can be:<br>- general warnings, cautions and related safety data<br>- symbols and abbreviations used<br>- all necessary material, ground equipment, software and special tools |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 001 | Title page<br>Code 001 gives information on a set of information (publication or a volume of publication). This information can be eg:<br>- the title<br>- issue number and date<br>- change number and date |
| | 002 | List of pages or data modules<br>Code 002 gives a list of pages or data modules in a set of information (publication or a volume of publication). The list can give eg:<br>- document identifier<br>- page number<br>- page/document date<br>- effectivity<br>The code is used for List of Effective Pages (LOEP), and List of Effective Data Modules (LOEDM), refer to Chap 3.9.4.<br>For separate codes for LOEP and LOEDM, refer to code 00R and 00S respectively. |
| | 003 | Change record or highlights<br>Code 003 gives information on the change state, including its history, of a set of information (publication or a volume of publication). It is also used for compilation of reason for changes of a set of information.<br>The code is used for Change Record (CR) and Highlights. Refer to Chap 3.9.4.<br>For separate codes for Change record and Highlights, refer to code 00T and 00U respectively. |
| | 004 | Access illustration<br>Code 004 gives an illustration and its identification and status information used for graphical access. |
| | 005 | List of abbreviations<br>Code 005 gives the abbreviations standards used in the data. Those abbreviations used that are not to the given standards are given in tables. This list also includes acronyms. |
| | 006 | List of terms<br>Code 006 gives the terms used in the data. Those terms used that are not to the given standards are given in tables. |
| | 007 | List of symbols<br>Code 007 gives the symbol standards from which symbols used on:<br>- illustrations<br>- wiring, routing and schematic diagram are got. Those symbols used that are not to the given standards are given in tables. |
| | 008 | Technical standard record<br>Code 008 gives information on incorporated technical changes in a set of information (publication or a volume of publication). The code is used for Technical Standard Record (TSR). |
| | 009 | Table of contents<br>Code 009 gives, in tabular format, the content of a set of information (publication or a volume of publication). |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 010 | General data<br>Code 010 gives general data necessary for the operation and/or maintenance persons. This general data can be:<br>- general warnings, cautions and related safety data<br>- the symbols and abbreviations used<br>- lists of special and dangerous materials<br>- a list of related data not in the common source data base. (When related data refer to available data it is to understand that the data must be available in all user countries) |
| | 011 | Function<br>Code 011 gives the function for persons at command level, supervisors and other such users. With this data they can easily and quickly find what it does and how. |
| | 012 | General warnings and cautions and related safety data<br>Code 012 gives general WARNINGS and CAUTIONS related to operation and/or maintenance. Refer to Chap 3.9.3 for definition and use of safety data. |
| | 013 | Numeric index<br>Code 013 gives indexes in numeric order. |
| | 014 | Alphabetic and alphanumeric index<br>Code 014 gives indexes in alphabetic or alphanumeric order. |
| | 015 | List of special materials<br>Code 015 gives data on items made of metals and metal alloys which are easily damaged by corrosion (for example magnesium). The data is given in tables and identifies the item and its location. |
| | 016 | List of dangerous materials<br>Code 016 gives data on materials which can damage a person's health. The data identifies the dangerous material and its location. |
| | 017 | List of related data<br>Code 017 gives available data on standards, regulations, conversion factors, etc which the CSDB does not include. It is also used for List of Applicable Specifications and Documentation, (LOASD)<br>For an explicit LOASD code, refer to code 00V. |
| | 018 | Introduction<br>Code 018 gives introductory information on the content of a set of information (publication or a volume of publication). The information can include the purpose, scope, structure, special format and use of the information set. Information of a general nature, which is not specified in any other data module in the information set, can also be included. |
| | 019 | Supplier list<br>Code 019 gives lists of suppliers providing products used for the maintenance of Product, engines or components and their equipment. |
| | 020 | Configuration<br>Code 020 gives data on configuration or model differences. |
| | 021 | Copyright<br>Code 021 gives copyright statements. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 022 | Business rules<br>Code 022 gives information relating to the project specific business rules. |
| | 023 | Administrative forms and data<br>Code 023 gives standard administrative forms required in technical data often located in front and rear matter (eg promulgation letters, authentication information, warranty information, etc.) |
| | 024 thru 027 | Available for projects |
| | 028 | General<br>Code 028 gives information of general nature. Eg a summary of information in some accompanying data modules or an overview presentation of a Product.<br>Note: IC018 must be used for introductory information of general nature for Information sets. |
| | 029 | Data structure<br>Code 029 gives the project specific configuration and usage of each element of the wiring data description Schema for the associated wiring data Schema |
| | 030 | Technical data<br>Code 030 is a list of data on the Product, system, equipment or component. The data is equivalent to (but can be more or less than) the examples of data that follow:<br>- identification: name, type, model, part No., NATO stock No., etc<br>- dimension and mass<br>- performance data and tolerances: rating, input/output, consumption, operation speeds, thrust range, turning radius, etc<br>- environmental limitations/requirements: ambient temperatures, humidity limits, coolant requirements (air/oil/water flow), etc<br>- power supply requirements<br>- operation materials: oils, fuels, coolant, etc<br>- capacities<br>- identification of sub-assemblies: name, type, model, part No., NATO stock No., etc |
| | 031 | Electrical standard parts data<br>Code 031 gives the technical information for each defined electrical standard part. |
| | 032 | Available for projects |
| | 033 | Technical data (functional breakdown)<br>Code 033 represents the technical data in respect to the functional breakdown of the Product, system, equipment or component. |
| | 034 | Technical data (physical breakdown)<br>Code 034 represents the technical data in respect to the physical breakdown of the Product, system, equipment or component |
| | 035 thru 039 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 040 | Description of how it is made and its function<br>Code 040 tells how the object was made and the material used: the code also gives all the related data about its functions. |
| | 041 | Description of how it is made<br>Code 041 gives sufficient data for the user to know how the object was made and assembled. The data includes:<br>- the materials the object is made of (steel, aluminum, magnesium, etc)<br>- the manufacturing processes used to make the object (cast, machine, weld, etc)<br>- the subject of disassembly |
| | 042 | Description of function<br>Code 042 gives sufficient data for the user to know the functions of the object so that he can do maintenance and failure isolation correctly. Where more than one subsystem or unit make a complete system, the relation is given. |
| | 043 | Description of function attributed to crew (functional breakdown)<br>Code 043 gives a basic overview with sufficient detail for the crew to know the function of the systems and, if applicable, information on malfunction analysis and emergency operation. Information on operating limitations and characteristics in normal as well as in adverse weather and climatic conditions is also given. The information enables the crew to convert to and subsequently operate the Product safely and effectively without recourse to associated engineering documents. The information given under this code can also be used by maintainers. |
| | 044 | Description of function (physical breakdown)<br>Code 044 gives a basic overview with sufficient detail for the maintainers to know the physical breakdown of the systems and, if applicable, information on malfunction analysis and emergency operation. Information on operating limitations and characteristics in normal as well as in adverse weather and climatic conditions is also given. The information enables the crew to convert to and subsequently operate the Product safely and effectively without recourse to associated engineering documents. The information given under this code can also be used by the crew. |
| | 045 thru 049 | Available for projects |
| | 050 | Diagram/List<br>Code 050 gives the electrical, electronic, and mechanical diagrams and lists for the Product, system, equipment or component. These diagrams and lists are necessary to do maintenance and with the code 042 data, help know the function. Refer to code 430 for data on failure symptom diagrams. |
| | 051 | Wiring diagram<br>Code 051 gives the diagrams which show all the electrical and electronic circuits for the Product, system, equipment or component. The diagrams include the identification or wires and connections and the location of equipment and components. At the level of the Product, system, subsystem, sub-subsystem, the diagrams do not show the internal circuits of the equipment or components. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 052 | Routing diagram<br>Code 052 gives the diagrams which show the routing on the Product, system, equipment or component of all the pipes, hoses etc and the electrical and electronic cables and harnesses. The diagrams also show the location of the components. |
| | 053 | Connection list<br>Code 053 gives a full list of those connection points which are not a complete unit in the wiring diagrams. The connection points include high density connectors, bulkhead fairleads, distributors, strip connectors, ground connections etc. |
| | 054 | Schematic diagram<br>Code 054 gives the diagrams which show how all the systems, equipment and components connect together. The diagrams give the complete operation to help the user isolate failures. The diagrams only show the internal circuit or equipment or components where necessary. Some systems have more than one level of diagrams: Block, simplified system schematic, system schematic, signal flow, pressure flow, etc. |
| | 055 | Location diagram<br>Code 055 gives diagrams which show the location of all equipment and components such as circuit breakers, fuses, wire harnesses, etc, at system, subsystem or sub-subsystem level. |
| | 056 | Equipment list<br>Code 056 gives a list of all equipment in the Product with details of each equipment or component. |
| | 057 | Wire list<br>Code 057 gives a list of all wires in the Product with details of each wire and its connections. |
| | 058 | Harness list<br>Code 058 gives a list of all harnesses in the Product with salient details of each harness. |
| | 059 | Maintenance envelope diagram<br>Code 059 gives the diagrams that identify the maintenance envelopes within the Product. |
| | 060 | Product support equipment, tools and software<br>Code 060 is a general list of all necessary support equipment, tools and software |
| | 061 | Special support equipment and tools<br>Code 061 is a list of all necessary support equipment and tools which have been made specially for the Product, equipment and component. |
| | 062 | Standard support equipment and tools<br>Code 062 is a list of all necessary support equipment tools which have not been made especially for the Product, equipment, and component. |
| | 063 | Government supplied support equipment and tools<br>Code 063 is a list of all necessary support equipment tools supplied by the government for the Product, equipment, or component. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 064 | Locally made support equipment and tools<br>Code 064 is a list of drawings for all the necessary support equipment tools which the user has to make for the Product, equipment, or component. |
| | 065 | Software<br>Code 065 is a list of all necessary computer software. |
| | 066 | Support equipment and tools data<br>Code 066 gives information on support equipment tools. The equipment information includes, for example:<br>- dimensions<br>- mass<br>- a parts list (normally a minimal list of parts that can be replaced by the user)<br>- an illustration of the equipment |
| | 067 | Decals and instruction plates<br>Code 067 gives the illustrations and descriptions of decals and operating instruction plates located on the equipment, which are essential for operation. |
| | 068 and 069 | Available for projects |
| | 070 | Consumables, materials, and expendables<br>Code 070 is a list of all necessary materials and contains safety data on those materials that are dangerous. |
| | 071 | Consumables<br>Code 071 is a list of all the consumables (eg oil, greases, sealants, safety wire) which help to do maintenance on the Product, system, equipment, or component (to make an item to repair damage). When necessary international equivalents are given. |
| | 072 | Materials<br>Code 072 is a list of all necessary materials (eg sheet metal, rubber) required by the user to do maintenance on the Product, equipment or component (eg to make an item to repair damage). When necessary international equivalents are given. |
| | 073 | Expendables<br>Code 073 is a list of all items which the user must replace, or items which he cannot repair. |
| | 074 | Data sheet for dangerous consumables and materials<br>Code 074 are data sheets for consumables and materials that are dangerous. The data sheet gives, for example:<br>- the name<br>- the manufacturer's name, address and NATO Code<br>- the function<br>- when it is dangerous and the cause<br>- the safety precautions the user must follow (eg safety equipment to use, medical first aid)<br>- the precautions when you discard it<br>- the type of fire extinguishers to use<br>- how to keep it in storage<br>- its flash point/radiation strength |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 075 | Parts list<br>Code 075 is a consolidated list of parts (other than expendables listed under code 073) identified in procedures and requiring data cross-referencing such as parts number. |
| | 076 | Fluid<br>Code 076 gives data on fluids such as gases and water. |
| | 077 | Data sheet for consumables and materials<br>Code 077 gives the list of data sheets for consumables and materials that are not dangerous. |
| | 078 | Fasteners<br>Code 078 gives data (such as materials, specifications, sizes or procedures for installation) related to fasteners. |
| | 079 | Available for projects |
| | 080 | Mixture and solution<br>Code 080 gives information on solutions and mixtures and also gives safety data on those materials that are dangerous. |
| | 081 | Chemical solution<br>Code 081 gives all information to prepare, use and regenerate a chemical solution. |
| | 082 | Chemical mixture<br>Code 082 gives all information to prepare, use and regenerate a chemical mixture. |
| | 083 thru 089 | Available for projects |
| | 090 | Software documentation<br>Code 090 gives sufficient data to help the user use the applicable computer software. |
| | 091 thru 095 | Available for projects |
| | 096 | Safety items and parts<br>Code 096 gives a list of flight safety critical aircraft parts and critical safety items. |
| | 097 thru 099 | Available for projects |
| | 00A | List of illustrations (normally used in front matter)<br>Code 00A gives the list of illustrations for a publication. |
| | 00B | List of support equipment (normally used in front matter)<br>Code 00B gives the list of support equipment for a publication. |
| | 00C | List of supplies (normally used in front matter)<br>Code 00C gives the list of supplies for a publication. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 00D | List of spares (normally used in front matter)<br>Code 00D gives the list of spares for a publication. |
| | 00E | Functional item numbers technical information repository<br>Code 00E gives the list of all functional item numbers and their associated information. |
| | 00F | Circuit breakers technical information repository<br>Code 00F gives the list of all circuit breakers and their associated information. |
| | 00G | Parts technical information repository<br>Code 00G gives the list of all parts and their associated information. |
| | 00H | Zones technical information repository<br>Code 00H gives the list of all zones and their associated information. |
| | 00J | Access panels and doors technical information repository<br>Code 00J gives the list of all access panels and doors and their associated information. |
| | 00K | Organizations technical information repository<br>Code 00K gives the list of all suppliers and their associated information. |
| | 00L | Supplies - List of products technical information repository<br>Code 00L gives the list of all consumables and their associated information. |
| | 00M | Supplies - List of requirements technical information repository<br>Code 00L gives the list of all consumables requirements or use cases and their associated information. |
| | 00N | Support equipment technical information repository<br>Code 00N gives the list of all tools and their associated information. |
| | 00P | Product Cross-reference Table<br>The Products Cross-reference Table (PCT) data module is a repository of product instances and the values for product attributes and conditions for each product instance. |
| | 00Q | Conditions Cross-reference Table<br>The Conditions Cross-reference Table (CCT) data module is used to declare conditions that have an affect on the applicability of data and is used to define the incorporation status for technical conditions. |
| | 00R | List of effective pages<br>Code 00R gives lists of pages or data modules in a set of information (publication or a volume of publication). Refer to Chap 3.9.4 for details. |
| | 00S | List of effective data modules<br>Code 00S gives lists of pages or data modules in a set of information (publication or a volume of publication). Refer to Chap 3.9.4 for details. |
| | 00T | Change record<br>Code 00T gives information on the change state, including its history, of a set of information (publication or a volume of publication). Refer to Chap 3.9.4 for details. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 00U | Highlights<br>Code 00U gives a compilation of reason for changes of a set of information (publication or a volume of publication). Refer to Chap 3.9.4 for details. |
| | 00V | List of applicable specifications and documentation<br>Code 00V gives a List of Applicable Specifications and Documentation, (LOASD). Refer to Chap 3.9.4 for details. |
| | 00W | Applicability Cross-reference Table<br>The Applicability Cross-reference Table (ACT) gives product attribute declarations to be used by the project in applicability statements, together with links to the PCT and the CCT. |
| | 00X | Controls and indicators technical information repository<br>Code 00X gives the list of controls and indicators |
| | 00Y | List of charts and forms<br>Code 00Y gives a list of charts and or forms that can be required in front matter. It can also be used to give actual charts and forms (eg as required in air crew data) |
| | 00Z | List of tables<br>Code 00Z gives a list of tables for the technical data typically found in front matter. |
| | 0A1 | Functional and/or physical areas repository<br>The functional and/or physical areas repository gives the functional and/or physical breakdown. |

## 2.3 Primary code 100 - Operation

*Table 4 Code 100 - Operation*

| Primary code | Secondary code | Definition |
|---|---|---|
| 100 | | Operation<br>Code 100 gives all the procedure necessary to operate the Product, equipment, or component to do the specified task. The procedure includes data on the necessary controls and indicators, pre and post-operation procedure, operation and emergency procedure. |
| | 101 | List of consumables associated with operation |
| | 102 | List of materials associated with operation |
| | 103 | List of expendables associated with operation |
| | 104 | List of special support equipment and tools associated with operation |
| | 105 | List of support equipment and tools associated with operation |
| | 106 | List of software associated with operation |
| | 107 | Parts list associated with operation |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 108 and 109 | Not available for projects |
| | 110 | Controls and indicators<br>Code 110 gives data on the applicable controls and indicators to operate the system, equipment or component. |
| | 111 | Controls and indicators<br>Code 111 gives a crew-oriented view of controls and indicators showing their positions and relations to functionality. The information enables the crew to operate the Product safely and without recourse to associated engineering documents. The information given under this code can also be used by maintainers. |
| | 112 | Modes of operation<br>Code 112 gives a crew-oriented description of the various modes of operation possible for each system or subsystem, including results and recovery actions. The information enables the crew to operate the Product safely and without recourse to associated engineering documents. The information given under this code can also be used by maintainers. |
| | 113 thru 119 | Available for projects |
| | 120 | Pre-operation<br>Code 120 gives in narrative and checklist form the procedures/conditions the user must follow/monitor before he operates the Product, equipment or component. |
| | 121 | Pre-operation procedure<br>Code 121 gives in, for crew members, narrative and, if applicable, in checklist form, all pre-operation procedures/conditions preceding a journey. Information on the relevant switch positions and what the indicators must show before the start of the usual operation is given. Maintenance and self-test controls are included. The top and bottom limits of indicators such as dials (ie those which have a range of indicators) are given. The initial conditions of related systems/equipment that can directly change the operation of the system/equipment are also given. |
| | 122 | Siting<br>Code 122 gives siting descriptions and/or procedures. This can include descriptions of requirements concerning locations, proximity to power sources, effective ranges, terrain requirements to avoid screening reflections, ground clutter, and other poor operational conditions due to terrain, technical requirements, etc. |
| | 123 | Shelter<br>Code 123 gives shelter descriptions and/or procedures. This can include amount of floor, wall, and height space required, a plan for a typical layout, required weight capacity of the building floor, dimensions required for installed equipment, environmental conditions (eg, venting), unusual requirements specific to equipment, such as air-conditioning, etc. |
| | 124 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 125 | Pre-operation procedures checklist<br>Code 125 gives, for crew members, in listed form the checks pertaining to the procedures given by code 121. |
| | 126 thru 129 | Available for projects |
| | 130 | Normal operation<br>Code 130 gives in narrative and checklist form all normal procedures required to accomplish usage of the Product. |
| | 131 | Normal operation procedure<br>Code 131 gives, for crew members, in narrative and, if applicable, in checklist form, procedure and data to operate the Product, equipment or component correctly in all its modes. The procedure is given in a sequence of major or minor functions, alternative procedure, the usual procedure instructions and the results. The procedures to start the usual operation again if the operation stops and the procedure to stop and disconnect are given. |
| | 132 and 133 | Available for projects |
| | 134 | Aviation checklist<br>Code 134 gives the aviation related checklists. |
| | 135 | Normal operation procedures checklist<br>Code 135 gives, for crew members, in listed form the checks (drills) for normal operation of the Product. If applicable, the checks for handling of installed equipment are included. Operating data can be included, if relevant for safe and effective operation of the Product. |
| | 136 thru 138 | Available for projects |
| | 139 | Nuclear, biological and chemical procedures<br>Code 139 gives procedures related to Nuclear, Biological, and Chemical (NBC) exposure or prevention. This is alternately referred to as Chemical, Biological, and Radiological (CBR) procedures. |
| | 140 | Emergency procedure<br>Code 140 gives in narrative and checklist form the procedures to be followed to meet any emergency that could reasonably be expected. |
| | 141 | Emergency operation procedure<br>Code 141 gives, for crew members, in narrative and, if applicable, in checklist form, procedure and data for the emergency operation of the Product, equipment or component. The code also gives the special controls for emergency operation and how the use of these controls changes the usual operation of the system. |
| | 142 | Operation under unusual conditions<br>Code 142 gives descriptions and procedures related to operating the product under unusual conditions. This can include operation in unusual weather, or degraded conditions. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 143 | Radio interference suppression<br>Code 143 gives procedures related to Radio interference suppression. This includes procedures for installation, testing, and removal of suppression components. |
| | 144 | Jamming and electronic countermeasures (ECM)<br>Code 144 gives procedures for operation of the equipment in an ECM environment through transmitted and reflected deception signals and through transmitted and reflected jamming. |
| | 145 | Emergency operation procedures checklist<br>Code 145 gives, for crew members, in listed form the checks (drills) for emergency operation of the Product. |
| | 146 thru 149 | Available for projects |
| | 150 | Post-operation<br>Code 150 gives in narrative and checklist form the procedures/conditions the user must follow/monitor after he has operated the Product, equipment, or component. |
| | 151 | Post-operation procedure<br>Code 151 gives, for crew members, in narrative and, if applicable, in checklist form, all post-operation procedures/conditions following usage. Information on the relevant switch positions and what the indicators must show when the system/equipment is stopped and disconnected after a usual or emergency operation is given. |
| | 152 thru 154 | Available for projects |
| | 155 | Post-operation procedures checklist<br>Code 155 gives, for crew members, in listed form the checks pertaining to the procedures given by code 151. |
| | 156 thru 159 | Available for projects |
| | 160 | Loading/Unloading procedure<br>Code 160 gives the procedure and data applicable to for load planning and loading/unloading of a Product equipped for carrying cargo. |
| | 161 thru 168 | Available for projects |
| | 169 | Mass & Balance<br>Code 169 gives information related to mass and balance of the product. It can also include procedures for calculating mass and balance data. |
| | 170 thru 199 | Not available for projects |

## 2.4 Primary code 200 - Servicing

*Table 5 Code 200 - Servicing*

| Primary code | Secondary code | Definition |
|---|---|---|
| 200 | | Servicing<br>Code 200 gives procedures and data necessary to do servicing on the Product, equipment, or component. The servicing can be scheduled or not scheduled such as procedures to fill and drain containers, procedures to bleed, prime, lubricate, clean, adjust, align, calibrate, inspect etc. Procedures to do servicing are complete instructions. |
| | 201 | List of consumables associated with servicing |
| | 202 | List of materials associated with servicing |
| | 203 | List of expendables associated with servicing |
| | 204 | List of special support equipment and tools associated with servicing |
| | 205 | List of support equipment and tools associated with servicing |
| | 206 | List of software associated with servicing |
| | 207 | Parts list associated with servicing |
| | 208 and 209 | Not available for projects |
| | 210 | Fill<br>Code 210 gives the procedure and data necessary to fill containers with fuel, oil, oxygen, nitrogen, air, water, and other fluids (gases or liquids). |
| | 211 | Refuel |
| | 212 | Fill with oil |
| | 213 | Fill with oxygen |
| | 214 | Fill with nitrogen |
| | 215 | Fill with air |
| | 216 | Fill with water |
| | 217 | Fill with hydrogen |
| | 218 | Fill with other liquid |
| | 219 | Fill with other gas |
| | 220 | Drain liquid and release pressure<br>Code 220 gives the procedure and data necessary to defuel, to drain liquids, and to release gas pressure to a specified quantity. |
| | 221 | Defuel and drain fuel |
| | 222 | Drain oil |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 223 | Release oxygen pressure |
| | 224 | Release nitrogen pressure |
| | 225 | Release air pressure |
| | 226 | Drain water |
| | 227 | Release hydrogen pressure |
| | 228 | Drain other liquid |
| | 229 | Release other gas pressure |
| | 230 | Bleed and prime<br>Code 230 gives the procedure and data necessary to:<br>bleed a system, equipment or component<br>fill a system, equipment or component with a liquid to remove a gas<br>fill with an inert gas/inert liquid to increase the safety of a container in order to displace oxygen<br>remove gas/liquid or reactant to prepare a vacuum |
| | 231 | Bleed<br>Code 231 gives the procedure to bleed a system, equipment, or component. |
| | 232 | Prime<br>Code 232 gives the procedure to fill a system, equipment, or component with a liquid to remove a gas. |
| | 233 | Dry<br>Code 233 gives the procedure to dry a system, equipment, or component. |
| | 234 and 235 | Available for projects |
| | 236 | Inert<br>Code 236 gives the procedure and data necessary to fill with an inert gas/inert liquid to increase the safety of a fuel tank or other sealed or closed-in tanks/containers that contain highly inflammable material, by pumping nitrogen, steam, carbon dioxide, or some of other inert gas or vapour into its air space in order to displace oxygen. |
| | 237 | Evacuate<br>Code 237 gives the procedure and data necessary to remove gas/liquid or the specific reactant completely to prepare a vacuum with support of special technical equipment. |
| | 238 and 239 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 240 | Lubrication<br>Code 240 gives the procedure and data necessary to lubricate a system, equipment, component, or item. |
| | 241 | Oil |
| | 242 | Grease |
| | 243 | Dry film |
| | 244 thru 249 | Available for projects |
| | 250 | Clean and apply surface protection<br>Code 250 gives the procedure and data necessary to remove contamination mechanically, chemically or with ultrasonic. The code also gives procedure to:<br>- apply wax and to polish (to protect surfaces)<br>- paint and apply markings |
| | 251 | Clean with chemical agent |
| | 252 | Clean by abrasive blast |
| | 253 | Clean by ultrasonic |
| | 254 | Clean mechanically |
| | 255 | Purge<br>Code 255 gives the procedure necessary to remove contamination (eg unwanted gas, liquids, materials) from a system, equipment, or component. |
| | 256 | Polish and apply wax |
| | 257 | Paint and apply marking<br>Code 257 gives the procedure necessary to paint a surface and to identify it with letters, numbers, symbols, etc. The code also gives the procedure to apply transfers. |
| | 258 | Other procedure to clean<br>Code 258 gives the procedure necessary to remove contamination, which are not in codes 251 thru 255. |
| | 259 | Other procedure to protect surfaces<br>Code 259 gives the procedure necessary to protect surfaces which are not in codes 256 and 257. |
| | 260 | Remove and prevent ice and remove contamination<br>Code 260 gives the procedure and data necessary to remove ice and contamination and to prevent the start of ice on surfaces. |
| | 261 | Remove ice |
| | 262 | Prevent ice |
| | 263 | Use disinfectant<br>Code 263 includes procedure given because of health. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 264 | Remove contamination<br>Code 264 gives the procedure to remove or to make neutral contamination (eg radioactive, bacteriological, and chemical). |
| | 265 thru 269 | Available for projects |
| | 270 | Adjust, align and calibrate<br>Code 270 gives the procedure and data necessary to adjust, align or calibrate a system, equipment or component. |
| | 271 | Adjust<br>Code 271 gives procedure to adjust a system, equipment, or component to a serviceable condition. |
| | 272 | Align<br>Code 272 gives procedure to align a system, equipment, or component to a serviceable condition. |
| | 273 | Calibrate<br>Code 273 gives procedure to calibrate a system, equipment, or component to make sure it is serviceable. |
| | 274 | Harmonize<br>Code 274 gives procedure to align a system, equipment, or component in all axes. |
| | 275 thru 277 | Available for projects |
| | 278 | Easily and quickly adjust after a battle damage repair<br>Code 278 gives procedure necessary to adjust a system, equipment or component of a Product after a battle damage repair has been done. The adjustment procedure to make the Product serviceable is easily and quickly done but the Product can have a limit of operation. |
| | 279 | Easily and quickly align after a battle damage repair<br>Code 279 gives procedure necessary to align a system, equipment or component after a battle damage repair has been done. The procedure to make the Product serviceable is easily and quickly done but the Product can have a limit of operation. |
| | 280 | Inspection<br>Code 280 gives the maintenance and overhaul inspections necessary to keep a Product, system, equipment or component serviceable. |
| | 281 | Scheduled inspection<br>Code 281 gives the maintenance and overhaul inspections necessary to keep a Product, system, equipment or component serviceable. The inspections are done to a schedule at a specified time given by the manufacturer. The manufacturer also gives the lives of equipment, components, items, or parts. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 282 | Unscheduled inspection<br>Code 282 gives the maintenance and overhaul inspections necessary to keep a Product, system, equipment or component serviceable. These inspections are done at a specified time given by the manufacturer but cannot be included in a schedule (refer to code 281). |
| | 283 | Special regular inspection<br>Code 283 gives the maintenance and overhaul inspections necessary to keep a Product, system, equipment or component serviceable. They are special inspections at the time given by the manufacturer which cannot be included in a schedule (eg time equipment operates, the number of rounds fired by a gun). |
| | 284 | Special irregular inspection<br>Code 284 gives special irregular inspections which do not occur frequently and which cannot be included in a schedule (eg heavy landing inspection, lightning strike inspection). |
| | 285 thru 287 | Available for projects |
| | 288 | Overhaul and retirement schedule<br>Code 288 gives the overhaul and retirement schedule for a part or product. This can include overhaul and/or retirement interval hours, maximum operating time allowed on the part or products before it is to be overhauled, overhaul interval notes, and any additional information required on the part or product's overhaul and/or retirement interval. |
| | 289 | Available for projects |
| | 290 | Change of liquid/gas<br>Code 290 gives the combined procedures and data necessary for code 220 drain liquid and release pressure and code 210 fill. |
| | 291 | Available for projects |
| | 292 | Change of oil<br>Code 292 gives the combined procedures and data necessary for code 222 Drain oil + code 212 Fill with oil. |
| | 293 | Change of oxygen<br>Code 293 gives the combined procedures and data necessary for code 223 Release oxygen pressure + code 213 Fill with oxygen. |
| | 294 | Change of nitrogen<br>Code 294 gives the combined procedures and data necessary for code 224 Release nitrogen pressure + code 214 Fill with nitrogen. |
| | 295 | Change of air<br>Code 295 gives the combined procedures and data necessary for code 225 Release air pressure + code 215 Fill with air. |
| | 296 | Change of water<br>Code 296 gives the combined procedures and data necessary for code 226 Drain water + code 216 Fill with water. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 297 | Change of hydrogen<br>Code 297 gives the combined procedure and data necessary for code 227 Release hydrogen pressure and code 217 Fill with hydrogen |
| | 298 | Change of other liquid<br>Code 298 gives the combined procedures and data necessary for code 228 Drain other liquid + code 218 Fill with other liquid. |
| | 299 | Change of other gas<br>Code 299 gives the combined procedures and data necessary for code 229 Release other gas pressure + code 219 Fill with other gas. |

## 2.5 Primary code 300 - Examinations, tests and checks

*Table 6 Code 300 - Examinations, test and checks*

| Primary code | Secondary code | Definition |
|---|---|---|
| 300 | | Examinations, tests and checks<br>Code 300 gives procedures and data necessary to examine and to do tests and checks on, the Product, system, equipment, component or item. |
| | 301 | List of consumables associated with examinations, tests and checks |
| | 302 | List of materials associated with examinations, tests and checks |
| | 303 | List of expendables associated with examinations, tests and checks |
| | 304 | List of special support equipment and tools associated with examinations, tests and checks |
| | 305 | List of support equipment and tools associated with examinations, tests and checks |
| | 306 | List of software associated with examinations, tests and checks |
| | 307 | Parts list associated with examinations, tests and checks |
| | 308 and 309 | Not available for projects |
| | 310 | Visual examination<br>Code 310 gives the procedure and data necessary to visually examine a Product, system, equipment, component equipment, component, or item for specific defects/failures. |
| | 311 | Visual examination without special equipment |
| | 312 | Examination with a Borescope |
| | 313 and 314 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 315 | QA requirements<br>Code 315 gives general descriptions of QA of the product. This can include references to QA procedures, statement of responsibility, requirements for maintenance or calibration of tools and test equipment used for QA, certification requirements, etc. |
| | 316 thru 319 | Available for projects |
| | 320 | Operation test<br>Code 320 gives the procedure and data necessary to do operation tests of a system, equipment or component to make sure it is serviceable (ie in the tolerances given by the manufacturer but not necessarily to the design standards). These tests require no special test equipment other than that installed on the Product, system, equipment or component. |
| | 321 thru 329 | Available for projects |
| | 330 | Test preparation<br>Code 330 gives the procedure and data necessary to prepare a Product system, equipment, or component to do operation tests, function tests, or structure tests. |
| | 331 | Connection of test equipment<br>Code 331 gives the procedure and data necessary to connect test equipment to a Product, system, equipment or component. |
| | 332 | Removal of test equipment<br>Code 332 gives the procedure and data necessary to remove test equipment from a Product, system, equipment or component. |
| | 333 | Installation of the unit before the test<br>Code 333 gives the procedure and data necessary to install an equipment or component to test equipment to do a test. |
| | 334 | Removal of the unit after the test<br>Code 334 gives the procedure and data necessary to remove equipment or component from test equipment after the test is done. |
| | 335 thru 339 | Available for projects |
| | 340 | Function test<br>Code 340 gives the procedure and data necessary to make sure a system, equipment, or component operates correctly. A function test is more complete than an operation test (code 320) and usually requires special test equipment. The procedure tells what to do and what the effects/indicators are. If the effects/indicators are incorrect, the procedure tells what to do (eg refer to failure reports and isolation tables - code 400, adjust/align procedure - code 270). This must be possible without additional documents. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 341 | Manual test<br>Code 341 gives the procedure and data to do a function test of a system, equipment, or component. Special test equipment can be used but not automatic test equipment. |
| | 342 | Automatic test<br>Code 342 gives the procedure and data to do a function test of a system, equipment, or component with automatic test equipment only. |
| | 343 | BIT operation (crew)<br>Code 343 gives the description of what the Built-in Test (BIT) procedure do from a crew's point of view. The information given under this code can also be used by maintainers. |
| | 344 | Compatibility test<br>Code 344 gives procedure and data necessary to perform compatibility tests. |
| | 345 thru 349 | Available for projects |
| | 350 | Structure test<br>Code 350 gives the procedure and data necessary to do tests for hardness and to detect faults such as cracks. |
| | 351 | Test for surface cracks with dye penetrant |
| | 352 | Test for surface cracks with magnetic particles |
| | 353 | Test for cracks and other defects with eddy current |
| | 354 | Test for cracks and other defects with X-rays |
| | 355 | Test for cracks and other defects with ultrasonic |
| | 356 | Hardness test<br>Code 356 gives the procedure and data necessary to measure how hard a material is. |
| | 357 | Gamma ray |
| | 358 | Resonance frequency |
| | 359 | Available for projects |
| | 360 | Design data/tolerances check<br>Code 360 gives the procedure and data necessary to make sure a system, equipment, or component is correct to the design data/tolerances. |
| | 361 | Dimensions check |
| | 362 | Pressure check |
| | 363 | Flow check |
| | 364 | Leak check |
| | 365 | Continuity check |
| | 366 | Resistance check |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 367 | Electrical power check |
| | 368 | Signal strength check |
| | 369 | Other check<br>Code 369 gives the procedure and data for design data/tolerances checks not related to codes 361 thru 368 (eg bonding check, frequency check, bandwidth check). |
| | 370 | Monitor the condition<br>Code 370 gives the procedure and data necessary to monitor the condition of a Product, system, equipment or component: the condition is monitored by the analysis of oil, vibration, tracking, etc. |
| | 371 | Oil analysis<br>Code 371 gives the procedure and data necessary to monitor the condition of a system, equipment, or component by an analysis of oil. |
| | 372 | Vibration analysis<br>Code 372 gives the procedure and data necessary to monitor the condition of a Product, system, equipment or component by analysis of its vibration. |
| | 373 | Tracking check<br>Code 373 gives the procedure and data necessary to monitor the precision of tracking. |
| | 374 | Fuel analysis<br>Code 374 gives the procedure and data necessary to monitor the condition of a system, equipment, or component by the analysis of fuel. |
| | 375 | Shooting accidental discharge analysis<br>Code 375 gives procedure and data necessary to analyse an accidental discharge incident of a weapon system. |
| | 376 | Check post application of adhesive<br>Code 376 gives procedure and data necessary to verify relevant system after a gluing. |
| | 377 thru 379 | Available for projects |
| | 380 thru 389 | Not available for projects |
| | 390 | Sample test<br>Code 390 gives the procedure to ensure the quality of a process by checking it on a specimen or sample part. |
| | 391 thru 399 | Available for projects |

## 2.6 Primary code 400 - Fault reports and isolation procedures

*Table 7 Code 400 - Fault reports and isolation procedures*

| Primary code | Secondary code | Definition |
|---|---|---|
| 400 | | Fault reports and isolation procedures<br>Code 400 gives the procedures and data necessary to get accurate reports on faults and malfunctions and to isolate the faults. |
| | 401 | List of consumables associated with fault diagnosis |
| | 402 | List of materials associated with fault diagnosis |
| | 403 | List of expendables associated with fault diagnosis |
| | 404 | List of special support equipment and tools associated with fault diagnosis |
| | 405 | List of support equipment and tools associated with fault diagnosis |
| | 406 | List of software associated with fault diagnosis |
| | 407 | Parts list associated with fault diagnosis |
| | 408 and 409 | Not available for projects |
| | 410 | General fault description<br>Code 410 gives maintenance messages and symptoms of faults with information on and references to the isolation and/or corrective procedures. |
| | 411 | Isolated fault<br>Code 411 gives the maintenance messages relative to isolated fault which can be memorized by the Product centralized monitoring system. It provides the information and procedure necessary to correct each isolated fault. |
| | 412 | Detected fault<br>Code 412 gives the maintenance messages relative to detected fault which can be stored by the Product centralized monitoring system. It provides the information and procedure necessary to isolate and correct each detected fault. |
| | 413 | Observed fault<br>Code 413 gives all symptoms related to observed faults which can be reported by the crew. Symptoms are sorted by system/subsystem and must be simply and not ambiguously described. It provides the information and procedure necessary to isolate and correct each observed fault. |
| | 414 | Correlated fault<br>Code 414 gives the set of maintenance messages and warnings/malfunctions which have been correlated and which can be recognized by the Product centralized monitoring system. It provides the information and procedures necessary to correct each correlated fault. |
| | 415 thru 419 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 420 | General fault isolation procedure<br>Code 420 gives the procedure and data necessary to isolate the fault. Each fault isolation procedure contains all operations needed to isolate the fault and must terminate with instructions for correcting it. |
| | 421 thru 428 | Fault isolation procedure |
| | 429 | Diagnostics<br>Code 429 gives procedures related to diagnostics of the products. This is typically used with the process data module. |
| | 430 | Fault isolation task supporting data<br>Code 430 contains explanations and diagrams which identify fault symptoms accurately and make the fault isolation easier. |
| | 431 thru 439 | Available for projects |
| | 440 | Index |
| | 441 | Fault code index<br>Code 441 contains a list of fault codes with references to the fault isolation procedures. |
| | 442 | Maintenance message index<br>Code 442 contains a list of maintenance messages with references to the fault isolation procedures. |
| | 443 thru 449 | Available for projects |
| | 450 thru 499 | Not available for projects |

## 2.7 Primary code 500 - Disconnect, remove and disassemble procedures

*Table 8 Code 500 - Disconnect, remove and disassemble procedures*

| Primary code | Secondary code | Definition |
|---|---|---|
| 500 | | Disconnect, remove, and disassemble procedures<br>Code 500 gives the procedures and data necessary to disconnect, remove and disassemble equipment, components and items. Included in the procedures is how to install seals/caps. |
| | 501 | List of consumables associated with removal |
| | 502 | List of materials associated with removal |
| | 503 | List of expendables associated with removal |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 504 | List of special support equipment and tools associated with removal |
| | 505 | List of support equipment and tools associated with removal |
| | 506 | List of software associated with removal |
| | 507 | Parts list associated with removal |
| | 508 and 509 | Not available for projects |
| | 510 | Disconnect procedure<br>Code 510 gives procedure and data necessary to disconnect equipment, components, or items. Included in the procedure is the installation of caps to protect disconnected equipment, components, or items. |
| | 511 thru 519 | Available for projects |
| | 520 | Remove procedure<br>Code 520 gives the procedure and data necessary to remove equipment, components, and items. The following codes can divide or add to code 520 when the necessary depth of detail needs a separate data module: |
| | 521 | Return to basic configuration<br>Undressing |
| | 522 | Remove support equipment/Remove from support equipment |
| | 523 | Preparation before removal |
| | 524 | Follow-on maintenance<br>Code 524 is used only when the follow-on maintenance cannot be included in code 520. |
| | 525 | Ammunition unloading<br>Code 525 gives the procedure and data necessary to unload ammunition from a weapon system. |
| | 526 | Deactivate launching device<br>Code 526 gives the procedure and data necessary to deactivate launching devices as a preliminary requirement to any operation on a weapon system. |
| | 527 thru 529 | Available for projects |
| | 530 | Disassemble procedure<br>Code 530 gives the procedure and data necessary to disassemble equipment, components and items to the necessary level. Included in the procedure is the installation of caps to protect disconnected equipment, components, or items. |
| | 531 thru 539 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 540 | Open for access procedure<br>Code 540 gives the procedure and data necessary to open panels or doors when this procedure are not easily done and are necessary before the start of other maintenance tasks. Usually this is applicable to engine bay doors, landing gear doors, etc. |
| | 541 thru 549 | Available for projects |
| | 550 | Unload software procedure<br>Code 550 gives the description of the methods/devices/interfaces implemented to download the software from one item and the time required. |
| | 551 | Fault monitoring storage readout (downloading) |
| | 552 | Data erasing |
| | 553 thru 559 | Available for projects |
| | 560 thru 599 | Not available for projects |

## 2.8 Primary code 600 - Repairs and locally make procedures and data

*Table 9 Code 600 - Repairs and locally make procedures and data*

| Primary code | Secondary code | Definition |
|---|---|---|
| 600 | | Repairs and locally make procedures and data<br>Code 600 gives the procedures and data necessary to repair a Product, equipment, component or item. Procedures and data necessary to locally make specified items are also given. |
| | 601 | List of consumables associated with repairs |
| | 602 | List of materials associated with repairs |
| | 603 | List of expendables associated with repairs |
| | 604 | List of special support equipment and tools associated with repairs |
| | 605 | List of support equipment and tools associated with repairs |
| | 606 | List of software associated with repairs |
| | 607 | Parts list associated with repairs |
| | 608 and 609 | Not available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 610 | Add material<br>Code 610 gives the procedure and data necessary which add materials to repair a Product, equipment, component or item. |
| | 611 | Insulation |
| | 612 | Metalize |
| | 613 | Pot |
| | 614 | Remetal |
| | 615 | Retread |
| | 616 thru 619 | Available for projects |
| | 620 | Attach material<br>Code 620 gives the procedure and data necessary which attach materials to repair a Product, equipment, component or item. |
| | 621 | Bond |
| | 622 | Crimp |
| | 623 | Braze |
| | 624 | Rivet |
| | 625 | Solder |
| | 626 | Splice |
| | 627 | Weld |
| | 628 and 629 | Available for projects |
| | 630 | Change the mechanical strength/structure of material<br>Code 630 gives the procedure and data necessary to change the mechanical strength/structure of materials. |
| | 631 | Anneal |
| | 632 | Case harden |
| | 633 | Cure |
| | 634 | Normalize |
| | 635 | Shot-peen |
| | 636 | Temper |
| | 637 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 638 | Other treatment<br>Code 638 gives the procedure and data necessary to heat treat metal or metal alloys which are not in codes 631, 632, 634 and 636. |
| | 639 | Other process to change the mechanical strength/structure of material<br>Code 639 gives the procedure and data necessary to change the mechanical strength/structure of material which are not in codes 633 and 635. |
| | 640 | Change the surface finish of material<br>Code 640 gives the procedure and data necessary to change the surface finish of material. |
| | 641 | Anodize |
| | 642 | Buff |
| | 643 | Burnish |
| | 644 | Chromate |
| | 645 | Hone |
| | 646 | Lap |
| | 647 | Plate |
| | 648 | Polish |
| | 649 | Other process to change the surface finish of material<br>Code 649 gives the procedure and data necessary to change the surfaces finish of materials which are not in code 641 thru code 648. |
| | 650 | Remove material<br>Code 650 gives the procedure and data necessary to remove material. |
| | 651 | Abrasive blast |
| | 652 | Bore/drill/ream |
| | 653 | Electrical/electrochemical/chemical etch |
| | 654 | Broach |
| | 655 | Grind |
| | 656 | Mill |
| | 657 | Thread/tap |
| | 658 | Turn |
| | 659 | Other process to remove material<br>Code 659 gives the procedure and data necessary to remove material which is not in code 651 thru code 658. |
| | 660 | Structure repair procedure and data<br>Code 660 gives the procedure and data necessary to repair damage and also gives the permitted damage. |
| | 661 | Permitted damage |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 662 | Temporary repair procedure |
| | 663 | Standard repair procedure |
| | 664 | Special repair procedure<br>Code 664 gives the procedure and data necessary to do special structure repairs. Usually a special repair is a repair to a damaged area or item of structure which is not in code 663 and which the manufacturer has written to repair damage that has occurred. |
| | 665 | Fly-in repair procedure<br>Code 665 gives the procedure necessary to carry out fly-in repairs to the structure of a Product, equipment, or component. Usually a fly-in repair is to permit transport to a base for a standard repair (code 663) or a special repair (code 664) |
| | 666 | Material classification<br>Code 666 gives data necessary for material classification. |
| | 667 | Structure classification<br>Code 667 gives data necessary for structure classification. |
| | 668 and 669 | Available for projects |
| | 670 | Locally make procedure and data<br>Code 670 gives the procedure and data necessary to locally make items, parts or equipment. |
| | 671 thru 679 | Available for projects |
| | 680 | Battle damage repair procedure and data<br>Code 680 gives the procedure and data necessary to perform battle-damage functions on a Product, system, equipment or component. The repair is easily and quickly done but the Product can have a limit of operation. |
| | 681 | Damage repair symbol marking<br>Code 681 gives the rules and symbols to be used to clearly mark the damaged zones, areas components, and parts and indicate the action to be performed following the damage assessment. |
| | 682 | Identification of damaged hardware<br>Code 682 gives information to establish a precise relationship between the observed damaged hardware and the coding of the data module providing its damage assessment data. |
| | 683 | Damage assessment<br>Code 683 gives, for a damaged and identified hardware, the necessary data and information to establish<br>- the effect of the hardware on the operation of the Product<br>- if the hardware can be left damaged without repair or isolation<br>- whether it can be repaired and/or isolated<br>- the relevant action which must be applied<br>- consequences of the actions on the Product utilization (mission, limitation, etc) |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 684 | Utilization degradation<br>Code 684 gives the consequence on the Product utilization (mission, limitation, etc) of the actions performed on the damaged hardware if this information is not provided under code 683.<br>Note: It is recommended to provide utilization degradation under code 683 as last step of the damage assessment process. |
| | 685 | Repair procedure<br>Code 685 gives the procedure to repair battle damaged hardware. Generally, the procedure is only performed with the hardware making up the battle damage repair kit. |
| | 686 | Isolation procedure<br>Code 686 gives the procedure to isolate damaged portions of the system or one of its damaged components |
| | 687 | Function test after battle damage repair<br>Code 687 gives the procedure to ensure that repaired systems can fulfill the requirements of the mission. Generally, these procedures make full use of on-board test facilities. If a test leads to operating limits, they are noted in the procedure. |
| | 688 | Battle damage repair kit<br>Code 688 gives the list of self-contained hardware (tools, materials, expendables and consumables) provided as a battle damage repair kit and necessary to perform the battle damage repairs. |
| | 689 | Damage repair |
| | 690 | Miscellaneous<br>Code 690 gives the procedure and data on various processes necessary during refurbishment of materials which are not in code 610 thru code 680. |
| | 691 | Marking<br>Code 691 gives the procedure and data to temporarily or permanently mark parts. |
| | 692 | Connector repair<br>Code 692 gives procedure and data necessary to repair connectors. |
| | 693 thru 699 | Available for projects |

## 2.9 Primary code 700 - Assemble, install and connect procedures

*Table 10 Code 700 - Assemble, install and connect procedures*

| Primary code | Secondary code | Definition |
|---|---|---|
| 700 | | Assemble, install, and connect procedures<br>Code 700 gives the procedures and data necessary to assemble, install, connect and secure equipment, components or items. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 701 | List of consumables associated with installation |
| | 702 | List of materials associated with installation |
| | 703 | List of expendables associated with installation |
| | 704 | List of special support equipment and tools associated with installation |
| | 705 | List of support equipment and tools associated with installation |
| | 706 | List of software associated with installation |
| | 707 | Parts list associated with installation |
| | 708 and 709 | Not available for projects |
| | 710 | Assemble procedure<br>Code 710 gives the procedure and data necessary to assemble equipment, components and items from the disassembled level. Included in the procedure is the removal of caps, the installation of seals, the torque and make secure attaching parts. |
| | 711 | Tighten procedure<br>Code 711 gives the procedure to tighten and to apply torque to threaded fasteners such as bolts, nuts and fittings |
| | 712 | Lock procedure<br>Code 712 gives the procedure to secure parts by use of safety wire or safety cable, cotter pin, tab washers, etc. |
| | 713 | Pack procedure<br>Code 713 gives the procedure to pack equipment (eg survival pack) |
| | 714 thru 719 | Available for projects |
| | 720 | Install procedure<br>Code 720 gives the procedure and data necessary to install equipment, components, and items. Included in the procedure are the removal of caps and the installation of seals. |
| | 721 | Build up to usable configuration<br>Dressing |
| | 722 | Install support equipment/Install on support equipment |
| | 723 | Preparation before installation |
| | 724 | Follow-on maintenance<br>Code 724 is only used when follow-on maintenance cannot be included in code 720. |
| | 725 | Ammunition loading<br>Code 725 gives the procedure and data necessary to load ammunition on a weapon system. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 726 | Activate launching device<br>Code 726 gives the procedure and data necessary to activate launching devices on a weapon system. |
| | 727 thru 729 | Available for projects |
| | 730 | Connect procedure<br>Code 730 gives the procedure and data necessary to connect equipment, components and items. Included in the procedure is the removal of caps and the installation of seals |
| | 731 thru 739 | Available for projects |
| | 740 | Close after access procedure<br>Code 740 gives the procedure and data necessary to close panels or doors at the end of a maintenance task, when this procedure are not easily done and apply to different tasks. Usually this is applicable to engine bay doors etc. |
| | 741 thru 749 | Available for projects |
| | 750 | Load software procedure<br>Code 750 gives the description of the methods/devices/interfaces implemented to load software on the item and the time required. |
| | 751 | Available for projects |
| | 752 | Data loading |
| | 753 thru 759 | Available for projects |
| | 760 thru 799 | Not available for projects |

## 2.10 Primary code 800 - Package, handling, storage, and transportation

*Table 11 Code 800 - Package, handling, storage, and transportation*

| Primary code | Secondary code | Definition |
|---|---|---|
| 800 | | Package, handling, storage and transportation<br>Code 800 gives the procedures and data necessary to put Product, systems, equipment or components in storage, to keep them serviceable while in storage, to pack and to transport them, and prepare them for transportation. Data of storage life is also included. |
| | 801 | List of consumables associated with storage |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 802 | List of materials associated with storage |
| | 803 | List of expendables associated with storage |
| | 804 | List of special support equipment and tools associated with storage |
| | 805 | List of support equipment and tools associated with storage |
| | 806 | List of software associated with storage |
| | 807 | Parts list associated with storage |
| | 808 and 809 | Not available for projects |
| | 810 | Preservation procedure<br>Code 810 gives the procedure and data necessary to protect Product, systems, equipment or components before they are put in storage. The servicing to be done on a Product, system, equipment or component and special data to move them is given if necessary. |
| | 811 | Preparation for vehicle transportation<br>Code 811 gives the procedure and data necessary to prepare the vehicle for transportation. |
| | 812 | Shipping and storage - General<br>Code 812 gives procedures related to general shipping and storage of the product. |
| | 813 thru 819 | Available for projects |
| | 820 | Procedure to remove preservation material<br>Code 820 gives the information and data necessary to remove material and parts used to keep Products, systems equipment or components serviceable when in storage. |
| | 821 thru 829 | Available for projects |
| | 830 | Procedure to put item in containers<br>Code 830 gives the procedure and data necessary to install Products, equipment or components in containers for storage and/or to move them by road, rail, sea, air. |
| | 831 | Vehicle loading<br>Code 831 gives procedure and data necessary to load a vehicle into another one for transportation. |
| | 832 thru 839 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 840 | Procedure to remove item from containers<br>Code 840 gives the procedure and data necessary to remove Products, equipment or components from their containers. The procedure includes the removal of the material used for protection. |
| | 841 | Vehicle unloading<br>Code 841 gives procedure and data necessary to unload a vehicle from another one after transportation. |
| | 842 thru 849 | Available for projects |
| | 850 | Procedure to keep item serviceable when in storage<br>Code 850 gives the information and data necessary to make sure Products, systems, equipment, or components stay serviceable when in storage. |
| | 851 thru 859 | Available for projects |
| | 860 | Procedure to move item when in storage<br>Code 860 gives the procedure and data necessary to move Products, systems equipment or components by road, rail, sea, air after they are installed in containers. |
| | 861 thru 869 | Available for projects |
| | 870 | Procedure to prepare item for use after storage<br>Code 870 gives the procedure and data necessary to prepare Products, systems, equipment or components for use after storage. |
| | 871 | Set on condition<br>Code 871 gives the procedure and data necessary to set the vehicle on condition after transportation. |
| | 872 thru 879 | Available for projects |
| | 880 | Procedure when item got out of storage<br>Code 880 gives the procedure and data necessary to accept Products, systems, equipment or components from storage before they are prepared for use (code 870). |
| | 881 thru 889 | Available for projects |
| | 890 | Life data of item when in storage<br>Code 890 gives the procedure and data necessary to accept Products, systems, equipment or components can be given in storage condition and stay safe/serviceable. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 891 thru 899 | Available for projects |

## 2.11 Primary code 900 - Miscellaneous

*Table 12 Code 900 - Miscellaneous*

| Primary code | Secondary code | Definition |
|---|---|---|
| 900 | | Miscellaneous |
| | 901 | Miscellaneous list of consumables |
| | 902 | Miscellaneous list of materials |
| | 903 | Miscellaneous list of expendables |
| | 904 | Miscellaneous list of special support equipment and tools |
| | 905 | Miscellaneous list of support equipment and tools |
| | 906 | Miscellaneous list of software |
| | 907 | Miscellaneous parts list |
| | 908 and 909 | Not available for projects |
| | 910 | Miscellaneous |
| | 911 | Illustration<br>Code 911 gives an illustration and its identification and status information. The code can be used for storing and transmission of illustrations in the form of data module. |
| | 912 | Handling procedure<br>Code 912 gives the general handling procedure and standard practices not specifically identified in other codes. This code covers procedure for the careful handling of components that can be easily damaged. It can apply to any component. |
| | 913 | General maintenance procedure<br>Code 913 gives the general maintenance procedure and standard practices not specially identified in other codes. This code is used to identify procedure where the maintenance is general. That is in order to cover very small assembly/ clean/inspect/repair/disassembly etc. procedures that are too small to warrant their own data module or are always performed together. |
| | 914 | Container data module<br>Code 914 indicates a container data module that refers to or includes different kinds of information and so cannot be covered by another dedicated information code. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 915 | Facilities<br>Code 915 gives the description of facilities required for operation, maintenance, repairs, or storage of the product. |
| | 916 | Maintenance allocation<br>Code 916 gives Maintenance allocation information for the product. |
| | 917 thru 919 | Available for projects |
| | 920 | Change = Remove and install<br>Code 920 gives the combined procedures and data for code 520 Remove and code 720 Install. |
| | 921 | Change = Remove and install a new item<br>Code 921 gives the combined procedures and data for code 520 Remove and code 720 Install a new item. |
| | 922 | Change = Remove and install the removed item<br>Code 922 gives the combined procedures and data for code 520 Remove and code 720 Install again the removed item. |
| | 923 | Change = Disconnect and connect an item<br>Code 923 gives the combined procedures and data to disconnect code 510 and connect a removed item code 730. |
| | 924 thru 929 | Available for projects |
| | 930 | Service Bulletin |
| | 931 | Service Bulletin data<br>Code 931 gives the information required to permit the operator to determine<br>- if his hardware is subject to the Service Bulletin<br>- if the Service Bulletin is urgent or not (compliance)<br>and identify the data module to deal with a Service Bulletin. |
| | 932 | Planning information<br>Code 932 gives data and information required to permit the operator to determine if the Service Bulletin is applicable to his component and to plan its accomplishment. |
| | 933 | Accomplishment instruction<br>Code 933 gives all the necessary instructions to accomplish the work required by a Service Bulletin. |
| | 934 | Material information<br>Code 934 gives the information regarding the material and components required to accomplish the Service Bulletin, their interchangeability and disposition data. |
| | 935 thru 939 | Available for projects |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 940 | Provisioning data<br>Code 940 gives data necessary for provisioning and to identify support items and spare parts. |
| | 941 | IPD<br>Code 941 gives data necessary to identify support items and spare parts relating to Product, equipment or components. Data are prepared in accordance with Chap 5.2.1.5. Related illustrations associated to the data are also included under this code. |
| | 942 | Numerical index<br>Code 942 contains IPD (IPD) cross reference index information, which identifies all IPD items. |
| | 943 thru 949 | Available for projects |
| | 950 | Generic process<br>Code 950 indicates a process data module that refers to or includes different kinds of information and so cannot be covered by another dedicated information code. |
| | 951 thru 959 | Available for projects |
| | 960 thru 979 | Not available for projects |
| | 980 | Environmental protection, fire-fighting and rescue<br>Gives descriptions, procedures and operating instructions for environmental protection, fire-fighting and rescue |
| | 981 | Air cleaning<br>IC981 gives descriptions, procedures, and operating instructions for air cleaning. |
| | 982 | Sewage treatment<br>IC 982 for sewage treatment. |
| | 983 thru 988 | Not available for projects |
| | 989 | Fire-fighting and rescue<br>IC989 gives descriptions, procedures and operating instructions for fire protection, fire-fighting and rescue. |
| | 990 | Neutralization and disposal<br>Code 990 gives the procedure and data necessary for neutralization of ordnance and substances and for the disposal of ordnance, material, equipment, or substances. |

| Primary code | Secondary code | Definition |
|---|---|---|
| | 991 | Neutralization of ordnance<br>Code 991 gives the procedure and data necessary to make ordnance, eg missiles, weapons, and ammunition, safe or inert to prevent operation and/or explosion. |
| | 992 | Neutralization of substance<br>Code 992 gives procedure and data necessary to destroy the distinctive or active property of the chemical substance, eg neutralization of an acid. |
| | 993 thru 995 | Available for projects |
| | 996 | Disposal of ordnance<br>Code 996 gives the procedure and data necessary to dispose of ordnance, such as missiles, weapons, or ammunition by explosion, fire, physical destruction, making inert, disassembly, etc. This code covers destruction of ordnance to prevent enemy use. |
| | 997 | Disposal of product<br>Code 997 gives the procedure and data necessary to dispose of product such as Product, equipment, components etc eg by destruction, disassembly and/or recycling of its materials. This code also covers the destruction of Product to prevent enemy use. |
| | 998 | Disposal of substance<br>Code 998 gives the procedure and data necessary to dispose of substance, such as chemicals, radioactive material, waste material, etc, by recycling, permanent storage in a safe place, cleaning for reuse, etc. |
| | 999 | Available for projects |

# 3 Business rules decisions

Business rules decisions include, but are not limited to, the following:

**Definitions**. The project or the organization must agree definitions before allocating them to the information codes that are defined as "Available for projects" as described in Chap 1.3.

# Chapter 8.5

## *SNS information and learn codes - Learn codes*

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| Chap No./Document No. | Title |
|---|---|
| Chap 1.3 | How to use the specification |
| Chap 8.5.1 | Learn codes - Human performance technology codes |
| Chap 8.5.2 | Learn codes - Training codes |

## 1 General

Learn codes are used in the data module code for training data modules.

## 2 Learn codes

There are two types of learn codes. The first type is human performance technology, which can be used to identify information regarding the human performance system. Each code has a long definition and a short definition.

Training is the second type, which can be used to identify the type of information related to training but associated with the SNS and information code. Each code has a long definition and a short definition.

Codes that are defined as "Not available for projects" are controlled by S1000D Steering Committee. Refer to Chap 1.3.

- Chap 8.5.1 provides human performance technology code definitions
- Chap 8.5.2 provides training codes definitions

# Chapter 8.5.1

## *Learn codes - Human performance technology codes*

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*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 4.3.9 | Data module code - Learn code |
| Chap 4.3.10 | Data module code - Learn event code |

## 1 General

Human performance technology data modules can be defined within a project to capture and archive human performance system data. The addition of the human performance technology learn codes to the data module code allows human performance technologists to create data modules that can:

- assist in the planning of a project's technical data module and training data module requirements
- evaluate the effectiveness of technical data modules and training data modules created to support the learning system requirements of a project

The coding framework for human performance technology data modules is derived from an industry-recognized human performance technology model developed by Darlene M. VanTiem, James L. Moseley, and Joan Conway Dessinger. Human performance technologists need to be familiar with this model and its core requirements.

All human performance technology learn codes have the first character set to "H", followed by two alphanumeric characters.

Learn codes are used in conjunction with a learn event code, as defined in Chap 4.3.10.

# 2 Human performance technology definitions

## 2.1 Short definitions

The short definitions of the alphanumeric characters used to populate the optional attribute `learnCode` of the element <`dmCode`> (Refer to Chap 4.3.9). The short definitions for human performance technology data modules are given in Table 2.

*Table 2 Human performance technology codes - Short definitions*

| Learn code | Definition | Remarks |
|---|---|---|
| H00 thru H0Z | Not available for projects | |
| H10 | Performance analysis | |
| H11 | Organizational analysis - Vision statement | |
| H12 | Organizational analysis - Mission statement | |
| H13 | Organizational analysis - Values | |
| H14 | Organizational analysis - Goal statement | |
| H15 | Organizational analysis - Objective statement | |
| H16 | Organizational analysis - Gap statement | |
| H17 | Environmental analysis - Organizational environment | Society, stakeholders, competition, etc. |
| H18 | Environmental analysis - Work environment | Resources, tools used, policies, etc. |
| H19 | Performer analysis - Worker | Knowledge, skill, motivation, role, etc. |
| H1A thru H1Z | Not available for projects | |
| H20 | Cause Analysis | |
| H21 | Environmental factor | |
| H22 | Internal factor | |
| H23 thru H2Z | Not available for projects | |
| H30 | Intervention definition | |
| H31 | Performance support | |
| H32 | Job/Work design | |
| H33 | Personal development | |
| H34 | Human resource development | |
| H35 | Organizational communication | |

| Learn code | Definition | Remarks |
|---|---|---|
| H36 | Organizational design and development | |
| H37 | Training | |
| H38 thru H3Z | Not available for projects | |
| H40 | Intervention implementation | |
| H4 thru H4Z | Not available for projects | |
| H50 | Evaluation | |
| H51 | Formative analysis | |
| H52 | Summative - Immediate performance competence | |
| H53 | Summative - Job transfer | |
| H54 | Summative - Organizational impact/ROI | |
| H55 thru H5Z | Not available for projects | |

## 2.2 Full definitions

The full definitions of the alphanumeric characters used to populate the attribute `learnCode` of the element <`dmCode`> (Refer to Chap 4.3.9). The full definitions for human performance technology data modules are given in Table 3.

*Table 3 Human performance technology codes - Full definitions*

| Learn code | Definition | Remarks |
|---|---|---|
| H00 thru H0Z | Not available for projects | |
| H10 | Performance analysis - Analytical technical results of a human performance need or opportunity for improvement from the perspective of the organization. | |
| H11 | Organizational analysis - Vision statement - The highest level statement describing the long-term end-state of an organization. Used to state a measurable, valued outcome in relation to society. | |
| H12 | Organizational analysis - Mission statement - A high level statement describing the mid-term end-state of an organization. Used to state a measurable, valued outcome in relation to and aligned with an organization's vision statement. | |
| H13 | Organizational analysis - Values - statements that describe the ethical boundaries within which an organization operates to achieve its purpose in society. | |

| Learn code | Definition | Remarks |
|---|---|---|
| H14 | Organizational analysis - Goal statement - A broad, measurable statement that describes what an organization must achieve as the result of some campaign or initiative. For example, a goal can involve increasing the ship fleet by 30% within eight years. | These are goals of the organization, not instructional or training goals. |
| H15 | Organizational analysis - Objective statement - A specific, measurable statement that describes what an organization must do to achieve its goal. For example, one objective could be to acquire three new destroyers within five years. Another could be to acquire five frigates within eight years. | These are objectives of the organization, not instructional or training goals. |
| H16 | Organizational analysis - Gap statement - Defines the delta between an organization's desired end state and its current state. Generally used in relation to goal and objective statements. | These are performance gaps, not training gaps. |
| H17 | Environmental analysis - Organizational environment - Describes internal and external forces that can influence an organization's ability to meet its vision, mission, goals and objectives. Some examples could include: special interest groups in society, company stakeholders, competitors, laws, and internal politics. | |
| H18 | Environmental analysis - Work environment - Describes work design factors that can influence an organization's workers' abilities to meet its vision, mission, goals and objectives. Such factors are external to the workers. Some examples could include: material resources, tools used, work flow, job hierarchy, location, policies and procedures enforced. | |
| H19 | Performer analysis - Worker - Describes factors internal to an organization's workforce that can influence its abilities to meet its vision, mission, goals and objectives. Some examples could include: knowledge, skills, motivation, and physical capabilities. | |
| H1A thru H1Z | Not available for projects | |
| H20 | Cause analysis - Technical data containing the root causes of a potential or observed human performance gap. Used to document the results of a cause analysis. | |
| H21 | Environmental factor - Identifies a specific cause of a potential or observed human performance gap. These factors are external to the performers subject to the cause analysis. | |
| H22 | Internal factor - Identifies a specific cause of a potential or observed human performance gap. These factors are internal to the performers subject to the cause analysis. | |
| H23 thru H2Z | Not available for projects | |
| H30 | Intervention definition - Technical data that describes the type and attributes of an intervention that will be designed to remedy the causes of a potential or observed human performance gap. | |

| Learn code | Definition | Remarks |
|---|---|---|
| H31 | Performance support -Technical data that describes a performance support type of intervention that will be designed to remedy the causes of a potential or observed human performance gap. | |
| H32 | Job/Work design -Technical data that describes an intervention that will require the re-design of a job's responsibilities, processes, placement within the organization, reporting structure, etc to remedy the causes of a potential or observed human performance gap. It could also describe the requirements of completely new job or work flow, versus modification of an existing one. | |
| H33 | Personal development -Technical data that describes an intervention that will target the improvement of existing personnel through knowledge, skill, physical, etc development to remedy the causes of a potential or observed human performance gap. | |
| H34 | Human resource development -Technical data that describes an intervention that will target the creation or modification of personnel selection processes to remedy the causes of a potential or observed human performance gap. | |
| H35 | Organizational communication -Technical data that describes an intervention that will re-design or establish communication patterns in an organization to remedy the causes of a potential or observed human performance gap. | |
| H36 | Organizational design -Technical data that describes an intervention that will re-design or establish the divisions, departments, etc needed by an organization to remedy the causes of a potential or observed human performance gap. | |
| H37 thru H3Z | Not available for projects | |
| H40 | Intervention implementation - Technical data regarding requirements for successful release and use of an intervention among the target population. For example, process consulting requirements, end user development needs, communication methods or channels required to inform about/release the intervention, etc. This data module will reference a "3x" type of human performance technology data module. | |
| H41 thru H4Z | Not available for projects | |
| H50 | Evaluation - Technical data regarding the requirements for an evaluation instrument or plan that will determine the success of an intervention. This data module will reference a "3x" type of human performance technology data module. | |
| H51 | Formative analysis - Technical data regarding the requirements for an evaluation instrument or plan that will be used during the development and testing of an intervention to determine how successful an intervention will be before its final release or implementation. This data module will reference a "3x" type of human performance technology data module. | |

| Learn code | Definition | Remarks |
|---|---|---|
| H52 | Summative - Immediate performance competence -Technical data regarding the requirements for an evaluation instrument or plan that determines whether an intervention resulted in the desired immediate effect on performance. This data module will reference a "3x" type of human performance technology data module. | |
| H53 | Summative - Job transfer - Technical data regarding the requirements for an evaluation instrument or plan that determines whether an intervention resulted in the desired effect on performance in the work environment, and that effect is sustained after initial release of the intervention. This data module will reference a "3x" type of human performance technology data module. | |
| H54 | Summative - Organizational impact/ROI -Technical data regarding the requirements for an evaluation instrument or plan that determines whether an intervention resulted in the desired effect on overall performance of the organization (not just at the worker or job level). This data module will reference a “3x” type of human performance technology data module. | |
| H55 thru H5Z | Not available for projects | |

# Chapter 8.5.2

## *Learn codes - Training codes*

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## *References*

*Table 1 References*

| Chap No./Document No. | Title |
|---|---|
| Chap 4.3.9 | Data module code - Learn code |
| Chap 4.3.10 | Data module code - Learn event code |

## 1 General

The coding framework for training data modules is derived from a theory of instruction by Robert Gagne, known as the Nine Events of Instruction. Trained or certified Instructional Systems Design (ISD) professionals need to be familiar with these events of instruction as a framework for designing training systems. Other well-established theories of instruction, learning, and/or motivation are also reflected in the training learn codes to facilitate their use and understanding across ISD practitioners.

All training learn codes have the first character set to "T", followed by two alphanumeric characters.

Learn codes are used in conjunction with a learn code event code, as defined in Chap 4.3.10.

## 2 Training code definitions

### 2.1 Short definitions

The short definitions of the alphanumeric characters used to populate the attribute `learnCode` of the element <`dmCode`> (Refer to Chap 4.3.9). The short definitions for training data modules are given in Table 2.

*Table 2 Training codes - Short definitions*

| LC | Definition | Remarks |
|---|---|---|
| T00 thru T0Z | Not available for projects | |
| T10 | Attention | |
| T11 | Perceptual - Concrete example | |
| T12 | Perceptual - Incongruity/Conflict | |
| T13 | Inquiry - Incongruity/Conflict | |
| T14 | Inquiry - Participatory exercise | |
| T15 | Inquiry - Relevance | |
| T16 thru T1Z | Not available for projects | |
| T20 | Learning objectives | |
| T21 | Terminal objective - Intellectual skill - Discriminations | |
| T22 | Terminal objective - Intellectual skill - Concepts | |
| T23 | Terminal objective - Intellectual skill - Rules/Principles | |
| T24 | Terminal objective - Intellectual skill - Processes | |
| T25 | Terminal objective - Intellectual skill - Procedures | |
| T26 | Terminal objective - Intellectual skill - Higher order rules | Problem solving |
| T27 | Terminal objective - Verbal information - Facts | |
| T28 | Terminal objective - Motor skill | |
| T29 | Enabling objective - Intellectual skill- Discriminations | |
| T2A | Enabling objective - Intellectual skill- Concepts | |
| T2B | Enabling objective - Intellectual skill- Rules/Principles | |
| T2C | Enabling objective - Intellectual skill- Processes | |
| T2D | Enabling objective - Intellectual skill- Procedures | |
| T2E | Enabling objective - Intellectual skill- Higher order rules | Problem solving |
| T2F | Enabling objective - Verbal information - Facts | |
| T2G | Enabling objective - Motor skill | |
| T2H thru T2Z | Not available for projects | |
| T30 | Recall | |
| T31 | Analogy | |

| LC | Definition | Remarks |
|---|---|---|
| T32 | Demonstration | |
| T33 | Informative practice | |
| T34 | Comparative organizer | |
| T35 | Metaphoric device | |
| T36 | Prerequisite concept review | |
| T37 | Question/problem | |
| T38 | Similar-task review | |
| T39 thru T3Z | Not available for projects | |
| T40 | Content | |
| T41 | Static content - Discrimination | Expositive |
| T42 | Static content - Fact | Expositive |
| T43 | Static content - Concept | Expositive |
| T44 | Static content - Rule/Principle | Expositive |
| T45 | Static content - Procedure | Expositive |
| T46 | Static content - Higher order rule | Expositive |
| T47 | Static content - Processes | Expositive |
| T48 | Animated content - Discrimination | Expositive Animation/Video |
| T49 | Animated content - Fact | Expositive Animation/Video |
| T4A | Animated content - Concept | Expositive Animation/Video |
| T4B | Animated content - Rule/Principle | Expositive Animation/Video |
| T4C | Animated content - Procedure | Expositive Animation/Video |
| T4D | Animated content - Higher order rule | Expositive Animation/Video |
| T4E | Animated content - Processes | Expositive Animation/Video |
| T4F | Interactive content - Discrimination | Exploratory Simulation/ Animation/Video |
| T4R | Interactive content - Fact | Exploratory Simulation/ Animation/Video |

| LC | Definition | Remarks |
|---|---|---|
| T4G | Interactive content - Concept | Exploratory Simulation/ Animation/Video |
| T4H | Interactive content - Rule/Principle | Exploratory Simulation/ Animation/Video |
| T4J | Interactive content - Procedure | Exploratory Simulation/ Animation/Video |
| T4K | Interactive content - Higher order rule | Exploratory Simulation/ Animation/Video |
| T4L | Interactive content - Processes | Exploratory Simulation/ Animation/Video |
| T4M thru T4Z | Not available for projects | |
| T50 | Learning guidance | |
| T51 | Analogy | |
| T52 | Metaphoric device | |
| T53 | Drill and practice/informative practice | |
| T54 | Case study | |
| T55 | Comparative organizer | |
| T56 | Concept map | |
| T57 | Demonstration | |
| T58 | Example/non-example | |
| T59 | Game | |
| T5A | Mnemonic device | |
| T5B | Problem solving | |
| T5C | Simulation | |
| T5D | Story | |
| T5E thru T5Z | Not available for projects | |
| T60 | Performance | |
| T61 | Drag-and-drop/matching exercise | |
| T62 | Multiple-choice - One selection | |

| LC | Definition | Remarks |
|---|---|---|
| T63 | Multiple-choice -Multiple selection | |
| T64 | Short answer free text | Fill in the blank |
| T65 | Simulation | |
| T66 | Game | |
| T67 thru T6Z | Not available for projects | |
| T70 | Feedback | |
| T71 | Knowledge of correct response | For discriminations, concepts, rules, principles, procedures |
| T72 | Knowledge of correct solution | For rules, principles, procedures, problem solving, processes |
| T73 | Knowledge of consequence | For rules, principles, procedures, problem solving, processes |
| T74 thru T7Z | Not available for projects | |
| T80 | Assessment | |
| T81 | Drag-and-drop/matching exercise | |
| T82 | Multiple-choice - One selection | |
| T83 | Multiple-choice - Multiple selection | |
| T84 | Short answer free text | |
| T85 | Simulation | |
| T86 | Game | |
| T87 | Pre-test | |
| T88 | Post-test | |
| T89 thru T8Z | Not available for projects | |
| T90 | Retention and transfer | |
| T91 | Drill and practice/informative practice | |

| LC | Definition | Remarks |
|---|---|---|
| T92 | Case study | |
| T93 | Comparative organizer | |
| T94 | Demonstration | |
| T95 | Example/non-example | |
| T96 | Game | |
| T97 | Problem solving | |
| T98 | Simulation | |
| T99 | Story | |
| T9A thru T9Z | Not available for projects | |

## 2.2 Full definitions

The full definitions of the alphanumeric characters used to populate the attribute `learnCode` of the element <`dmCode`> (Refer to Chap 4.3.9). The full definitions for training data modules are given in Table 3.

*Table 3 Training codes - Full definitions*

| LC | Definitions | Remarks |
|---|---|---|
| T00 thru T0Z | Not available for projects | |
| T10 | Attention<br>Abrupt stimulus designed to activate learner's internal process of reception and alertness to the forthcoming technical information. | |
| T11 | Perceptual - Concrete example<br>Attention technique that uses novelty, surprise or uncertainty in the learner to gain their attention. Media are used as anchors for specific, tangible representations of content to be learned. | |
| T12 | Perceptual - Incongruity/Conflict<br>Attention technique that creates incongruity or contradiction in the learner to gain their attention. Media are used to provide a different perspective on the content to be learned. | |
| T13 | Inquiry - Incongruity/Conflict<br>Attention technique that creates incongruity or contradiction in the learner, followed by a question or problem that will unfold throughout the learning event, to gain their attention. Media are used to provide a different perspective on the content to be learned. | |

| LC | Definitions | Remarks |
|---|---|---|
| T14 | Inquiry - Participatory exercise<br>Attention technique that creates incongruity or contradiction in the learner, followed by a problem or challenge the learner must actively solve throughout the learning event, to gain their attention. Media are used to provide a different perspective on the content to be learned. | |
| T15 | Inquiry - Relevance<br>Attention technique that assists the learner in connecting the content to their personal or professional interests. Media are used to provide the learner with "what's in if for me" to gain attention. | |
| T16 thru T1Z | Not available for projects | |
| T20 | Learning objectives<br>States the action, condition, behavior and standard expected of the learner by the end of a learning event. | |
| T21 | Terminal objective - Intellectual skill - Discriminations<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to distinguish critical, physical attributes. | |
| T22 | Terminal objective - Intellectual skill - Concepts<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to recognize and classify based on knowledge of critical attributes. | |
| T23 | Terminal objective - Intellectual skill - Rules/Principles<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to specify relationships among multiple concepts. | |
| T24 | Terminal objective - Intellectual skill - Processes<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to describe how a system or organization operates. | |
| T25 | Terminal objective - Intellectual skill - Procedures<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to apply prescribed sequences of learned rules or principles to defined problems. | |
| T26 | Terminal objective - Intellectual skill - Higher order rules<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to apply unique combinations of learned rules or principles to ill-defined problems. | Problem solving, troubleshooting. |
| T27 | Terminal objective - Verbal information - Facts<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to recall rote information or facts. | |

| LC | Definitions | Remarks |
|---|---|---|
| T28 | Terminal objective - Motor skill<br>Highest level learning objective. States the action, condition, behavior and standard expected of the learner to perform physical actions. | |
| T29 | Enabling objective - Intellectual skill - Discriminations<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to recognize and classify critical attributes. | |
| T2A | Enabling objective - Intellectual skill - Concepts<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to recognize and classify based on knowledge of critical attributes. | |
| T2B | Enabling objective - Intellectual skill - Rules/Principles<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to specify relationships among multiple concepts. | |
| T2C | Enabling objective - Intellectual skill - Processes<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to describe how a system or organization operates. | |
| T2D | Enabling objective - Intellectual skill - Procedures<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to apply prescribed sequences of learned rules or principles to defined problems. | |
| T2E | Enabling objective - Intellectual skill - Higher order rules<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to apply unique combinations of learned rules or principles to ill-defined problems. | Problem solving, troubleshooting. |
| T2F | Enabling objective - Verbal information - Facts<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to recall rote information or facts. | |
| T2G | Enabling objective - Motor skill<br>Subordinate level learning objective. States the action, condition, behavior and standard expected of the learner to perform physical actions. | |
| T2H thru T2Z | Not available for projects | |
| T30 | Recall<br>Stimulus designed to aid learner in retrieving relevant information expected to be encoded in long-term memory to working memory for the purpose of aiding semantic meaning on the forthcoming technical information. | |

| LC | Definitions | Remarks |
|---|---|---|
| T31 | Analogy<br>A strategy for stimulating learner recall of previously learned content by stating similarities between attributes of the learned and to-be-learned content. | |
| T32 | Demonstration<br>A strategy for stimulating learner recall of previously learned content by showing the learner what will be accomplished and how the task is performed. | |
| T33 | Informative practice<br>A strategy for stimulating learner recall of previously learned content that provides the learner specific component knowledge (previously learned in parts) while performing a new task. | |
| T34 | Comparative organizer<br>A strategy for stimulating learner recall of previously learned content by generating a table or grid that lists the attributes, key points, etc of previously learned content and compares new content on the same attributes, key points, etc. | |
| T35 | Metaphoric device<br>A strategy for stimulating learner recall of previously learned content by referring to the to-be-learned content as if it were something else (usually something more familiar to the learner). | |
| T36 | Prerequisite concept review<br>A strategy for stimulating learner recall of previously learned content by engaging in a review type of event where the learner re-examines component concepts in context of a new or more advanced application for the root concepts. | |
| T37 | Question/problem<br>A strategy for stimulating learner recall where a question or problem relevant to the purpose of to-be-learned content is presented to the learner that requires the learner to apply previously learned content. | |
| T38 | Similar-task review<br>A strategy for stimulating learner recall of previously learned rules or procedures that have similar steps, tasks, or purposes as those found in the to-be-learned content. | |
| T39 thru T3Z | Not available for projects | |
| T40 | Content<br>A data module that contains the information intended for use in the learning event. It is training content that has been modified for instructional purpose from the authoritative technical source. This is the raw content and is often complemented with a T5x data module (Learning Guidance). | |
| T41 | Static content - Discrimination<br>Expositive, inactive media used to support the learner in developing the knowledge required to form a discrimination. | |

| LC | Definitions | Remarks |
|---|---|---|
| T42 | Static content - Fact<br>Expositive, inactive media used to provide the learner with specific facts to be learned. | |
| T43 | Static content - Concept<br>Expositive, inactive media used to provide the learner with examples and non-examples of concepts to be learned. | |
| T44 | Static content - Rule/principle<br>Expositive, inactive media used to provide the learner with a rule or principle to be learned. | |
| T45 | Static content - Procedure<br>Expositive, inactive media used to provide the learner with a procedure to be learned. | |
| T46 | Static content - Higher order rule<br>Expositive, inactive media used to provide the learner with an example of higher order rules to be learned. | |
| T47 | Static content - Processes<br>Expositive, inactive media used to provide the learner with a process to be learned. | |
| T48 | Animated content - Discrimination<br>Expositive, active animation or video used to provide the learner in developing the knowledge required to form a discrimination. | |
| T49 | Animated content - Fact<br>Expositive, active animation or video used to provide the learner with specific facts to be learned. | |
| T4A | Animated content - Concept<br>Expositive, active animation or video used to provide the learner with examples and non-examples of concepts to be learned. | |
| T4B | Animated content - Rule/Principle<br>Expositive, active animation or video used to provide the learner with a rule or principle to be learned. | |
| T4C | Animated content - Procedure<br>Expositive, active animation or video used to provide the learner with a procedure to be learned. | |
| T4D | Animated content - Higher order rule<br>Expositive, active animation or video used to provide the learner with an example of higher order rules to be learned. | |
| T4E | Animated content - Processes<br>Expositive, active animation or video used to provide the learner with a process to be learned. | |
| T4F | Interactive content - Discrimination<br>Exploratory interactive simulation, animation or video used to support the learner in developing the knowledge required to form a discrimination. | |

| LC | Definitions | Remarks |
|---|---|---|
| T4R | Interactive content - Fact<br>Exploratory interactive simulation, animation or video used to provide the learner with specific facts to be learned. | |
| T4G | Interactive content - Concept<br>Exploratory interactive simulation, animation or video used to provide the learner with examples and non-examples of concepts to be learned. | |
| T4H | Interactive content - Rule/Principle<br>Exploratory interactive simulation, animation or video used to provide the learner with a rule or principle to be learned. | |
| T4J | Interactive content - Procedure<br>Exploratory interactive simulation, animation or video used to provide the learner with a procedure to be learned. | |
| T4K | Interactive content - Higher order rule<br>Exploratory interactive simulation, animation or video used to provide the learner with an example of higher order rules to be learned. | |
| T4L | Interactive content - Processes<br>Exploratory interactive simulation, animation or video used to provide the learner with a process to be learned. | |
| T4M | Not available for projects | |
| thru<br>T4Z | | |
| T50 | Learner guidance<br>An instructional strategy designed to support the learner's internal process of encoding the information contained in a T4x (Content) data module. For example, this data module could contain a mnemonic device designed to help the learner encode the steps of a procedure contained in a T45 data module. | |
| T51 | Analogy<br>An instructional strategy for improving learner comprehension and encoding that uses the similarities in attributes between familiar and to-be-learned content. | |
| T52 | Metaphoric device<br>An instructional strategy for improving learner comprehension and encoding that uses a more familiar concept or schema and refers to it as if it were the to-be-learned content. For example, "Life is a box of chocolates." | |
| T53 | Drill and practice/informative practice<br>An instructional strategy for improving learner comprehension and encoding provides the learner specific component knowledge while practicing a new task. | |

| LC | Definitions | Remarks |
|---|---|---|
| T54 | Case study<br>An instructional strategy for improving learner comprehension and encoding that requires the leaner to respond to problems wrapped in the context of a realistic situation, by applying newly learned concepts, rules, principles, etc. | |
| T55 | Comparative organizer<br>An instructional strategy for improving learner comprehension and encoding that requires the learner to generate (or complete) a table or grid that lists the attributes, key points, etc of familiar content and compare them on the same attributes, key points, etc to the newly learned content. | |
| T56 | Concept map/trees<br>An instructional strategy for improving learner comprehension and encoding that uses a hierarchical or spidering representation of newly learned content for the learner to generate, complete or review. | |
| T57 | Demonstration<br>An instructional strategy for improving learner comprehension and encoding that presents to the learner the steps required to accomplish a task and how the steps are expected to be performed. | |
| T58 | Example/non-example<br>An instructional strategy for improving learner comprehension and encoding that provides the learner with an array of representative examples of the newly learned content simultaneously with counter-examples. | |
| T59 | Game<br>An instructional strategy for improving learner comprehension and encoding that places the newly learned content in a competitive format and scores the learner. (Note: Such scoring is usually in relation to the game, not the learning objective.) | |
| T5A | Mnemonic device<br>An instructional strategy for improving learner comprehension and encoding that provides the learner with a memory device that relates to the newly learned content to make it more memorable. For example, "Stalactites hold tight to the cave ceiling…" | |
| T5B | Problem solving<br>An instructional strategy for improving learner comprehension and encoding that requires the leaner to respond to a specific problem by applying newly learned concepts, rules, principles, etc. | |
| T5C | Simulation<br>An instructional strategy for improving learner comprehension and encoding that places the learner in an activity (possibly as a character) that mimics reality and allows the learner to complete tasks or solve problems as they would in the real world, by applying newly learned concepts, rules, principles, etc. | |

| LC | Definitions | Remarks |
|---|---|---|
| T5D | Story<br>An instructional strategy for improving learner comprehension and encoding that wraps newly learned content in the context of story (fictional or non-fictional) or anecdote. | |
| T5E thru T5Z | Not available for projects | |
| T60 | Performance<br>A practice exercise designed to ensure that the learner's encoding of information received from a T4x data module will be stable and lasting in long-term memory. This is often complemented with aT7x data module (Feedback). | |
| T61 | Drag-and-drop/matching exercise<br>A practice exercise data module that contains objects that the learner must match appropriately. | |
| T62 | Multiple-choice - Single select<br>A practice exercise data module that provides the learner with a question or statement, and then requires their response to be a selection of one item from a set of provided answers. | |
| T63 | Multiple-choice - Multi-select<br>A practice exercise data module that provides the learner with a question or statement, and then requires their response to be a selection of one or more items from a set of provided answers. | |
| T64 | Short answer free text<br>A practice exercise data module that provides the learner with a question or statement, and then requires their response to be the entry of a typed response in a blank field embedded in or following the question/statement. | |
| T65 | Simulation<br>A practice exercise module that provides the learner with in an activity that mimics reality and requires the learner to complete a task or solve a problem as they would in the real world. | |
| T66 | Game<br>A practice exercise data module that provides the learner with a competitive format and scores the learner in relation to the corresponding learning objective. | |
| T67 thru T6Z | Not available for projects | |
| T70 | Feedback<br>A data module containing the necessary information about the degree of correctness regarding a learner's response to a T6x data module. The content of this data module is designed to reinforce or adjust the learner's mental representation of the content being learned. | |

| LC | Definitions | Remarks |
|---|---|---|
| T71 | Knowledge of correct response<br>Data module used to inform the learner whether their response was correct or incorrect and provide explanatory information. Used for objectives providing discrimination, concept, rule, principle, or procedure learning. | |
| T72 | Knowledge of correct solution<br>Data module used to provide the learner with information relevant to their response. Learner uses this data module to determine their own correctness of response and possible changes in cognitive strategy. Used for objectives providing rule, principle, procedure, problem solving, or process learning. | |
| T73 | Knowledge of consequence<br>Data Module used to provide an example of consequence to the learner in relation to their response/action. Degree of correctness is inherent. Used for objectives providing rule, principle, procedure, problem solving, or process learning. | |
| T74 thru T7Z | Not available for projects | |
| T80 | Assessment<br>A test item designed to determine the learner's ability to retrieve and apply information from long-term memory to meet the standard set by a corresponding T2x (Objectives) data module. The purpose of this data module's content is to ensure the learner's capability is complete and stable. | |
| T81 | Drag-and-drop/matching exercise<br>An assessment data module that contains objects that the learner must match appropriately. | |
| T82 | Multiple-choice - Single select<br>An assessment data module that provides the learner with a question or statement, and then requires their response to be a selection of one item from a set of provided answers. | |
| T83 | Multiple-choice - Multi-select<br>An assessment data module that provides the learner with a question or statement, and then requires their response to be a selection of one or more items from a set of provided answers. | |
| T84 | Short answer free text<br>An assessment data module that provides the learner with a question or statement, and then requires their response to be the entry of a typed response in a blank field embedded in or following the question/statement. | |
| T85 | Simulation<br>An assessment data module that provides the learner with in an activity that mimics reality and requires the learner to complete a task or solve a problem as they would in the real world. | |

| LC | Definitions | Remarks |
|---|---|---|
| T86 | Game<br>An assessment data module that provides the learner with a competitive format and scores the learner in relation to the corresponding learning objective. | |
| T87 | Pre-test<br>An assessment data module that provides multiple, potentially varied, assessment types designed to evaluate a learner in relation to one or multiple corresponding learning objectives prior to exposure to the content. | |
| T88 | Post-test<br>An assessment data module that provides multiple, potentially varied, assessment types designed to evaluate a learner in relation to one or multiple corresponding learning objectives following exposure to the content. | |
| T89<br>thru<br>T8Z | Not available for projects | |
| T90 | Retention and transfer<br>A data module designed to provide more advanced or complex content, practice, or guidance than a learner originally experienced in a related T4x, T5x, or T6x data module. The purpose of this data module content is to reinforce the learner's retrieval ability of encoded information and increase likelihood of applying it to novel situations. | |
| T91 | Drill and practice/informative practice<br>A strategy for enhancing the retention and/or transfer of learned content by applying it to a task that varies in complexity and context from the initial learning task(s). Throughout the task, specific component knowledge is provided to the learner as reinforcement. | |
| T92 | Case study<br>A strategy for enhancing the retention and/or transfer of learned content that requires the leaner to respond to problems wrapped in the context of a realistic situation and apply learned concepts, rules, principles, etc to the problems. | |
| T93 | Comparative organizer<br>A strategy for enhancing the retention that requires the learner to generate (or complete) a table or grid that lists the attributes, key points, etc of familiar content and compare them on the same attributes, key points, etc to the learned content. | |
| T94 | Demonstration<br>A strategy for enhancing the retention and/or transfer of learned content that provides the learner a holistic view of the steps required to accomplish a task and how the steps are expected to be performed. | |

| LC | Definitions | Remarks |
|---|---|---|
| T95 | Example/non-example<br>A strategy for enhancing the retention and/or transfer of learned content that provides the learner with or requires the learner to generate an array of representative examples of learned content simultaneously with counter-examples. | |
| T96 | Game<br>A strategy for enhancing the retention and/or transfer of learned content by placing it in a competitive format and scores the learner in relation to the corresponding learning objectives. | |
| T97 | Problem solving<br>A strategy for enhancing the retention and/or transfer of learned content that requires the leaner to respond to a specific problem by applying learned concepts, rules, principles, etc. | |
| T98 | Simulation<br>A strategy for enhancing the retention and/or transfer of learned content that places the learner in an activity (possibly as a character) that mimics reality and allows the learner to complete tasks or solve problems, as they would in the real world, by applying learned concepts, rules, principles, etc. | |
| T99 | Story<br>A strategy for enhancing the retention and/or transfer of learned content by wrapping learned content in the cotext of story (fictional or non-fictional) or anecdote. | |
| T9A thru T9Z | Not available for projects | |

# Chapter 9

## *Terms and data dictionary*

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# Chapter 9.1

## *Terms and data dictionary - Introduction*

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## 1 General

This chapter gives a brief description of the main chapters that deal with information generation.

## 2 Content

A comprehensive terminology dictionary for terms used in this specification is given in Chap 9.2. The dictionary also includes a list of abbreviations and acronyms. These include all specific S1000D definitions, abbreviations and some basic abbreviations to be used when authoring data modules.

The content of the electronic Schema documentation is presented in Chap 9.3. The complete Schema documentation is downloadable for easy use off line. You can search for elements in a specific Schema or just for elements and attributes.

# Chapter 9.2

## *Terms and data dictionary - Glossary of terms, abbreviations and acronyms*

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# 1 General

## 1.1 Glossary of terms

| | |
|---|---|
| access illustration | An access illustration is a data module with one or more illustrations used to support the navigation of an interactive publication. |
| Aerospace Ground Equipment (AGE) | Refer to support equipment for generic definition. |
| airborne equipment | A component necessary in the air to operate the air vehicle. |
| air vehicle | A generic term for aircraft, airships, gliders, spacecraft, missiles etc. |
| applicability | The quality of a data module, or parts of the data module, in the CSDB of being relevant product attributes and conditions of the Product. |
| Applicability Cross-reference Table (ACT) | A cross-reference table which gives Product attribute definitions to be used by the project in applicability statements, together with links to the PCT and the CCT. |
| assembly | A number of items that are connected for a specified function. Refer to Fig 1. |
| business rule (BR) | A rule that has been applied by a project or an organization about how to a implement a particular aspect of S1000D and is normally the result of a business rule decision. |
| business rule decision | A decision that must be made by a project or an organization about how to a implement a particular aspect of S1000D. |
| business rules category | A unique grouping that describes rules applicable to product definition, maintenance philosophy, concepts of operation, security, business processes, data creation, data exchange, data integrity, data output and/or legacy data conversion, management, handling and other issues. |
| business rules layer | A level of stakeholders within the hierarchy to which the business rules apply. |

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|---|---|
| Commercial and Government Entity code (CAGE code) | The CAGE code is a unique identifier assigned to suppliers (to various government or defense agencies) as well as to government agencies themselves and also various organizations. CAGE codes provide a standardized method of identifying a given facility at a specific location. |
| Common Source Database (CSDB) | A "store" of data modules and associated information required to produce technical publications. |
| component | Any self-contained parts, combination of parts, subassemblies or units that do a specified function for the correct operation of a system. Equivalent term: Unit. Refer to Fig 1. |
| condition | A property other than a product attribute that has an affect on the applicability of data. Conditions differ from product attributes in that values of a condition are more likely to change throughout service life of a product instance or are often not tracked against a product instance. Conditions can be associated with the physical configuration of the Product, with maintenance conditions, with weather conditions or any other condition that has an affect on the applicability of data. |
| Conditions Cross-reference Table (CCT) | A cross-reference table which describes condition types that affect on the applicability of data and define the incorporation status for technical conditions. |
| SCORM Content Aggregation Model (SCORM CAM) | A learning-taxonomy neutral means for designers and implementers of instruction to aggregate learning resources for the purpose of delivering a desired learning experience to a LMS. |
| consumable | Supply required to maintain the Product. Eg oils, greases, locking wire. |
| content section | The second part of a data module containing text and illustrations. |
| customer | The individual or corporate identity using the Product and/or receiving post delivery services for such products. |
| database | A store for data modules. |
| Data Module (DM) | A self-contained unit of data for the description, operation, identification of parts or maintenance of the Product and its support equipment. The unit of data consists of an identification and status section and contents section and is produced in such a form that it can be input into and retrieved from, a database using the data module code as the identifier. |
| Data Module Code (DMC) | A 17 to 37 character alphanumeric code identifying the type and the applicability of the data in a data module and enabling it to be input into and retrieved from, a database. |
| Data Module code Extension (DME) | An extension to the DMC to uniquely identify multiple instances of a data module. |

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| disassembly code | The fourth (together with disassembly code variant) part of the data module code. Consists of 2 characters. Identifies the breakdown condition of an assembly to which information applies. Refer to Chap 4.3.4. |
| disassembly code variant | The fourth (together with disassembly code) part of the data module code. Consists of 1, 2 or 3 characters. Identifies alternative items of equipment or components differing slightly in design, but not enough to warrant a change of the system difference code. Refer to Chap 4.3.5. |
| document | A generic term used to describe the presentation of the content of one data module irrespective of the media of presentation or the content of specially created information for a paper publication (eg front matter). |
| Engineering Order (EO) | Equivalent to a service bulletin, except that the customer defines the "design change". The engineering order can be defined based on a manufacturer service bulletin or from scratch. |
| Enabling Learning Objective (ELO) | A statement in behavioral terms of what is expected of the student in demonstrating mastery at the knowledge and skill level necessary for achievement of a Terminal Learning Objective (TLO) or another ELO. |
| engine module number | The number allocated to an engine module. Modules are defined for engines of modular design and each module is a combination of assemblies, subassemblies and parts, contained in one package, or so arranged as to be installed in one maintenance action. |
| Electronic Performance Support System (EPSS) | A component of a software package or application in which training and educational information is embedded. An (EPSS) can include a tutorial, expert system and hypertext jumps to reference material. |
| equipment | The items necessary to operate, maintain the Product and its support equipment. Includes training items. |
| expendable | An item of supply required to maintain the Product. Eg O-rings, gaskets, tab washers. |
| figure | One or more illustration sheets and the figure reference line. The figure is the image (or view), which will be presented to the reader. |
| figure number | A sequential number given to a figure within a data module. |
| figure reference line | A line of text in a data module consisting of a figure number and, if necessary, a title. The figure reference line follows the last line of the text portion to which the figure relates. |
| Functional Check (FNC) | A quantitative check to determine if one or more functions of an item perform within the specified limits. |
| Functional item number (FIN) | A functional item number allows to uniquely identifying an item performing a function in a system at a given position. |

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| Hard Time (HT) | A primary maintenance process under which an item must be removed from service at or before a previously specified time. |
| identification and status section | The first part of a data module containing identification elements (DMC, title, issue number and date, etc) and status elements (applicability, technical standard, QA status, etc) for the management of the data module. |
| illustration | A graphical representation of hardware or a process. Includes diagrams, schematics, graphs and photographs. If the graphical presentation cannot be shown within a specified page image area, it can be divided into two or more illustration sheets. |
| illustration reproduction area | The illustration reproduction area is the area on the presentation media in which the graphic, diagrammatic, photograph, or photo-realistic computer generated images are placed. |
| illustration sheet | The visible presentation of an illustration, or part of an illustration, including its specified illustration reproduction area. Each illustration sheet has its own illustration control number. |
| ICN | A number (set of characters), which gives the address of an illustration sheet or a multimedia object in the CSDB store. |
| information code | The fifth (together with information code variant) part of the data module code. Consists of 3 characters. Identifies the type of information within a data module. Refer to Chap 4.3.6. |
| information code variant | The fifth (together with information code) part of the data module code. Consists of 1 character. Identifies any variation in the activity defined by the information code. Refer to Chap 4.3.7. |
| information set | The required information in a defined scope and depth (author view) in form of data modules managed in the CSDB. A project data module requirements list lists all required data modules for that project. |
| Interactive Electronic Technical Publication (IETP) | A set of information needed for the description, operation and maintenance of the Product, optimally arranged and formatted for interactive screen presentation to the end user on an electronic display system. IETP includes conditional branching mechanisms, which can be based on user feedback. Parameters are evaluated at run-time and their values can depend on context and specific user input. |
| item | Any level of an assembly (eg system, subsystem part, component, unit, tool). Refer to Fig 1. |
| item location code | The last part of the data module code. Consists of on character. Identifies the situation to which the information is applicable, eg where the maintenance task will be carried out in terms of a Product. Refer to Chap 4.3.8. |

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| Job Instruction (JI) | A detailed step-by-step procedure. Each special AGE, tool, software, consumable and material are referenced in the procedure at the applicable step. Their identification and coding if any, in the text and illustrations must be in accordance with the relevant information given in the content of the data module. Refer to Chap 3.9.5.2.3. |
| learn code | First optional code, after the ILC, that is applied only to Human Performance Technology (HPT) and training data modules for those projects that have a requirement to be SCORM conformant or wish to use the functionality brought about by the LC. It describes the type of HPT or training information that is in the content of the data module. Consists of two alphanumeric characters. Refer to Chap 4.3.9. |
| learn code event | Second optional code that is applied only to Human Performance Technology (HPT) or training data modules for those projects that have a requirement to be SCORM conformant or wish to use the functionality brought about by the LEC. Defines which branch of the learning schema is used. Consists of one alpha character. Refer to Chap 4.3.10. |
| Learning Management System (LMS) | A software application or Web-based technology used to plan, implement and assess a specific learning process. |
| line check | A routine check, inspection and malfunction rectification performed at en-route and base stations during transit, turn-around or night stop. |
| Line Replaceable Unit (LRU) | An item, which can be readily changed on the Product during line maintenance operation. |
| Logistic Support Analysis (LSA) | The selective application of scientific and engineering efforts undertaken during the development process, as part of the system engineering and design process, to assist in complying with supportability and other Integrated Logistic Support activities. This is achieved by the use of eg MIL-STD-1388 employing a repetitive process of definition, synthesis, trade-off, test and evaluation. |
| maintenance | The servicing and/or the repair of the Product, its support and training equipment to keep it serviceable. |
| maintenance task | Start-to-finish, step-by-step, procedural data arranged in a logical sequence to do maintenance. |
| manufacturing batch number | The sequential number allocated by the manufacturer to an individual manufacturing batch or production lot of the Product. |
| manufacturing part number | A combination of characters assigned by the manufacturer to identify, without ambiguity, an item manufactured to a certain specification. |

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| manufacturing serial number | The manufacturer assigned sequential number identifying the individual manufactured part by its rank in the series production batch of equal parts having identical part numbers. |
| material | A supply required to maintain the Product. Eg gasket sheet, sheet metal, plastic, copper. |
| materiel | Items used in the process to produce a Product. Eg parts, equipments. |
| Materiel Item Category Code (MICC) | This is an optional code applied in front of the SNS to identify which SNS is being used. |
| modification - Mod | A "design change" defined by the manufacturer and implemented (embodied) before or after product delivery. |
| model | The second level of identity. The unique designation given to the Product sub-type. |
| Model Identification code (MI code) | The first part (2 to 14 characters) of the data module code. Identifies the Product to which the data applies. The code is allocated by NAMSA and is used to identify the Product. Refer to Chap 4.3.1. |
| multimedia | A generic term referring to any combination of integrated digital media, such as sound, video, animation, graphics or text, hyperlinked from within an electronic document or software presentation or product. |
| munitions | A general term covering bombs, fuses, missiles, rockets, pyrotechnics, launchers, dispensers and items such as impulse cartridge jettison charges, training items, ammunitions and other inventory items considered similar or relative to munitions, including accessories which have been pre-loaded. |
| NATO/National Stock Number (NSN) | The unique identification of an item of supply by a number assigned by the national codification bureau to each approved item identification. |
| On Condition (OC) | An item that is maintained on condition and is not subjected to a limit whatsoever. |
| Operational Check (OPC) | A task to determine that an item is fulfilling its intended purpose. The check does not require quantitative tolerances. This is a failure finding task. |
| Operation Limit (OTL) | This is the maximum time to change or repair at O- or I-level that an item can operate. |
| organization | An administrative or functional structure (such as a business or a government body) implementing an S1000D project. |
| page image area | The page image area is the area on the presentation media other than the header and footer in which information can be placed. |
| part | An item of Product, forming part of an assembly or subassembly, which is not normally broken down further. Refer to Fig 1. |

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| post engineering modification | The configuration or build standard of the Product after a particular engineering modification is incorporated. |
| post service bulletin | The configuration or build standard of the Product after a particular service bulletin requirement is incorporated. |
| pre engineering modification | The configuration or build standard of the Product before a particular engineering modification is incorporated. |
| pre service bulletin | The configuration or build standard of the Product before a particular service bulletin requirement is incorporated. |
| product, the Product | Any platform, system or equipment (air, sea, land vehicle, equipment or facilities, civil or military).<br>The term the Product is used in this specification to mean platforms, systems, subsystems, sub-subsystems, assemblies, equipment, LRU, components, parts etc. |
| product attribute | A property of the Product that can affect the applicability of technical data. Product attributes are properties of the Product that are typically set at the time of manufacture of a product instance and will usually not change throughout the service life of a product instance. Examples of product attributes are model, series and serial number. |
| Product Cross-reference Table (PCT) | A cross-reference table which identifies the product instances and the values for product attributes and conditions for each product instance. |
| product instance | A single physical occurrence of the Product. |
| project | The task to develop, maintain and dispose of the Product. |
| publication | A generic term used to describe the presentation of a set of data modules, which have been arranged to make an eg publication, checklist, guide, catalogue etc on a particular subject, irrespective of the media of presentation (eg paper or screen).<br>The compilation and publishing of information for a customer. This can be an IETP, a paper publication compiled from DMs or a publication containing legacy data. The List of Applicable Publications (LOAP) lists the required publications for a customer project.<br>Refer to Publication Module. |
| Publication Module (PM) | The publication module defines the content (references to data modules, other publication modules or legacy data) of a publication and its structure. Uses the publication module code as the identifier. Refer to Chap 4.9.1. |
| Publication Module Code (PMC) | A 12 to 24 character standardized and structured identifier of a publication module or a final deliverable publication. Refer to Chap 4.9.2. |

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|---|---|
| repository-dependent data module | The delivery of the technical information repository data modules and the data modules to the customer or end-user (or an IETP application). The customer, end-user or the IETP has to resolve any links before use or during use of the IETP viewer/browser.<br>Refer to also Self-standing data modules. |
| SCORM Content Package Code (SCPC) | The SCORM content package code is the standardized and structured identifier of a S1000D SCORM content package or a final learning deliverable in S1000D. |
| self-contained data module | A self-standing data module ready to be delivered for use to the customer or end-user. For projects that use repositories, all links from repository data modules are resolved and the data module is in a form that is ready to be delivered to the customer or end-user.<br>Refer to Repository-dependent data modules. |
| Service Bulletin (SB) | A "design change" defined by the manufacturer but implemented (applied) after product delivery to the customer. Service bulletins are applied on already delivered Product. Refer to Chap 5.2.1.16. |
| servicing | Any act of replenishment for the purpose of maintaining the inherent design operating capabilities of an item. |
| Since Last Maintenance (SLM) | This is the time elapsed to next same maintenance task. Eg borescope check of the engine each 200 hours of operation. |
| software program edition | The identification allocated to a software program or a combination of software programs, which identifies it as to its purpose and relates it to a certain level of development. |
| Shop Replaceable Unit (SRU) | An item, which can be only changed at shop level. |
| Standard Numbering System (SNS) | The third part of the data module code. Consists of three groups of characters. Intended to provide standardization in the arrangement or addressing of the Product. Refer to Chap 4.3.3. |
| store | A generic term covering non-munitions items carried externally on or internally in the Product such as fuel tanks, reconnaissance pods, chaff and flares dispensers, transportation pods, missile warning system pods. |
| subassembly | An assembly, which is part of a larger assembly. Refer to Fig 1. |
| subsystem | A major functional part of a system, which contributes to operational completeness of a system. Refer to Fig 1. |
| supplies | Consumables, material and expendables required to maintain the Product. |
| support equipment | An item of equipment required to maintain the Product in its operational status, including related computer programs. Includes special tools (refer to tool, special). |

| | |
|---|---|
| system | A combination of inter-related items arranged to perform a specific function. Refer to Fig 1. |
| system difference code | The second part (2 to 4 characters) of the data module code. Identifies alternative versions of the system and subsystem/sub-subsystem identified by the SNS without affecting the type, model or variant identity. Refer to Chap 4.3.2. |
| Time Between Overhaul (TBO) | The maximum interval that the subject part is permitted to operate between scheduled overhauls. The interval as qualified by the time/cycle code is expressed as unit flight hours, operating cycles or aircraft landing cycles. |
| tool, common | A general term covering those general hand tools such as screwdrivers, spanners, pliers, etc which do not require special identification. As a general rule, such tools form part of a typical tradesman's toolkit. |
| tool, special | A general term covering those hand tools or other devices which have been manufactured specifically to enable the tradesman to correctly accomplish a given action, task or procedure. Such tools must be positively identified (usually by Part No. or other identifying code). |
| Training Equipment (TE) | The equipment necessary to train personnel on how to operate and maintain the Product and its support equipment. |
| Training Needs Analysis (TNA) | An analysis of the occupational and industrial training requirements both quantitatively and qualitatively in a particular cluster of occupations. |
| Terminal Learning Objective (TLO) | A statement of the instructor's expectations of student performance at the end a specific lesson or unit. |
| type | This is the first or highest level of identity. The unique designation given to the Product on the type certificate.<br>**Note**<br>Type can be subdivided into Model (second level of identity) and Version (third level of identity). |
| unit | A component that normally does one function. |
| version | This is the third level of identity. The unique designation given to a sub-model of the Product. |
| version rank | The manufacturer assigned number identifying the Product for a specific customer. |
| Work Sheet (WS) | Chronological sequence of instructions, JI and/or WS, necessary to perform a complex work on an assembly, a component, etc. |

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*Fig 1 Relationship of the breakdown of the Product*

## 1.2 Abbreviations and acronyms

### 1.2.1 General

When there is doubt whether an abbreviation or acronym will be understood or whenever there is ample space to write in full, the term must be written out rather than abbreviated. Refer to Chap 3.9.1.

### 1.2.2 Word combination - Acronym

Abbreviations for word combinations, acronyms, must be used as such and not separated for use singly, unless authorized singly.

Single abbreviations can be combined when necessary if there is no abbreviation listed for the combination.

### 1.2.3 Tense and number

The same abbreviation must be used for all tenses, possessive cases, singular and plural forms of a given word.

### 1.2.4 Abbreviation and acronym list

| | |
|---|---|
| AC | Alternating Current |
| ACCP | Air vehicle Corrosion Control Publication |
| ACLP | Air vehicle Cargo Loading Publication |
| ACRW | Aircrew (information set) |
| ACRWP | Aircrew Publication |
| ACSP | Air vehicle Cross Servicing Publication |
| ACT | Applicability Cross-reference Table |
| ADF | Automatic Direction Finding |
| ADL | Advanced Distributed Learning |
| AECMA | The European Association of Aerospace Industries. AECMA has since April 2004 changed its name to ASD. Refer to ASD. |
| AFIP | Air vehicle Fault Isolation Publication |
| AIA | Aerospace Industries Association of America |
| AIP | Air vehicle Inspection Publication |
| AM | Amplitude Modulation |
| AMBP | Air vehicle Mass and Balance Publication |
| AMP | Air vehicle Maintenance Publication |
| ANA | Air Force - Navy Aeronautical |
| ANDTP | Air vehicle Non Destructive Testing Publication |
| A/PC | Agency/Partner Company |
| Apr | April |
| ARCP | Air vehicle Role Change Publication |
| ARP | Air vehicle Recovery Publication |

| | |
|---|---|
| ACSG | Air vehicle Cross Servicing Guide (information set) |
| ASD | AeroSpace and Defence Industries Association of Europe |
| ASDP | Air vehicle Schematic Diagrams Publication |
| ASP/AS | Air vehicle Storage Publication |
| ASLP | Air vehicle Stores Loading Publication |
| ASR | Air vehicle Structure Repair (information set) |
| ASRP | Air vehicle Structure Repair Publication |
| ATA | Air Transport Association of America |
| ATECMA | Agrupación Technica Española de Constructores de Material Aerospacial (of Spain) |
| Aug | August |
| AWDP | Air vehicle Wiring Data Publication |
| AWLP | Air vehicle Weapon Loading Publication |
| BDAR | Battle Damage Assessment and Repair (information set) |
| BS | British Standard |
| BR | Business Rule |
| BREX | Business Rules EXchange (data module) |
| CAGE Code | Commercial And Government Entity Code (refer to NCAGE Code) |
| CALS | Continuous Acquisition and Life-cycle Support |
| CAM | Content Aggregation Model |
| CC | Corrosion Control (information set) |
| CCITT4 | Comité Consultatif International Téléphonique et Télégraphique Groupe 4 |
| CCT | Conditions Cross-reference Table |
| CID | Common Information and Data (information set) |
| CIDP | Common Information and Data Publication |
| c.g. | centre of gravity |
| CGM | Computer Graphics Metafile |
| Chap | Chapter |
| CL | Cargo Loading (information set) |
| CM | Component Maintenance (information set) |
| CMS | Central Maintenance System |
| CMP | Component Maintenance Publications |
| CPF | Change Proposal Form |

| | |
|---|---|
| CPSC | Customer and Product Support Committee (of ASD) |
| CR | Change Record |
| CRT | Cathode Ray Tube |
| CSDB | Common Source DataBase |
| CSL | CSDB Status List |
| CSN | Catalogue Sequence Number |
| C-W | Continuous Wave |
| DC | Direct Current |
| DCAS | Digital Core Avionic System |
| DDN | Data Dispatch Note |
| Dec | December |
| DEF STAN | Defence Standard (UK MOD) |
| deg | degree |
| DM | Data Module |
| DMC | Data Module Code |
| DME | Distance Measuring Equipment |
| DME | Data Module code Extension |
| DML | Data Module List |
| DMRL | Data Module Requirement List |
| dpi | dots per inch |
| D&O | Description and Operation |
| EBMP | Engine Base Maintenance Publication |
| ECU | Engine Change Unit |
| eg | For example |
| EDMP | Engine Depot Maintenance Publication |
| EHF | Extra High Frequency |
| EO | Engineering Order |
| EPWG | Electronic Publications Working Group |
| ESM | Engine Shop Maintenance (information set) |
| ES | Engine Shop (information set) |
| ESP (1) | Engine Shop Publication |
| ESP (2) | Engine Standard Practices (information set) |
| ESPP | Engine Standard Practices Publication |

| | |
|---|---|
| ETP | Electronic Technical Publication |
| etc | and others, especially of the same kind |
| Feb | February |
| FI | Fault Isolation |
| FIN | Functional Item Number |
| Fig | Figure |
| FNC | Functional Check |
| FM | Frequency Modulation |
| FWD | Forward |
| HF | High Frequency |
| HLT | Highlight |
| HQ | Headquarters |
| HT | Hard Time |
| HTML | HyperText Markup Language |
| IATA | International Air Transport Association |
| ICCAIA | International Coordinating Council of Aerospace Industries Associations |
| ICN | Information Control Number |
| ie | that is (id est se) |
| IETP | Interactive Electronic Technical Publication |
| IFF | Identification Friend or Foe |
| IFR | In-Flight Refueling |
| ILS | Instrument Landing System<br>Integrated Logistic Support |
| in. | inch |
| IPC | Illustrated Parts Catalog |
| IPD | Illustrated Parts Data (Information set) |
| IPP | Initial Provisioning Project |
| IPPN | Initial Provisioning Project Number |
| IPR | In-Process Review |
| ISN | Item Sequence Number |
| ISO | International Standards Organization |
| ITE | Illustrated Tool and Equipment (information set) |
| ITEP | Illustrated Tool and Equipment Publication |

| | |
|---|---|
| Jan | January |
| JPEG | Joint Photographic Experts Group |
| JI | Job Instruction |
| Jul | July |
| Jun | June |
| LF | Low Frequency |
| LH | Left Hand |
| LMS | Learning Management System |
| LOA | List of Abbreviations |
| LOAP | List of Applicable Publications |
| LOASD | List of Applicable Specifications and Documentation |
| LOEDM | List Of Effective Data Module |
| LOEP | List of Effective Pages |
| LOI | List of Illustrations |
| LOM | Learning Object Model |
| LORAN | Long Range Navigation |
| LOS | List of Symbols |
| LOT | List of Terms |
| LOX | Liquid Oxygen |
| LRU | Line Replaceable Unit |
| LSA | Logistic Support Analysis |
| MAC | Mean Aerodynamic Chord |
| Mar | March |
| May | May |
| MB | Mass and Balance (information set) |
| MCR | Maintenance Steering Group |
| MD | Materiel Data (information set) |
| MDP | Material Data Publication |
| MI | Model Identification |
| MICC | Materiel Item Category Code |
| mm | millimeter |
| Mk | Mark |
| Mod | Modification |

| | |
|---|---|
| MoD | Ministry of Defence |
| MP | Maintenance Planning (Information set) |
| MSG | Maintenance Steering Group (Refer to Chap 2.2) |
| NATO | North Atlantic Treaty Organization |
| NDT | Non-Destructive Testing |
| No. | Number |
| Nov | November |
| NSN | NATO/National Stock Number |
| OC | On Condition |
| Oct | October |
| OPC | Operational Check |
| OS | Output Specification |
| OTL | Operational Limit |
| PA | Passenger Address |
| Para | Paragraph |
| PCT | Product Cross-reference Table |
| PDF (pdf) | Portable Document Format |
| PI | Parts Identifier |
| PLCS | Product LifeCycle Support (ISO 10303 AP 239. Refer to Chap 2.2) |
| PM | Publication Module |
| PMC | Publication Module Code |
| PMCS | Preventive Maintenance Checks and Services |
| PPB | Power Plant Build-up (information set) |
| PPBP | Power Plant Build-up Publication |
| pt | Point, a typographical term for a unit of measure which is equivalent to 1/72 of an inch. |
| QA | Quality Assurance |
| Qty | Quantity |
| R | Recovery (information set) |
| RC | Role Change (information set) |
| RCM | Reliability Centered Maintenance |
| RH | Right Hand |
| RPC | Responsible Partner Company |
| RPM | Revolutions per Minute |

| | |
|---|---|
| S | Storage (information set) |
| SB | Service Bulletin |
| SCO | Sharable Content Object |
| SCORM | Sharable Content Object Reference Model |
| SD | Schematic Diagrams |
| SE | Support Equipment (information set) |
| Sep | September |
| SHET | S1000D Heavy Email Traffic |
| SHF | Super High Frequency |
| SI | Système International d'Unites |
| SL | Stores Loading (information set) |
| SLM | Since Last Maintenance |
| SMC | SCORM Content Package code |
| SN | Serial Number |
| SNS | Standard Numbering System |
| SR | Structural Repair (information set) |
| SRU | Shop Replaceable Unit |
| STE | Simplified Technical English® (ASD-STE100) |
| SWR | Standing Wave Ratio |
| TBD | To Be Determined |
| TBO | Time Between Overhaul |
| TE | Training Equipment (information set) |
| TEP | Training Equipment Publication |
| TIFF | Tagged Image File Format |
| TOC | Table of Contents |
| thru | up to and including |
| TPSMG | Technical Publications Specification Maintenance Group (of ASD/AIA/ATA) |
| TSR | Technical Standard Record |
| UHF | Ultra High Frequency |
| US | The United States |
| VHF | Very High Frequency |
| VLF | Very Low Frequency |
| VOR | VHF Omni directional and Radio Range |

| | |
|---|---|
| W | Wiring |
| WD | Wiring Data (information set) |
| WDD | Wiring Data Description |
| WP | Wiring Publication |
| WL | Weapon Loading (information set) |
| WS | Work Sheet |
| XML | Extensible Markup Language |
| XSL | Extensible Stylesheet Language |

# Chapter 9.3

## *Terms and data dictionary - Data dictionary*

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| Chap 3.9.5 | Authoring - Data modules |

## 1 General

Descriptions of all element types declared within all the S1000D Schema are available on the S1000D web site on www.s1000d.org.

## 2 Data dictionary

The complete Schema documentation is downloadable for easy use offline. You can search for elements in a specific Schema or just for an element. The following information can be found:

- **element** gives the name of an element within the start-tag delimiters (as it would be used within the data module instance)
- **group** gives the name of an element group (element groups do not appear within a data module instance)
- **complexType** gives the name of a complex type (complex types are used for schema management and do not appear within a data module instance)
- **simpleType** gives the name of a simple type (simple types are used for schema management and do not appear within a data module instance)
- **attributeGroup** gives the name of an attribute group (attribute groups do not appear within a data module instance)
- **diagram** gives a graphical representation of the content of an element, group, complexType, simpleType, or attributeGroup using symbols as defined in Chap 3.9.5
- **namespace** gives the namespace of an element, simpleType, or attributeGroup which is defined outside of the S1000D namespace
- **type** gives whether an element is a simpleType or complexType

- **properties** gives information about the element, simpleType or complexType such as whether mixed content is allowed, the base type, and whether simple or complex content is allowed
- **children** gives the list of elements contained by this element, group, or complexType
- **used by** gives the list of elements, groups, complexTypes and attributes containing this element, group, complexType, simpleType, or attributeGroup
- **attributes** gives the list of attributes contained by this element further divided into the following fields:
  - **Name** gives the name of the element
  - **Type** gives the simpleType of the attribute
  - **Use** gives the cardinality of the attribute
    - No value indicates the attribute is optional
    - **required** indicates the attribute is required
  - **Default** gives a default value for the attribute which can be overridden
  - **Fixed** gives a value for the attribute which can not be overridden
  - **Annotation** is not used
- **facets** gives any restrictions on the content of an element or simpleType expressed as a pattern of allowable values
- **source** gives the schema fragment defining this element, group, complexType, simpleType, or attributeGroup

The HyperText Markup Language (HTML) Schema documentation can be found at www.s1000d.org.