ATA Spec 2000
Chapter 9

Automated Identification and Data Capture

Revision 2020.1

ATA e-BUSINESS PROGRAM

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Highlights

Release History

Revision 2016.1 – Last version of Chapter 9 with RFID release

Revision 2016.1 – divided specification into separate volumes related to different business functions – prior revisions to Chapter 9 were part of the consolidated Spec 2000 document.

Changes Incorporated

Revision 2020.1

CR #	Description
CR-2020-62_RFID	· Multiple changes to Section 9-5, appendices. See RFID 9-5 revision highlights for details.

How to Implement

Implementation of SPEC2000 is most feasible by chapter or, in some cases, by parts of a chapter. Since the majority of the chapters describe information exchange formats between companies, you should work with your trading partners on what parts of the specification to implement.

Implementation of many chapters is facilitated by the use of software provided by third parties, or often as a part of internal ERP or Maintenance Planning or Material Management software. Often times the majority of the information being exchanged already exists within a company's systems, and the main part of implementation involves mapping the data to formats described in the chapters.

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For more information about maintenance of the specification, contact:

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Chapter 9. Automated Identification and Data Capture

9-1. Introduction

Note:	In 2020 section 9-5, RFID as well as related appendices were completely reorganized. Additionally, although there are no relevant content changes in the other sections of chapter 9, the visual format of the section numbering, as well as the numbering of the figures has been modified. Finally, the appendices are renumbered from 11, 12, 13 to A, B, C

Accuracy of information exchanged within the aviation industry can be improved by using methods other than manual keying. Alternatives utilize machine-readable code, as exemplified by bar code or radio frequency identification (RFID).

Automated identification technologies provide an accurate, easy, and inexpensive method of data storage and data entry for computerized information management systems.

Establishment of a common set of specifications provides the base on which to build specific requirements for the exchange of supply information. The ATA Common Support Data Dictionary [CSDD] provides the strong foundation by which electronic business may be conducted by more than 1,000 companies worldwide. In addition, the definition of a permanent, 'cradle-to-grave', 'Social Security' number for expensive serialized parts opens the door for expanded business functions between trading partners that was not possible before.

9-1-1. Policy

The aviation industry designates specific bar code symbologies and RFID standards which are detailed in the respective sections of this chapter. Use of automated identification technologies should be a cooperative effort by trading partners within the industry to achieve improved data accuracy and productivity while reducing cost.

9-1-2. Purpose

To define the applications for automated identification technologies within the material management activities in the airline industry.

In order that automated processes may be used RFID offers additional capabilities. Examples are not requiring line-of-sight and facilitates the changing of encoded data.

This specification defines standard data and formats for the identification of both new and in-service parts.

9-1-3. Guidelines

1. Bar Coding

The bar code symbologies used in this specification should be in accordance with Association for Automatic Identification and Mobility [AIM] Uniform Symbology specifications. The print quality should be in accordance with the American National Standards Institute (ANSI) Bar Code Print Quality - Guideline ANSI X3.182-1990 (R1995) with a minimum Grade C print quality. An ANSI print quality grade of 'C' is the minimum acceptable standard.

When using the Data Matrix symbology, both the square and rectangular formats are acceptable. The Data Matrix Error Correction Code 200 (ECC200), specified by [AIM] is the only acceptable version. When using Data Matrix for marking parts, the Direct Part Mark (DPM) quality ratings shall comply with the 2D Data Matrix Requirements for Part Marking, Aerospace Series - Quality Management Systems, published by the International Aerospace Quality Group (IAQG): Document # AS 9132 (America), Document # SJAQ 9132 (Asia), Document # ENO 9132 (Europe).

When using the PDF417 symbology, character encoding, error correction, etc. are to follow the standards set forth in International Organization for Standards ISO 15438.

Only valid characters, defined as part of the bar code character set and the ATA CSDD should be used.

2. Radio Frequency Identification

The RFID standards used in this specification should be in accordance with ISO 14443 and/or ISO 15693 and/or ISO 18000.

9-1-4. Data Text

Human readable text shall be printed above, below, or adjacent to the printed bar code symbols or RFID tag subject to technical constraints.

The interpretation of the pertinent encoded data shall be presented in a human-readable font. The data text is intended to be used only for human recognition and is not intended to be machine readable.

9-1-5. Bar Code Representation in This Document

All bar code symbols shown in this chapter are representative illustrations of bar code only and are not valid for actual reading or technical verification.

9-2. Customer Receipt Process - Bar Coding

9-2-1. Command Code

Not Applicable

1. Purpose

In order for customers to utilize automated processes in their receiving function, suppliers are to provide Code 39 or Code 128 linear bar coding, 2D Data Matrix bar coding or PDF417 bar coding on the document/label/tag for a shipment item (Internal) and a label for the box (External). If multiple items are contained in one box, there will be a bar coded document/label/tag for each item contained within the box.

The bar coded data will consist of a Text Element Identifier (TEI) containing three characters with a space position. For 2D Data Matrix and PDF417 symbologies a slash delimiter is used between the data fields.

The bar coded statement will contain an asterisk (*) prior to, and at the end of the statement. The asterisk (*) is the defined 3 of 9 start and stop character. The Text Element Identifier (TEI) will be included in the data.

2. Input Contents and Sequence

Not required as this bar coded statement is generated by the supplier.

3. Output Contents and Sequence - External

1. Supplier Code (SPL)
2. Master Carton Number (BOX)
3. + Customer Order Number (CPO)
4. + Part Number (PNR)
5. + Shipment Quantity (SHQ)
6. + Unit of Measure Code (UNT)
7. + Packing Sheet Number (PSN)
8. +NATO Stock Number (NSN)

+ Indicates conditional data elements

4. Output Contents and Sequence - Internal

1. Customer Order Number (CPO)
2. Part Number (PNR)
3. Shipment Quantity (SHQ)
4. Unit of Measure Code (UNT)
5. + Supplier Code (SPL)
6. + Part Serial Number (SER)
7. + Manufacture Date (DMF)
8. + Hazardous Material Code (HAZ)

9. + Packing Sheet Number (PSN)
10. + Master Carton Number (BOX)
11. + Expiration Date (EXP)
12. + Shelf Life Code (SLC)
13. + Point of Use Location Name (POU)
14. +NATO Stock Number (NSN)

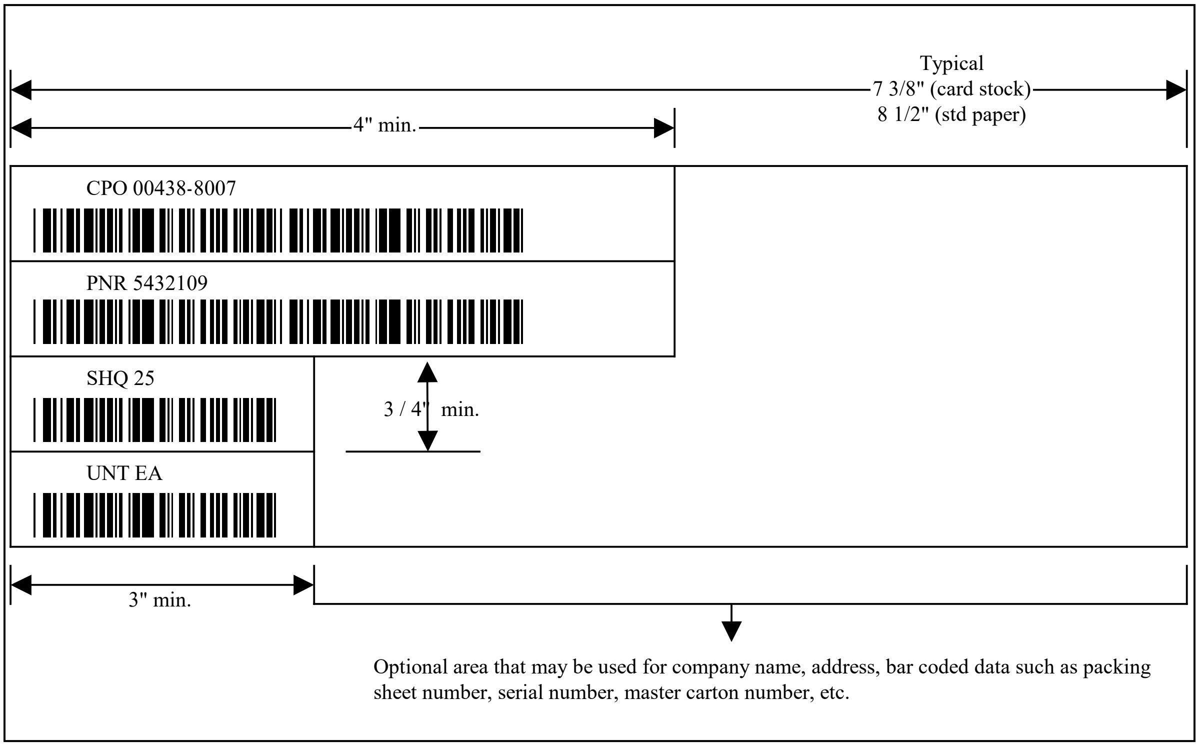
\+ Indicates conditional data elements

5. Remarks

For Shelf Life Limited items, Expiration Date (EXP) or Shelf Life Code (SLC) and Manufacture Date (DMF) can be used, if available.

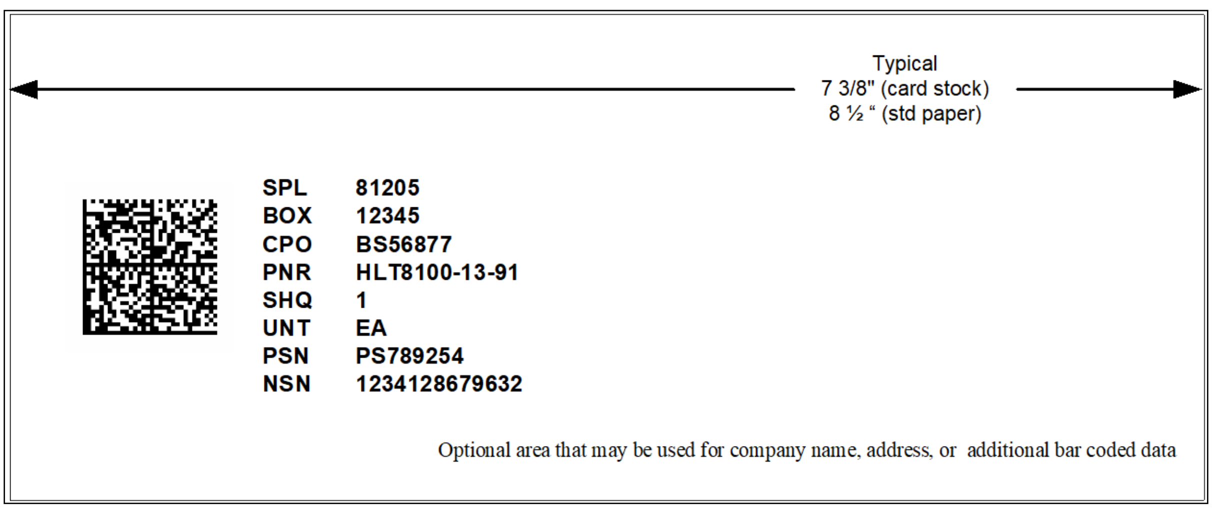
9-2-2. Supporting Technical Information - Receipt Process

Figure 1 – Example of Internal Customer Receiving Tag – Linear Bar Code



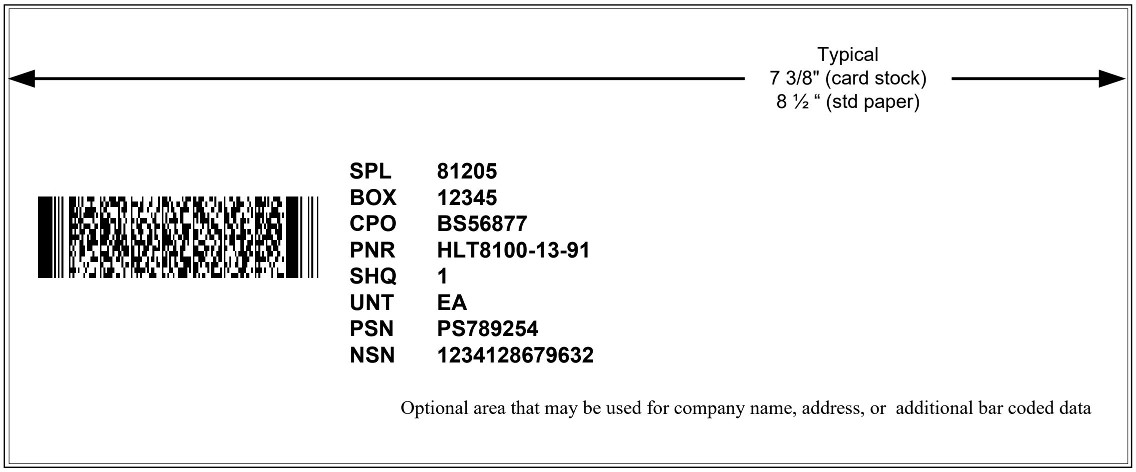
Note:	Border lines around bar code examples are for label sizing purposes and are not required. This linear bar code example shows only the mandatory data fields.

Figure 2 - Example of Internal Customer Receiving Tag - 2D Data Matrix



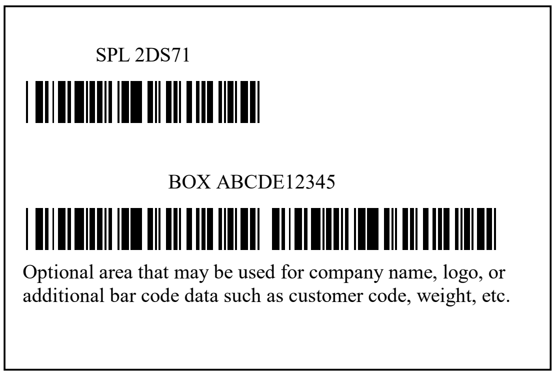
Note:	Border lines around bar code examples are for label sizing purposes and are not required. This 2D Data Matrix example shows use of conditional elements.

Figure 3 - Example of Internal Customer Receiving Tag - PDF417



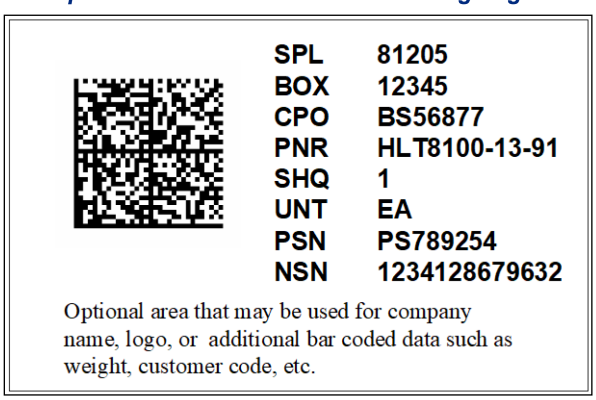
Note:	Border lines around bar code examples are for label sizing purposes and are not required. This PDF417 example shows use of conditional elements.

Figure 4 – Example of External Customer Receiving Tag - Linear Bar Code



Note:	Border lines around bar code examples are for label sizing purposes and are not required. This linear bar code example shows only the mandatory data fields.

Figure 5 – Example of External Customer Receiving Tag - 2D Data Matrix



Note:	Border lines around bar code examples are for label sizing purposes and are not required. This 2D Data Matrix example shows use of conditional elements.

Figure 6 – Example of Internal Customer Receiving Tag - PDF417

SPL	81205
BOX	12345
CPO	BS56877
PNR	HLT8100-13-91
SHQ	1
UNT	EA
PSN	PS789254
NSN	1234128679632

Optional area that may be used for company name, logo, or additional bar coded data such as weight, customer code, etc.

Note:	Border lines around bar code examples are for label sizing purposes and are not required. This PDF417 example shows use of conditional elements.

9-2-3. Explanation of Bar Coded Customer Receiving Tag

1. Bar code symbology should be linear Code 39, linear Code 128, 2D Data Matrix or PDF417. All bar codes should be medium density and meet existing ATA bar code specifications contained in this document. The medium density is meant to allow your Customers to read these bar code with standard bar code equipment.

2. Linear bar codes should be approximately 0.4 inches high, plus minimum 0.1 inch high human readable characters printed directly above or below the bar code symbol.

   2D Data Matrix bar codes should be approximately 3/4 in. square, but may vary depending upon size of content. Likewise, PDF417 will vary depending upon content size. The human readable characters accompanying 2D Data Matrix and PDF417 are also minimum 0.1 inch (10 point type) printed next to, but not touching, the bar code.

3. To enable the machine readable (bar) code to be properly identified, a Text Element Identifier (TEI) will immediately precede and be a part of the data being read. 2D Data Matrix and PDF417 bar codes have slash delimiters separating the data fields. The TEIs used are listed in 9-2-1.3 and 9-2-1.4.

Note:	SPEC2000 TEI's are four characters in length, consisting of 3 alphabetic characters followed by a space. This linear bar code example shows only the mandatory data fields.

4. The Text Element Identifiers (TEI) will be displayed in the human readable characters that are printed with the text of the bar code. If this TEI code is not desired in the receiving company's data, the application program will have to strip off the characters and retain only the number. The start/stop characters and slash delimiters will not be displayed since they are not part of the data.

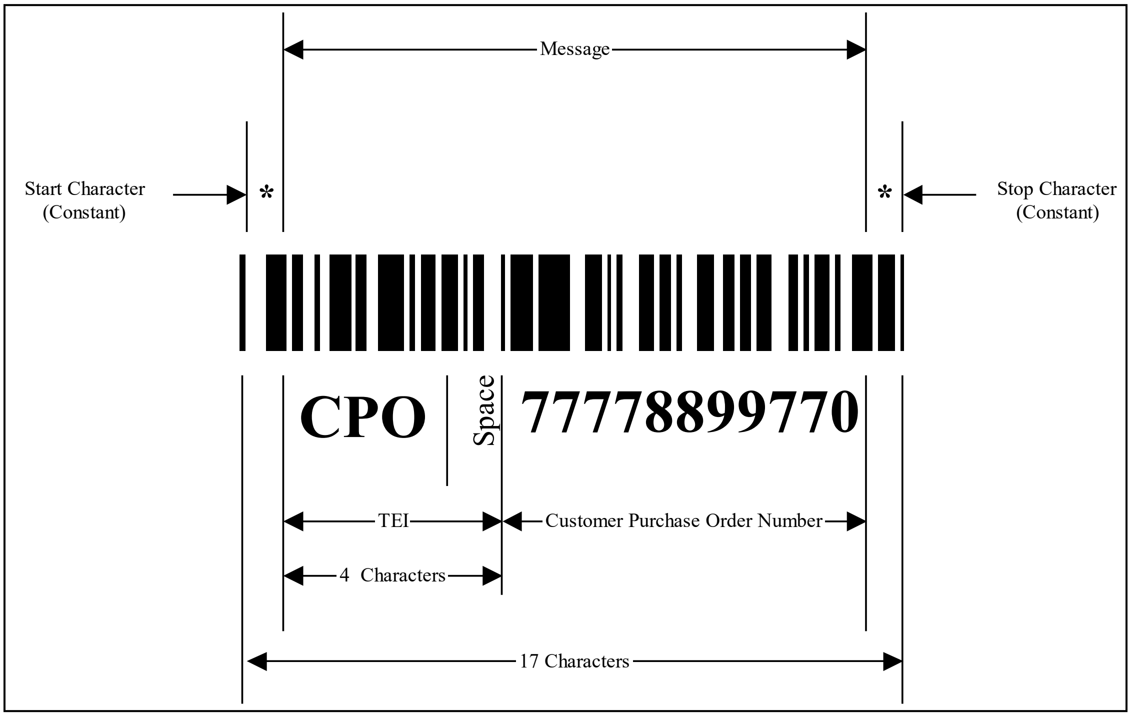
5. On the internal linear receiving tag, an area approximately 4" wide by 3" high is reserved for the bar code information Figure 1. The four required items shown in 9-2-1.4 are listed adjacent to the bar code area with the minimum lengths for linear shown (minimum 4" for Part and Order Number; minimum 3" for Quantity and Units). The bar code area may be larger than 4" x 3" and located anywhere on the shipping document, as long as the four mandatory bar codes are obvious.

6. In addition to the aforementioned required information, the rest of the document may contain company logos, names, free-form alpha descriptions of the part, or other data that meets your business needs.

7. When a supplier prints a bar coded field, and the data contained in the field is less than the maximum length, only the actual data element is to be bar coded. Do not include any tab character or fill the field with blanks to make the field the maximum length. It is the responsibility of the receiving system to determine field tab functions within the receiving system.

8. The PDF417 is able to carry machine-readable data that can contain biometric data files such as photographs, fingerprints, and signatures as well as text, numerics and graphics.

Figure 7 – Example of Bar Coded Purchase Order Number With Text Element Identifier (TEI)



9-3. Repair Agency Receipt Process - Bar Coding

9-3-1. Command Code

Not Applicable

1. Purpose

In order for repair agencies to utilize automated processes in their receiving function, suppliers are to provide Code 39 or Code 128 linear bar coding, 2D Data Matrix or PDF417 bar coding on the document/label/tag for a shipment item. If multiple items are contained in one box, there will be a bar-coded document/label/tag for each item contained within the box.

The bar-coded messages will consist of a Text Element Identifier (TEI) containing three characters with a space position. 2D Data Matrix and PDF417 bar codes have slash delimiters separating the data fields.

The bar coded statement will contain start and stop characters. These are included automatically by the hardware or software device printing the bar code. The Text Element Identifier (TEI) will be included in the data.

2. Input Contents and Sequence

Not required as this bar coded statement is generated by the supplier.

3. Output Contents and Sequence

1. Repair Purchase Order Number (RPO)
2. Part Number (PNR)
3. Customer Identification Code (CIC)
4. Supplier Code (SPL)
5. + Manufacturer Code (MFR)
6. + Part Serial Number (SER)
7. + Shipment Quantity (SHQ)

Mandatory if Part Serial Number (SER) is not present.

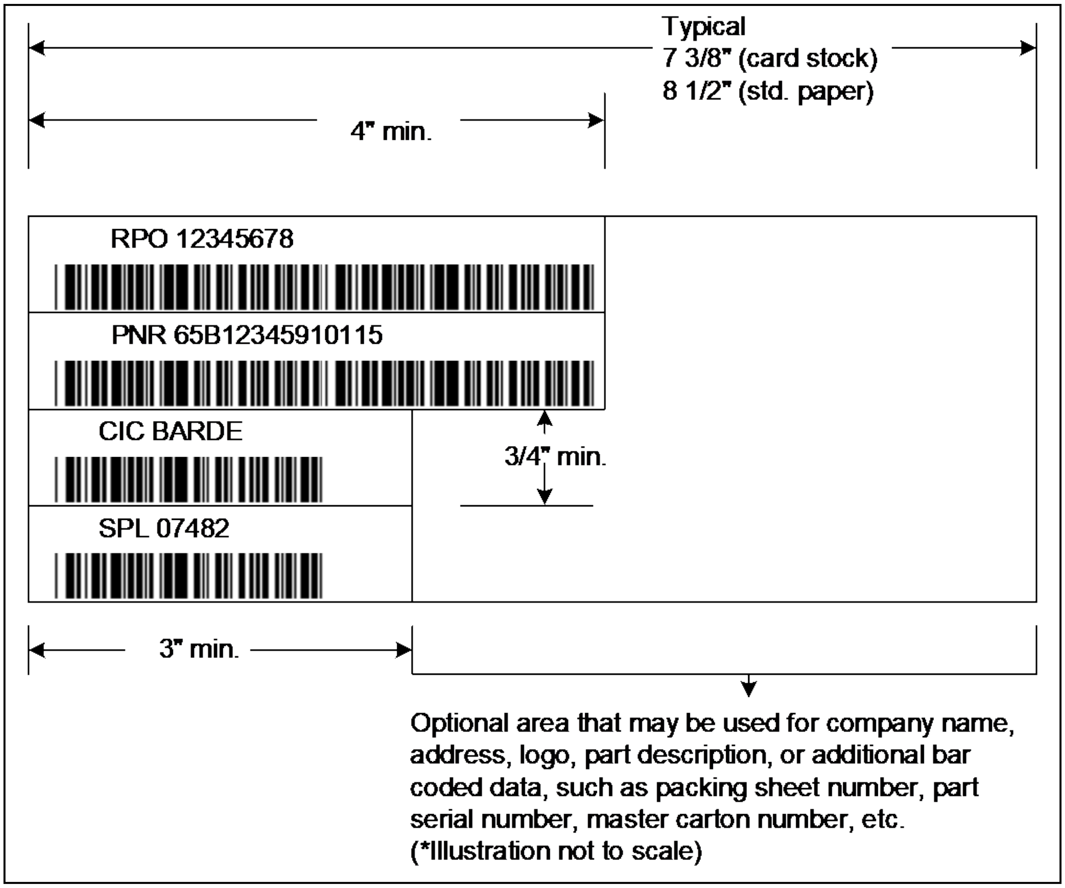
8. + Unit of Measure Code (UNT)
9. + Hazardous Material Code (HAZ)
10. + Packing Sheet Number (PSN)
11. + Master Carton Number (BOX)
12. +Repair Agency Claimed Certificate Number (RCN)
13. +Date Repaired (DRP)
14. +NATO Stock Number (NSN)

+ Indicates conditional data elements

9-3-2. Supporting Technical Information - Repair Process

1. Examples of Bar Coded Repair Agency Receiving Tags

Figure 8 - Example of Internal Repair Agency Receiving Tag - Linear Bar Code



Note:	Border lines around bar code examples are for label sizing purposes and are not required. This linear bar code shows only mandatory data elements.

Figure 9 - Example of Internal Repair Agency Receiving Tag - 2D Data Matrix

Typical
7 3/8" (card stock)
8 ½ " (std paper)

RPO	**12345678**
PNR	**HLT8100-13-91**
CIC	**BAR**
SPL	**07482**
SHQ	**1**
UNT	**EA**
PSN	**PS789254**
SER	**5417829**
DRP	**112204**
RCN	**O4197**
NSN	**1234567890123**

Optional area that may be used for company name, address, or additional bar coded data

Note:	Border lines around bar code examples are for label sizing purposes and are not required. This 2D Data Matrix example shows use of conditional elements.

Figure 10 - Example of Internal Repair Agency Receiving Tag - PDF417

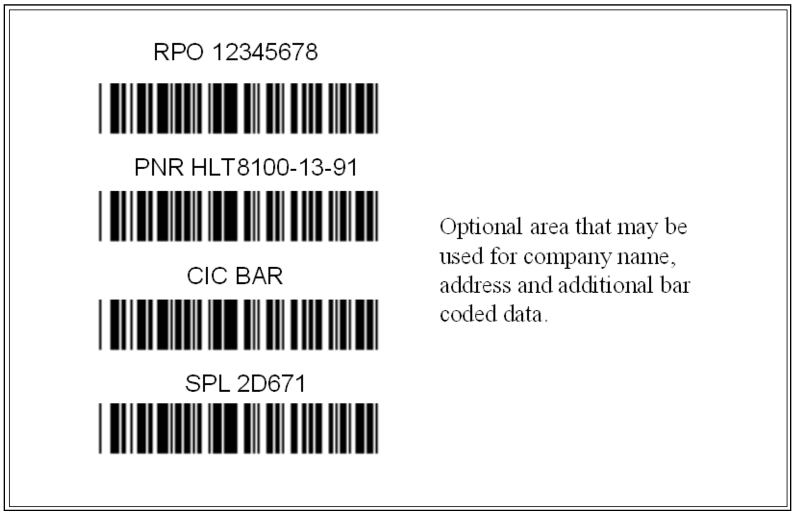
Typical
7 3/8" (card stock)
8 ½ " (std paper)

RPO	**12345678**
PNR	**HLT8100-13-91**
CIC	**BAR**
SPL	**07482**
SHQ	**1**
UNT	**EA**
PSN	**PS789254**
SER	**5417829**
DRP	**112204**
RCN	**O4197**
NSN	**1234567890123**

Optional area that may be used for company name, address, or additional bar coded data

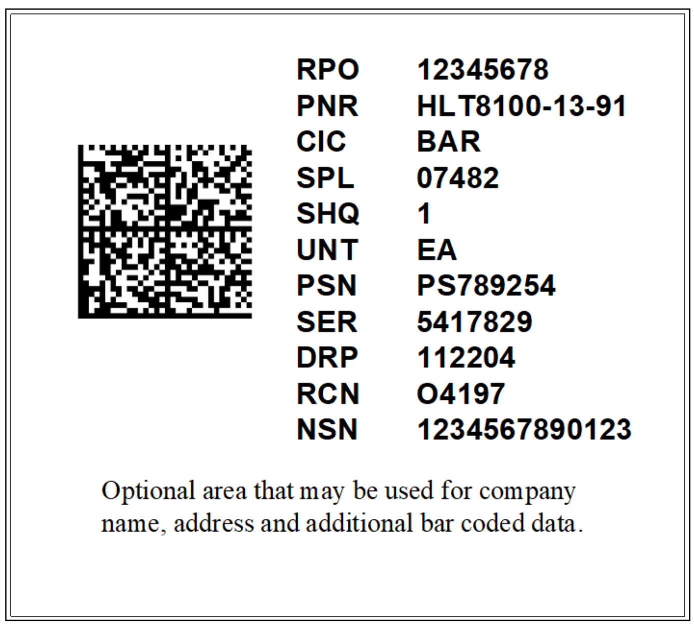
Note:	Border lines around bar code examples are for label sizing purposes and are not required. This PDF417 example shows use of conditional elements.

Figure 11 - Example of External Repair Agency Receiving Tag - Linear Bar Code



Note:	Border lines around bar code examples are for label sizing purposes and are not required. This linear bar code shows only mandatory data elements.

Figure 12 - Example of External Repair Agency Receiving Tag - 2D Data Matrix



Note:	Border lines around bar code examples are for label sizing purposes and are not required. This 2D Data Matrix example shows use of conditional elements.

Figure 13 - Example of External Repair Agency Receiving Tag - PDF417

RPO	**12345678**
PNR	**HLT8100-13-91**
CIC	**BAR**
SPL	**07482**
SHQ	**1**
UNT	**EA**
PSN	**PS789254**
SER	**5417829**
DRP	**112204**
RCN	**O4197**
NSN	**1234567890123**

Optional area that may be used for company name, address and additional bar coded data.

Note: Border lines around bar code examples are for label sizing purposes and are not required. This PDF417 example shows use of conditional elements.

2. Explanation of Bar Coded Repair Agency Receiving Tags

1. Linear bar code symbology should be:

   Code 39 at a medium density (approximately 4-8 characters/inch), or

   Code 128 at a medium density (approximately 6-12 characters/inch)

   and meet existing ATA bar code specifications contained in this document.

   2D Data Matrix bar code symbology should be:

   at a medium density and meet existing ATA bar code specification contained in this document.

   PDF417 bar code symbology should be:

   at a medium density and meet existing ATA bar code specification contained in this document.

2. Linear bar codes should be approximately 0.4 inches high, plus minimum 0.1 inch high human readable characters printed directly above or below the bar code symbol.

   2D Data Matrix bar codes should be approximately 3/4 in. square, but may vary depending upon size of content. The human readable characters accompanying 2D are also minimum 0.1 inch (10 point type) printed next to, but not touching, the bar code.

3. To enable the machine readable bar code to be properly identified, a Text Element Identifier (TEI) will immediately precede and be a part of the data being read. 2D Data Matrix and PDF417 bar codes have slash delimiters separating the data fields. The TEIs used are listed in [9-3-1.3]

Note: SPEC2000 TEI's are four characters in length, consisting of 3 letters plus a space.

If this TEI code is not desired in the receiving company's data field, the application program will have to strip off the characters and retain only the data content.

4. The Text Element Identifiers (TEI) will be displayed in the human readable characters that are printed with the text of the bar code. The start/stop characters and slash delimiters will not be displayed in human readable format, since they are not part of the data.

5. On the internal linear bar coded receiving tag, an area approximately 4” wide by 3” high area is reserved for the bar code information Figure 8. The four required items in 9-3-1.3 are printed adjacent to the bar code area with the minimum lengths for linear shown (minimum 4” for Part and Order Number; minimum 3” for Customer Identification Code and Supplier Code). The bar code area may be larger than 4” x 3” and located anywhere on the shipping document, as long as the four mandatory bar codes are obvious.

   2D usage is shown in Figure 9, using a 3/4 in. square data matrix. PDF417 is s shown in Figure 10 As with linear bar codes, 2D Data Matrix and PDF417 bar codes may be located anywhere on the shipping document as long as the bar code and its accompanying human readable data are obvious.

6. In addition to the aforementioned required information, the rest of the document may contain company logos, names, free-form alpha descriptions of the part, or other data.

7. When a supplier prints a bar coded field, and the data contained in the field is less than the maximum length, only the actual data element is to be bar coded. Do not include any tab character or fill the field with blanks to make the field the maximum length. It is the responsibility of the receiving system to determine field tab functions within the receiving system.

8. The PDF417 is able to carry machine-readable data that can contain biometric data files such as photographs, fingerprints, and signatures as well as text, numerics and graphics.

9-4. Permanent Bar Code Parts Identification

9-4-1. Purpose

In order that automated processes may be used in parts handling, and to facilitate "cradle-to-grave" tracking of serialized parts, an industry task force has defined a Permanent Bar Code specification that uses Code 39, Code 128 or Data Matrix symbology. Code 128 is the preferred linear symbology for Permanent Parts Identification. The data formats specified in this section are closely integrated with the Traceability Data Standard, see 9-6 Traceability Data Standard, and also the Line Removal, Shop Tear Down, and Reliability Data found in Spec 2000 Chapters 7 and 11. The XML-compatibility of Spec 2000 data allows it to work well with web and new database applications.

Traditionally, aircraft and engine parts manufacturers have used Part Number and Part Serial Number in combination to uniquely identify a part. However, where a modification affecting form, fit, or function is applied to the part, the airworthiness authorities require a new Part Number to be assigned. This process breaks the Part/Serial Number relationship used to track the part, thereby presenting problems for the owners, users, and repairers of the part. This specification defines the data format for a universal serial number that provides a ‘social security number’ concept to uniquely identify the part throughout its life. This ‘social security number’ consists of an Enterprise Identifier and unique serial number within the Enterprise.

This specification defines standard data and formats for the identification of both new and in-service parts:

A Part Serial Number (SER) or Unique Component Identification Number (UCN), along with a code identifying the party assigning it, will uniquely identify the part throughout its life, whether or not the Part Number changes. The combination of the CAGE Code plus the unique SER/UCN number creates a ‘social security number’ for the part. Parts already in service may be labeled using the owner/user's CAGE Code instead of the manufacturer's. However, this does not preclude a manufacturer's code being used where the permanent bar code identity is retroactively applied by the manufacturer, the manufacturer's agent, or the owner when in receipt of the manufacturer's authority. When the original Serial Number for an in-service part is not unique to the manufacturer, the manufacturer should assign a separate UCN.

From a data perspective, the MFR or SPL enterprise identifiers represent the same type of data, specifically, a company’s five character CAGE Code (outside North America it is known as NATO Supply Code for Manufacturers, or NCAGE). From a labeling perspective, the MFR or SPL are used to represent whether the manufacturer or someone else had the responsibility for marking the parts and ensuring that the Part Serial Number (or UCN) is unique. Similarly, the SER and UCN are also the same type of data. Typically, the MFR would have the numbering authority to ensure that the SER is unique within their CAGE or NCAGE Code, when the part is new. Any other company marking an In-Service part with the SPEC2000 data format would use the SPL/UCN combination.

To save space when the marking area is limited, MFR/SER and SPL/UCN can be concatenated as follows:

1. The Universal Serial Number (USN) concatenates the MFR and SER data into one number and can be used when marking new serialized parts.

2. A second data element, the Universal Serial Tracking Number (UST), consisting of SPL and UCN, serves the same function when marking in-service serialized parts.

To maximize consistency, the Enterprise Identifier (e.g. MFR or SPL) should always be the first data element in the bar code.

In this release three new Enterprise Identifiers are introduced to allow parts obtained from companies who do not have a CAGE/NCAGE Code to be identified and tracked using the SPEC 2000 identification schema. Trading partners may agree to use these identifiers in place of or in addition to MFR and SPL. They are:

1. Commercial and Government Entity Code (CAG) which shall be equal to MFR and SPL when used.

2. Dun & Bradstreet D-U-N-S Number (DUN) followed by the companies Dun and Bradstreet D-U-N-S

Number.

3. EAN.UCC Company Identifier (EUC) followed by the companies EAN.UCC Company Prefix number.

The United States Department of Defense Unique Identification (UID) policy requires a slightly different kind of part marking specifically related to the 2-D Data Matrix symbology. These requirements are presented in 9-4-10 Military UID (Unique Identification) Standard – an alternative marking method. All companies who may need to read 2-D Data Matrix codes and companies who need to mark parts in compliance with the UID military policy should refer to Military UID (Unique Identification) Standard - see 9-4-10.

The bar coded information will consist of a Text Element Identifier (TEI) and the corresponding data. The text of the data will be printed adjacent to the bar code to allow part identification without bar code reader equipment. As a goal, all parts should be identified using the concept of a 'Social Security Number' for part identification unless technically impractical.

Serialized parts require different identification than non-serialized parts.

The bar code shall be on the part itself or on one or more data plates/labels, depending on shape and technical constraints.

There are two categories of parts: Serialized and Non-Serialized, each having different data requirements. See the following outline:

Category A – Serialized Parts

I. New Serialized Part Marking:

A. MFR/SER option

- CAG/SER, DUN/SER and EUC/SER alternative

B. USN option

II. In-Service Serialized Part Marking:

A. SPL/UCN option

- CAG/UCN DUN/UCN and EUC/UCN alternative

B. UST option

Category B – Non-Serialized Parts

I. Part Number approach:

A. MFR/PNR

II. Lot Number approachs:

A. Identification number within an Enterprise Identifier (preferred)

- CAG/LTN or DUN/LTN or EUC/LTN or MFR/LTN

B. Identification number within Original Part Number

- CAG/PNO/LOT

- DUN/PNO/LOT

- EUC/PNO/LOT

- MFR/PNO/LOT

Note:	Trading partners shall agree on which approach/option to use for non-serialized parts

9-4-2. Category A – Serialized Parts

(Tracked, non-tracked, uniquely identified, critical, regulatory requirements, etc.)

1. New Serialized Parts

Figure 14 - New Serialized Parts

Data Elements	1-D Linear Barcode (Preferred on Data Plates	2-D Data Matrix (Preferred on Direct Part Marking)
MFR/SER	MFR 12345 SER ABC123	MFR 12345 SER ABC123 (see note) Encoded in Data Matrix: MFR 12345/SER ABC123 Note: Human Readable Interpretation does NOT include embedded slash "/", but the data does include it. A Carriage Return is not embedded in 2D Data Matrix. Refer to 9-4.10 for DoD UID marking
or **USN** (=MFR+SER)	USN 12345ABC123	USN 12345ABC123
PNR	PNR F100F200	PNR F100F200 (Conditional on DPM Applications)
DMF (Conditional Data Element value 'MMYYYY')	DMF 082000	DMF 082000

Note:	MFR Enterprise Identifier used for illustration

1.1. New Serialized Parts - Limited Space Marking Exceptions

In some direct part marking situations (e.g., very small engine part marking areas) it may be impossible to apply the human readable text next to the 2D bar codes. Getting the machine readable data and the human readable text on the part is so important that exact placement, i.e., putting both "adjacent to" each other, is of secondary importance. They should be as close as is technically feasible.

However, there are some situations where space is so limited that another option of representing 2D bar code might have to be used. In cases where the Universal Serial Number (USN) format is used, the concatenation of the CAGE Code (MFR) and the unique Part Serial Number (SER) may create a human readable character string that is too long for the available marking area. In these situations, an exception is allowed to use the USN xxxxx111111… data string in the 2D bar code, but break it into its component pieces of MFR xxxxx and SER 111111… for the human readable portion. This allows maximum flexibility in marking very small parts, however, be cautioned that reading the 2D bar code and comparing it to the human readable information may be confusing. For that reason, the user should be made aware of this condition.

2. In-Service Serialized Parts

Figure 15 - In-service Serialized Parts

Data Elements	**1-D Linear Barcode** (Preferred on Data Plates)	**2-D Data Matrix** (Preferred on Direct Part Marking)
SPL/UCN Used for In-Service Serialized Parts	SPL 54321 UCN 123ABC	SPL 54321 UCN 123ABC (see note) Encoded in Data Matrix: SPL 54321/UCN 123ABC Note: Human Readable Interpretation does NOT include embedded slash "/", but the data does include it. Carriage Return is not embedded in 2-D Data Matrix. Refer to 9-4.1 for DoD UID marking
or **UST** (= SPL+UCN)	UST 54321123ABC	UST 54321123ABC
Other Data Elements	Other Data Elements shown above may also be included	

Note:	SPL Enterprise Identifier used for illustration

2.1. In-Service Serialized Parts - Limited Space Marking Exceptions

In some direct part marking situations (e.g., very small engine part marking areas) it may be impossible to apply the human readable text next to the 2D bar codes. Getting the machine readable data and the human readable text on the part is so important that exact placement, i.e., putting both "adjacent to" each other, is of secondary importance. They should be as close as is technically feasible.

However, there are some situations where space is so limited that another option of representing 2D bar code might have to be used. In cases (where the Universal Tracking Number (UST) format is used,) the concatenation of the Supplier Code (SPL) and the Unique Component Identification Number (UCN) may create a human readable character string that is too long for the available marking area. In these situations, an exception is allowed to use the UST xxxxx111111… data string in the 2D bar code, but break it into its component pieces of SPL xxxxx and UCN 111111… for the human readable portion. This allows maximum flexibility in marking very small parts, however, be cautioned that reading the 2D bar code and comparing it to the human readable information may be confusing. For that reason, the user should be made aware of this condition.

9-4-3. Category B - Non-Serialized Parts

Figure 16 - Non-serialized Parts

Data Elements	**1-D Linear Barcode** (Preferred on Data Plates	**2-D Data Matrix** (Preferred on Direct Part Marking)
MFR/PNR	MFR 54321 PNR HK23ABC	MFR 54321 PNR HK23ABC (see note) Encoded in Data Matrix: MFR 54321/PNR HK23ABC Note: Human Readable Interpretation does NOT include embedded slash "/", but the data does include it. Carriage Return is not embedded in 2-D Data Matrix.
Other Data Elements	Other Data elements shown above may also be included	

Note:	MFR/PNR approach used for illustration

9-4-4. Input Contents and Sequence

Not Applicable

9-4-5. Output Contents and Sequence

1. Category A - Serialized Parts

1.1. New Serialized Parts - Code 128 (preferred), Code 39, or Data Matrix

1.1.1. MFR/SER Option

1. Manufacturer Code (MFR)

Note:	When Trading Partners select the Enterprise Identifier alternative, CAG, DUN or EUC are used in place of MFR.

2. Part Serial Number (SER)

   - The SER should be a unique number within the CAGE Code or NCAGE of the Enterprise marking the part (e.g., MFR).

   - The SER is alphanumeric, the only special character allowed is the DASH (-).

- The Enterprise Identifier and the SER will remain constant during the life of the part, even if the Part Number is changed due to an incorporation of a modification/service bulletin.

3. Part Number (PNR)

   - Should be on a second data plate/label to easily allow for necessary changes over the life of the part.

Note:	If using Data Matrix, it is strongly recommended that Part Number be in a second Data Matrix code to easily allow for necessary changes over the life of the part.

4. + Manufacture Date (DMF)

+	Identifies conditional data elements.

Note:	The slash delimiter (/) must be used in Data Matrix codes to separate data elements.

Refer to 9-4-10 for DoD UID-marked parts

1.1.2. Universal Serial Number (USN)

An alternate format is allowed for new parts that have limited marking space available. This format concatenates the Manufacturer Code and the unique Part Serial Number into a single number. This method saves space that would otherwise be needed for the second Text Element Identifier and enables even more parts to be marked with the Universal Serial Number data format.

Example: USN CCCCCSSSSSS ... S

where 'CCCCC' represents the fixed length, 5 character, Manufacturer Code (MFR), and 'SSSSS ... S' represents the variable length, 1 to 15 character, unique Part Serial Number (SER).

This option is only available if using CAGE Codes as the Enterprise Identifier, not DUN, or EUC.

Refer to 9-4-10 for DoD UID-marked parts

1.2. In-Service Serialized Parts - Code 128 (preferred), Code 39, or Data Matrix

1.2.1. SPL/UCN Option

1. Supplier Code (SPL)

Note:	When Trading Partners select the Enterprise Identifier alternative, CAG, DUN or EUC are used in place of SPL.

2. Unique Component Identification Number (SER)

   - The UCN should be a unique number within the Enterprise marking the part, whether MFR, SPL, or CAG.
   - The UCN is alphanumeric, the only special character allowed is the DASH (-).
   - The UCN will remain constant during the life of the part, even if the Part Number is changed due to an incorporation of a modification/service bulletin.

3. Part Number (PNR) – the current Part Number

   Conditional but strongly desired. It is recommended that Part Number be in a separate bar code to easily allow for necessary changes over the life of the part. If Part Number is not used, or if a second

Data Matrix code is used for Part Number, no delimiter slash (/) should follow the Unique Component Identification Number in the first Data Matrix code.

4. Manufacture Date (DMF)

+ Identifies conditional data elements.

Note: The slash delimiter (/) must be used in Data Matrix codes to separate data elements.

Refer to 9-4-10 for DoD UID-marked parts

1.2.2. Universal Serial Tracking Number (UST) Option

An alternate format is allowed for in-service parts that have only limited marking space available. This format concatenates the Supplier Code and the Unique Component Identification Number into a single number, thus saving space otherwise needed for a second Text Element Identifier. This enables even more parts to be marked with the Universal Serial Tracking Number data format. For these in-service parts, it is important that the original Part Serial Number assigned by the manufacturer not be used unless it is actually unique within the CAGE Code or NCAGE of the Supplier (SPL).

Example: UST CCCCCSSSSSS ... S

where 'CCCCC' represents the fixed length, 5 character Supplier Code (SPL), and 'SSSSSS ... S' represents the variable length, 1 to 15 character, unique Part Serial Number (SER) or Unique Component Identification Number (UCN).

Refer to 9-4-10 for DoD UID-marked parts

2. Category B - Non-Serialized Parts

2.1. Non-Serialized Parts - Code 128 (Preferred), Code 39 or Data Matrix

2.1.1. Part Number Approach

For non-serialized parts that are only identified by Part Number (PNR), the following format may be used:

1. Manufacture Date (DMF)
2. Part Number (PNR)

Note: The slash delimiter (/) must be used in Data Matrix codes to separate data elements.

2.1.2. Lot Number Approaches

Lot number is a unique identity for a group of units of the same item which are processed, manufactured, or assembled under uniform conditions and which are expected to function in a uniform manner.

There are two approaches identified below. The first approach (LTN) identifies a lot within the enterprise identifier. The second approach (LOT) identifies a lot within the original part number.

1. Identification number within an Enterprise Identifier (Preferred)
   a. Enterprise Identifier (CAG, DUN or EUC)
   b. Enterprise Lot Number (LTN)

      The Enterprise Lot Number shall be unique within the Enterprise Identifier of the manufacturer.

      The Enterprise Lot Number is alphanumeric, the only special character allowed is the DASH (-).

The Enterprise Lot Number shall remain constant during the life of the part.

c. Part Number (PNR)

Should be on a second data plate / label or in a second Data Matrix.

d. +Manufacture Date (DMF)

Should be on a second data plate / label or in a second Data Matrix.

2. Identification number within an Original Part Number

a. Enterprise Identifier (CAG, DUN or EUC)

b. Original Part Number (PNO)

c. Lot Number (LOT)

The Lot Number shall be unique within the Original Part Number.

The Lot Number is alphanumeric, the only special character allowed is the DASH (-).

The Lot Number shall remain constant during the life of the part.

+	Identifies conditional data elements.

Note:	The slash delimiter (/) must be used in Data Matrix codes to separate data elements.

Refer to [9-4-10] for DoD UID-marked parts

2.2. Non-Serialized Parts – Alternative Marking Method for Data Matrix

For companies following the military's UID-format of ISO wrappers around the Text Element Identifiers, non-serialized parts that are only identified by Part Number (PNR) and/or parts that are identified by lot or batch numbers, the ISO wrapper format may also be used to mark parts with the approaches described in 9-4-5.2.1. If planning to use this approach, manufacturers are encouraged to communicate with their commercial trading partners to avoid rejections.

Refer to [9-4-10] for more information

9-4-6. Supporting Technical Information - New Serialized Parts

1.	Manufacture Code (MFR):	2D671
2.	Part Serial Number (SER)	ABC333-001
3.	Part Number (PNR):	F1002003004AP

Figure 17 - Example of Bar Coded Data Plate - New Serialized Part

MFR 2D671

SER ABC333-001

PNR F100200300400AP

Note:	MFR Enterprise Identifier used for illustration

Figure 18 - Examples of Data Matrix Format - New Serialized Part

MFR 2D671
SER ABC333-001

- or -

USN 2D671ABC333-001

PNR F100200300400AP

PNR F100200300400AP

Note:	MFR Enterprise Identifier used for illustration

9-4-7. Supporting Technical Information - In-Service Serialized Part

1. Supplier Code (SPL): K6807
2. Unique Component Identification Number (UCN): BA123-987

Figure 19 – Example of Bar Coded Data Plate - In-Service Part

SPL K6807

UCN BA123-987

Note:	SPL Enterprise Identifier used for illustration

Figure 20 – Examples of Data Matrix Format - In-Service Part

SPL K6807
UCN BA123-987

- OR -

UST K6807BA123-987

Note:	SPL Enterprise Identifier used for illustration

9-4-8. Supporting Technical Information - Data Matrix

Data Matrix symbology allows for the bar code to be printed in either a square or rectangular format. The rectangular format would typically be used if it would fit within the marking area more appropriately, but either is acceptable. Without repeating all the previous options, let the pictorial representations below suffice for examples to cover both New Serialized as well as In-Service Serialized part marking:

1. Manufacturer Code (MFR): MFR 00198
2. Part Serial Number (SER): SER AB123

Figure 21 – Examples of Data Matrix Format

Square Data Matrix Format

Rectangular Data Matrix Format

Encoded Data Content:
MFR 00198/SER AB123
- Or -
USN 00198AB123

Note:	This example displays a Data Matrix bar code in both the square and rectangular formats allowed by the Data Matrix symbology. Additionally, companies are free to maintain their current specification for other, non-data, product information text. The data text must include the same encoded data of the Data Matrix except for the slash (/) delimiter which might be mistaken for a valid data character.
Note:	MFR Enterprise Identifier used for illustration

9-4-9. Explanation of Permanent Bar Code Parts Identification

1. Bar code symbology should be Code128 (preferred) or Code 39 at a medium density, or Data Matrix ECC-200 at a medium density and meet existing ATA bar code specifications contained in this document. The goal is to stay in the technological mainstream so that your customers and partners can read the bar codes with standard equipment.
2. For Code 128 (preferred) and Code 39, the bar code itself should be minimum 0.125 inch (3.2 mm) high, plus a minimum 0.06 inch (1.5 mm) high human readable characters printed directly above or below the bar code symbol. Data Matrix codes should also have a minimum 0.06 inch high human readable characters printed adjacent to the bar code.
3. To enable the machine readable (bar) code to be properly identified, a Text Element Identifier (TEI) will immediately precede and be a part of the bar code that follows:

Note:	SPEC2000 Text Element Identifiers (TEIs) are four characters in length, consisting of 3 letters followed by a space.

Manufacturer Code will begin with 'MFR '

Supplier Code will begin with 'SPL '

Commercial and Government Entity Code will begin with 'CAG '

Dun & Bradstreet D-U-N-S Number will begin with 'DUN '

EAN.UCC Company Identifier will begin with 'EUC '

Part Serial Number will begin with 'SER '

Enterprise Lot Number will begin with 'LTN '

Unique Component Identification Number will begin with 'UCN '

Part Number will begin with 'PNR '

Manufacture Date will begin with 'DMF '

4. Human readable text will be displayed near the bar code. All the mandatory data in the bar code (e.g. MFR/SER, SPL/UCN, PNR, USN, or UST), including the Text Element Identifier (TEI) in the Data Matrix code, will be displayed. The slash character (/) or any other non-data characters will not be displayed. The intent is that the human readable data and the bar coded data will be as identical as possible for all the mandatory data, allowing a redundant method of entering data if the bar code technology fails. If the TEI code is not desired in the receiving company's data field, the application program will have to strip off the characters and retain only the number. The start/stop characters and other control characters in the bar code symbology will not be displayed since they are not part of the data.

5. In addition to the aforementioned required information, the rest of the data label/plate may contain company logos, names, free-form alpha descriptions of the part, or other data. If other data is encoded in the bar code, it will follow the mandatory data and is not required to be displayed.

6. When a supplier prints a bar coded field, and the data contained in the field is less than the maximum length, only the actual data element is to be bar coded. Do not include any tab character or fill the field with blanks, nor fill the number with leading zeroes to make the field the maximum length. This is unnecessary and is difficult for humans to type in correctly if the need arises. It is the responsibility of the receiving system to determine field tab functions within the receiving system.

7. Subject to technical restraints, the durability of the bar coded data label/plate or mark should be sufficient to be readable for the entire life of the part.

8. The size of the data label/plate or mark depends on available space and technical constraints. The data plate may contain additional data.

9. When applying a SPEC2000 data plate/mark to an In-Service Serialized Part, airlines, distributors, repair agencies, and other non-manufacturers should avoid applying a label with a company name or logo. This may be misunderstood by others as representing your proprietary numbering system, rather than the SPEC2000 industry standard, and the label may be incorrectly removed. The label should not imply ownership because that is a transient state and the label should be permanent. Original Equipment Manufacturers marking their own, in-service parts may include their name or logo.

10. When using Data Matrix format, a square or rectangular symbol may be used. See [Figure 21] for an example.

11. When encoding multiple data elements within a data matrix, a slash delimiter is used between all data elements. A specific sequence of data elements is not required, though the "social security number" data elements (e.g. MFR/SER, SPL/UCN, etc.) are preferred to be first. Due to space limitations, it is permissible to encode multiple data elements into a single data matrix, e.g., Part Number (PNR) and Universal Serial Number (USN). Refer to [9-4-10] for DoD UID-marked parts

12. Data plates may not require a Part Number (PNR) for specific items, such as engine identification plates.

13. The guidelines contained in this chapter shall be complied with to the maximum extent possible, subject to technical constraints.

14. Companies who mark legacy parts with the SPL/UCN combination (or UST) should follow the traceability specification presented in Section 9-6 Traceability Data Standard, specifically using the MRK action code that creates a digital traceability record of what the original, non-unique Serial Number was for the legacy part. This process provides historical continuity from the original Serial Number to the new 'social security number' on the part.

9-4-10. Military UID (Unique Identification) Standard – an alternative marking method

This sub-section pertains to any company that manufactures and/or marks parts that flow into the military sector. The U.S. Department of Defense, as part of their UID (Unique ID) policy, will require a 2-D Data Matrix bar code standard that is slightly different from Spec 2000 'plain text' format. This only pertains to the 2-D Data Matrix bar code itself, not the human readable text or any other criteria. This requirement is discussed as an ISO/IEC 15434 "wrapper" around the Spec 2000-defined data elements. It does not pertain to parts marked with 1-D bar codes, nor to un-serialized parts. It does pertain to both new serialized and in-service serialized parts, presented in [9-4-2.1] or [9-4-2.2] respectively. That information will not be repeated here as the only thing that is different are the extra characters in the bar code symbol itself.

This guideline would be appropriate for companies who sell the product into both the commercial and military sectors, e.g., engine manufacturers. For economic reasons, the company may decide to mark parts with a single standard that is compatible for both sectors. Spec 2000 specifies the TEI-defined data elements and they are also acceptable to the military to create the UID data matrix mark.

The Department of Defense's UID requirements include Spec 2000 data elements (MFR, SPL, CAG, DUN, EUC in combination with SER or UCN, USN, UST and PNR) but that data must be wrapped in an International Standards Organization ISO/IEC15434 syntax. The DoD's version of that syntax is presented in brief below, but reference is made to the DoD's UID policy statement (www.acq.osd.mil/uid) and the ISO/IEC 15434 specification to obtain a complete understanding.

Straight Spec 2000 uses a plain text, WYSIWYG format, using the standard EDI slash ("/") delimiter between data fields to encode data into the 2D Data Matrix symbol. Examples are in [Figure 21]

The DoD UID 2-D bar code requirements specify use of the ISO/IEC 15434 syntax which will replaces the slash (/) with a Group Separator character for the DoD assigned Format Indicator and includes header and trailer characters before and after the data: when encoding a Data Matrix (see example below).

Figure 22 - Example of UID Data Matrix

Decoded data stream = [)>$^{R}{}_{S}$12 $^{G}{}_{S}$**MFR XXXXX** $^{G}{}_{S}$**SER YYYYYY..Y** $^{R}{}_{S}$ $^{E}O_{T}$

Legend:

[)>	3-character ISO/IEC 15434 compliance indicator
$^{R}{}_{S}$	Record Separator (special ASCII character 030)
12	ISO/IEC 15434 Format Header indicating TEI's to follow
$^{G}{}_{S}$	Group Separator (special ASCII character 029)
$^{E}O_{T}$	End of Transmission (special ASCII character 004)

Note:	When the DOD UID mark was first introduced (Spec 2000 version 2005.1 – issued in March 2005, ISO had not approved the use of "12" as the indicator that TEI's are following. At that time, a temporary mark of "DD" was used. Thus, although new marks should begin to use "12", "DD" should continue to be recognized on existing part marks.

The regular Spec 2000 data elements of MFR XXXXX and SER YYYYY..Y can be identified as being embedded within the ISO "wrapper" required by the DoD.

Companies that manufacturer and mark parts for the DoD will need to follow ISO/IEC 15434 when creating the Data Matrix if the contract requires use of ISO/IEC 15434. All companies that may need to read these special codes will want to program their Data Matrix decoding algorithm to accept both the Spec 2000 as well as the DoD-specific Data Matrix formats. This is easily accomplished because the 2-D readers read all the data before it begins to decode it, and extraneous characters can simply be ignored by the algorithm to extract the core data of the TEI, e.g. MFR XXXXX and SER YYYYYY..Y, needed for either commercial or DoD's UID requirements.

It should also be noted that UID allows a Construct 1 and Construct 2 schemas. The Construct 1 schema is the same as the SPEC 2000 schema (9-4-1 through 9-4-9). Use of the SPEC 2000 schema has been proven to be a cost effective method to mark in-service/legacy parts. All the TEIs needed to implement Construct 1 are contained in Section 9-4 and the ATA CSDD . This Best Commercial Practice (SPEC 2000 schema) has been utilized since 1992 and is broadly considered as the best solution in the long run so there is safety in adopting the Construct 1 approach to mark all your parts.

Construct 2 is based on the traditional method of identifying parts. The traditional method assigns sequential serial numbers to a part number. When the part number is changed because of a fit, form, or function change the part number/sequential serial number relationship is broken. While SPEC 2000 does not endorse the traditional method of identifying a part it is recognized there may a business case to use the traditional method of part identification. For example, when a part is nearing the end of its life-cycle.

Construct 1 is the preferred form of permanent identification. While allowable, Construct 2 is not recommended.

To assist companies who are identifying parts for the first time with a Data Matrix and to help ensure that the TEIs SER and PNR are not misused the following TEIs are provided to support Construct 2. The TEIs SEQ and PNO must always be used together. Also provided is a TEI for the DoD UID number. The UID data content can also be used as part of the EPC Global identification number.

- SEQ = Sequential Part Serial Number (within Part Number)

- PNO = Original Part Number

- UID = Unique Identification Number

Instructions on how to implement Construct 2 and the Unique Identification Number are described in the DoD UID Guide (https://www.acq.osd.mil/dpap/pdi/uid/guides.html)

If using military or other Part Numbers the PNR data content may contain a slash (/) as a significant character in the actual part number. Note that a slash (/) is not a valid character in the Spec 2000 specification for PNR.

9-5. Radio Frequency Identification (RFID) on Parts

Note:	In 2020 this chapter was reorganized to make it more readable, and to focus more on business usage in the main chapter with technical development / programming details within the Appendices. Due to this major change, revision indicators are not used, except in the data tables where actual changes to the technical content or business rules were made.

9-5-1. Introduction

The RFID tag is considered a permanent attachment on the part or embedded in the nameplate. The term “ATA tag” refers to an RFID tag that has been encoded with EPC (Electronic Product Code) and user data according to requirements set forth in this chapter.

This specification follows the previously identified data concept in 9-4 Permanent Bar Code Parts Identification, using a universal serial number that provides a ‘social security number’ to uniquely identify a part throughout its life. Standards for the identification of serialized and non-serialized parts for both new (OEM) and in-service (legacy) parts are given. In addition, this section also follows the concepts described in 9-6 Traceability Data Standard for the traceability of maintenance events.

1. Scope and Objectives

To improve the speed and data accuracy of data capture Automated Identification Technologies (AIT) are now being used throughout the aviation industry. Barcodes are one example of AIT and are relatively inexpensive and easy to use. However, they are a line-of-sight technology in which the codes are read one at a time and not useful if the user cannot see or get close to the item that is barcoded. RFID offers the accurate data reading ability of barcode without the restriction of having to see or be near the item being read, plus it can read hundreds of tags per second. This document specifies a common, industry standard data format for aviation part marking which can be written onto the RFID tags and can be read by all the stakeholders in the aerospace value chain.

2. Key Design Goals

Below are key principles for this section:

- Tags affixed to aircraft parts with usage aligned with current regulatory guidelines. In some cases, this means they are ancillary part marking and not subject to stringent TSO data plate requirements.
- Applications linked to the operator’s maintenance needs as well as internal logistics
- Whole industry approach (including parts manufacturers, airframe manufacturers, airlines, and MRO’s)
- Flexible data structure (to accommodate various use case and technology capabilities)
- Future-ready (able to evolve with backwards compatibility)
- E-Business standard in line with previous sections and principles of Spec 2000
- RFID technology is aligned with UHF, ISO/IEC 18000-63 RFID technology. [iso]
- Data standards should be compatible with Spec 2000 9-4 and supportable in the future. It is preferred that 2D data matrix identifiers described in 9-4 are included in addition to RFID tags to facilitate the best mixed-use technology for various use cases.

- Regardless of which technology may be used in the future, the formats should follow the Spec2000 data structure of a quickly accessible, unique identity plus birth record (and additional data) using TEIs

- Read range and read speed are significant factors when selecting an RFID tag, and these factors are primary considerations for many use cases. Refer to Use Cases (By Industry Sector) when determining what memory size and record format to use.

3. Document Structure

The complete set of AIT specifications for parts are included in five sections:

1. Chapter 9-4 is foundational in the explanation of the unique serialization numbering schema for permanent part marking. This chapter also discusses the use of human readable and bar-coding on parts.

2. Chapter 9-5 (this section) describes business data requirements supporting the aviation industry's operational processes for on part RFID data.

3. Appendix A – Technical Programming Details describes in detail the technical formats of the tag data and a structure to support user memory, referred to as the Table of Contents (ToC) which documents the technical tag data architecture that supports the business requirements.

4. Appendix B – 6-bit ASCII encoding table

5. Appendix C – A conformance table to help implementers and others confirm that tags conform to the specification described in the other sections above.

The first two sections above [9-4] and [9-5] can be viewed as the AIT business requirements, whereas the third describes a technical architecture and technical implementation details. It is expected that the business data described in [9-4] and [9-5] will remain more stable than future technologies which is why they are contained in appendices.

Section [9-5] is broken into the below sections:

1. Introduction which includes design goals, document structure, a history of revisions and references.

2. UHF RFID Tag Features presents a high-level description of the tag memory and details of the EPC bank for the RFID tag. Includes requirements for the contents of the EPC identifier User Memory.

3. Business Data Contents for each record format describes the business data contents of the records described in Section 2. Business rules for presenting data within the various record types are found here. Full descriptions of each of the data records are provided with complete listing of the data elements and their definitions.

4. Implementation Guidelines discusses the aviation industry's design for securing the data and provides several typical use cases to help understand normal usage of the RFID tag data, including potentially competing needs based on the industry sector. Other specific implementation details related to damaged tags, full tags, etc. are covered in Appendix A.

4. Business Priorities for RFID

The benefits of RFID tags on aircraft parts and the recipients of those benefits vary during a part's lifecycle. For each use case, certain characteristics such as data format, tag physical size, data programming or acquisition time and read distance are factors an organization should consider when looking at RFID implementations. A more detailed list of use cases is described further in Use Cases (By Industry Sector).

For more business priorities specific to airlines refer to IATA publication (See External Documents).

5. Document Revision History

Table 1 - Document Revision History

Document Revision Number	Date	Major Changes
2007.1	December, 2007	Initial issue with data for Birth Record.
2010.1	May, 2009	Update to use variable record lengths, incorporate table of contents, and add structure for the current data record and part history record.
2013.1	May 2013	• Incorporates the approved GS1/EPC Aerospace & Defense EPC Indicator • Adds the dual record option • Clarifies and modifies some of the memory flags • Adds clarity, improves definition of part history functions, clarifies business rules for conditional data elements • Describes the use of additional TEI's from the CSDD and company-defined data.
2016.1	January 2016	• Clarifies which business entity can write a Birth Record • Incorporates Single Record Birth Tag and Single Record Utility Tag options • Adds ATA Tag Type field to ToC Header • Adds new filter values to the ADI EPC • Adds Usage of Tag Data for Business Operations to Section 4 • Deletes HF and CMB from Section 5 • Updates some business rules for the dual-record tag • Minor changes to the multi-record tag business rules • Clarifies Versioning • Clarifies Tag Correction Process • Clarifies Tag Replacement Process • Adds permalock requirements to the short ToC Header and CRC in Appendix 11 • Clarifies bit directions in Appendix 11 • Updates some flags in Appendix 11
2020.1	September 2020	• Reorganizes specification moving more development / technical details to appendix and clarifying and simplifying the business language in chapter 9-5. • Renumbers appendix 11, 12 and 13 to A, B and C • Adds use case information and information on business priorities. • Re-identifies the "tag types" as data formats, since the various technologies of tags, records, size, etc. can change over time. • Changes to required, conditional and optional fields across record types. • Updates Filter Value table. • Introduces "Embedded Life Part" to allow for information about a child part to be contained

		in the parent when it is impractical to tag the child. • Modifies the tag replacement section. • Re-identifies the Part Numbers to better match other ATA specifications. • Updated Business Data Contents Version and ToC Format versions Table 17

6. Version Control

The tags contain "versions" which correspond to both data described in section 9-5 along with detailed structural formats described in the appendices. More detailed information on tag version management is contained in Table 17 - Version Control

7. External Documents

Table 2 - External Document References

[gen2]	EPC Radio-Frequency Identity Protocols Class-1 Generation-2 UHF RFID Protocols for Communications at 860-960 MHz, Version 2.0.0
[iso]	ISO/IEC 18000-6:2013 - Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz General
[tds]	GS1 EPC Tag Data Standard, Current Version
[csdd]	ATA Common Support Data Dictionary Current Revision. (Note applicable items have been extracted and are contained after the appendix in this document)
[faa]	AC20-162, current version; AC119-20, current version
[sae]	SAE AS5678, Passive RFID Tags Intended for Airborne Equipment Use, current version
[iata]	AIRLINES' BUSINESS REQUIREMENTS for Original Equipment Manufacturers on Radio Frequency Identification (RFID) and 2D Barcode Tagging for Aircraft Cabin Equipment
[icao]	Technical Instruction for the Safe Transport of Dangerous Goods by Air, International Civil Aviation Organization (ICAO)

9-5-2. UHF RFID Tag Features

This section gives a high-level business overview of the UHF Tag structure and features, with most technical details provided in Appendix A.

1. Memory Structure

The UHF RFID tag contains four separate memory blocks numbered 0 through 3:

0 – Reserved

1 – EPC Bank

2 – Tag Identification Memory Bank (TID)

3 – User Memory Bank

The EPC is vital because it contains the tagged item's unique ID which must be globally unique across all RFID tags. It is also the memory block that responds automatically and quickly whenever interrogated by a reader. Details about how to structure the EPC memory are discussed directly below, and structure of the User Memory in the appendices, with business content described in detail in this chapter.

2. EPC Bank Description

EPC stands for the Electronic Product Code of the physical item the tag is attached to and is defined by GS1 [tds]. It provides the globally unique ID for that tag. One of the unusual and beneficial features of the EPC's Aerospace and Defense (A&D) structure that Spec2000 uses is that the key data is encoded in ASCII characters. This allows the data to be read and interpreted at point of use with a handheld reader. This avoids a significant amount of the infrastructure required for other EPC encoding schemes to get the serial number of the item.

At a high level, the significant pieces of the EPC Field will be presented here, but the technical details will be left to Appendix A.

A picture of the Aerospace/Defense Indicator (ADI) is the easiest way to begin the discussion. Figure 23 and Figure 24 below illustrate the two ways ADI parts are assigned a unique identity, which is encoded in the EPC field. Construct 1 is for items uniquely serialized within a CAGE Code. Construct 2 is for items that have a unique sequence number within the part number and the part number is unique within the CAGE Code. The difference is important so reference [9-4] for a further explanation of Construct 1 (C1) and Construct2 (C2).

Figure 23 – EPC Format for Aerospace & Defense if Using Construct 1

EPC Header	Filter Value	Manager Number: CAGE Code (MFR, CAG or SPL)	Delimiter	Serial Number (SER or UCN)	Terminator
Fixed 8-bit value is assigned by GS1, specifically: 0011 1001	See filter value section below	A space followed by 5 Character CAGE code	00 0000	Up to 30 alphanumeric characters	00 0000

Figure 24 – EPC Format for Aerospace & Defense if Using Construct 2

EPC Header	Filter Value	Manager Number: CAGE Code (MFR, CAG or SPL)	Original Part Number (PNO)	Delimiter	Serial Number (Sequential number within Part #) (SEQ)	Terminator
Fixed 8-bit value is assigned by GS1, specifically: 0011 1001	See filter value section below	A space followed by 5 Character CAGE code	Up to 32 alphanumeric characters	00 0000	Up to 30 alphanumeric characters	00 0000

The ADI EPC is made up of the following elements:

1. **EPC Header**

   This is a fixed number assigned to the ADI EPC data structure by GS1 EPCGlobal, which is unique from the header fields used by other industries. The purpose of the header field is to indicate this particular EPC identifier is structured in accordance with the ADI data format and reflects an aviation-related part. The value of this header can be found in [tds] and in hex code equals 3B.

2. **Filter Value**

   The primary purpose of filter values is to facilitate finding a part by reducing the number of reads based on part type particularly in a dense RFID tag environment (e.g., the passenger cabin. For example, if the goal is to read all the oxygen generators in the aircraft cabin, performance of the capturing application may improve by using the filter values to select the oxygen generators but instruct all other tags with different filter values to not respond.)

   The table of filter values for ADI is found in [tds] and is reproduced in Table 18 - EPC Filter Values for Aerospace and Defense.

Note:	Occasionally the ATA e-Business Program identifies changes to the table which have yet to be incorporated into [tds]. Please use filters as identified in this specification.

   When assigning filter values to tagged parts, the filter values chosen should be as specific as possible. In general, the lower numbered values in the table below are for specific categories of items that the aerospace and defense industries have identified thus far. The more generic categories are located later in the list and should be used only if a lower number value is not an accurate description. Further information is found in Table 18 - EPC Filter Values for Aerospace and Defense

3. **Manager Number**

   This is the CAGE Code of the company that commissioned the tag with this specific EPC identifier. The manager number field is always 6 characters in length (36 bits) –an ASCII space character followed by a 5-character CAGE code. 6-bit ASCII encoding as defined in Appendix G of [tds] is always used for the individual characters. Note [tds] allows DODAAC to be used, but within commercial aviation only CAGE should be used.

4. **Original Part Number (PNO, but only if serialized via Construct 2)**

   If the part is uniquely sequenced ("serialized") only within the Original Part Number (UID Construct 2), the Original Part Number (PNO) is encoded here and can have a maximum of 32 characters. This part number must be coded using the 6-bit ASCII encoding rule as defined in [tds] and Appendix B. Refer to [9-4] for clarifications regarding use of PNO. Construct 2 formats must only be built using the original Part Number (PNO).

   For companies who serialize uniquely within their CAGE code (commercial aviation preferred, also called UID Construct 1) the PNO will be left out.

5. **Alphanumeric Serial Number**

   This is also a variable-length data field and can have a length between 1 and 30 characters so that the resulting ADI EPC value is globally unique. This Serial Number must be encoded using the 6-bit ASCII encoding rule as defined in [tds].

The data in this field shall follow one of two constructs:

- Construct 1 – SER (a serial number unique within CAGE code of the MFR or CAG); or UCN (a serial number unique within CAGE code of the owner/SPL).
- Construct 2 – SEQ (a serial number unique within the original part number that is unique within the CAGE code).

These are defined in the [csdd].

Alternatively, for purposes of identification within the ATA Spec 2000 framework, the ADI EPC scheme may be used for assigning a unique identifier for RFID purposes to a part that is traditionally not serialized or not required to be serialized for other purposes (for example to tag parts from a specific lot/batch, but which aren't individually serialized). In this situation, the first character of the serial number component of the ADI EPC shall be a single '#' character. This is used to indicate that the serial number does not correspond to the serial number of the part, but rather was created only for uniqueness from an RFID perspective. The remainder of the alpha-numeric string immediately following the # character for these non-serialized parts can follow any numbering scheme as long as it is unique within the organization assigning the number. Note that this number is only used for creating uniqueness for tagging purposes and will not be considered an item's unique serial number for non-RFID purposes.

6. **Delimiter/terminator**

The Original Part Number and Serial Number fields are variable-length and therefore need to be followed by a null delimiter character. The six-bit null character (a binary 000000) is used as the delimiter, which also acts as the EPC word terminator when following the Serial Number.

3. User Memory

The User Memory block is where the bulk of the business data is stored. The content and business rules for this section is defined in sections 3 and 4 in detail based on tag type. Detailed formatting of the User Memory is described in the Appendices.

4. Reserved and TID Memory

The other two memory banks are the Reserved and TID Memory. The Reserved memory is for passwords which the aviation industry does not allow due to the need for interoperability. The TID memory contains technical details about the creator of the RFID chip and other non-business information.

5. 6-bit vs. 8-bit Encoding

This specification allows for both 6 bit and 8-bit ASCII encoding of the data. The primary difference is that 6 bit uses less memory but may possibly not contain all characters necessary for complete encoding. 6-bit encoding is required for single record tags. For dual or multi-record tags, the subject matter experts to determine if 6-bit encoding is sufficient. See Appendix B for the 6-bit encoding charts.

9-5-3. Business Data Contents

There are four ATA data types – two single record formats, a Dual-Record format and a Multi-Record format. All of these formats shall contain a non-rewritable ADI EPC identifier as described in 9-5-2.2.

Note: Throughout prior revisions of this specification, as well as on occasion in this specification, the data formats are referred to as tag formats. However, the primary consideration is the way the tag technology implementation creates "records" and allows "locking" as the logical record and locking as well as data formatting is the focus of this specification within the User memory of the tags. For more information on how tag sizes traditionally correspond to data formats, and in particular affect performance the requirements of which vary by use cases, please see the section on Use Cases (By Industry Sector).

Every data format except the utility format requires non-rewriteable birth record data that defines the part at its birth. There are four data elements that are most important and that most every company handling the part needs to know. This essential Birth Record data is found in all tag types except the utility tag (where it may be provided at the implementer's discretion) and is made up of these four pieces of key Birth Record data (see [9-4] for further explanation):

- MFR/CAG/SPL – CAGE Code of company controlling the Serial Number
- SER/UCN/SEQ – unique identity of that particular part
- PNR – Part Number of the item
- DMF – Date of Manufacture of the item

The Birth Record data is important, and also the two pieces of data (or their equivalents, see Table 3, items one and 2) that together create a globally unique number for that part number will never change.

Figure 25 – Birth Record Data

Birth Record Data
- MFR – CAGE Code
- SER – Unique Serial Number
- PNR – Part Number
- DMF – Date of manufacture

These two pieces of data (or their equivalents) create the globally unique, cradle-to-grave 'social security number'

In addition to birth data, tag data formats contain the following:

- Single Record Birth format - other non-rewritable data that is unlikely to change;
- Single Record Utility format - a user memory area which can be rewriteable;
- Dual Record format -– includes the non-rewriteable birth data as well as a rewritable record;
- Multi-Record format - a variety of rewritable and/or lockable record types,

Within the data tables below, the following general business rules apply

1. In the column labeled M/C/O, below definitions apply
    a. (M)andatory – Items listed as "M" must be included when the record is written.
    b. (C)onditional – Items listed as "C" must be included when the record is written if its corresponding condition described is satisfied. Conditions are defined in the sections following each table of entries. If a condition is not satisfied, the Conditional item may be written at the discretion of the tag originator.
    c. (O)ptional - Items listed as "O" are never required but may be included at the discretion of the tag originator. They are normally only mentioned in the specification when contributors believed the specific items are of particular interest. (See additional entries)

2. All date formats are YYYYMMDD. Note in situations where date does not need to be day specific and the exact day is not known, use the last day of the month.

1. Single Birth-Record Format

Note:	For typical use case guidance see Use Cases (By Industry Sector).

The Single Birth-Record Format is typically used on lower memory, high read distance tags. The data shall be locked. This format also works well when all that is needed is the identity of the part because all the tracking is already accomplished in their System of Record. It can also be used for supplemental information that is unlikely to change, but processes need to be put in place to either replace the tag or have the software handle exceptions should the data change on the tag after it's installed. These Birth Record formats are typically written by OEMs who create the tag from their systems. If an organization has the authority to create a new or replacement data plate on a part, they have the authority to create a Single Birth-Record format as well.

The data on the tag shall be encoded using 6-bit ASCII encoding, as defined in Appendix 13.

Single Birth-Record Format contents are listed in Table 3. Items listed shall be the first entries in the Birth Record. The order of the elements shown is highly preferred but not mandatory.

The proper format, limits, and allowed values for each data element are controlled by their definitions in [*csdd*]. If the maximum field length listed in Table 3 is less than what is specified in [*csdd*], the maximum defined in the table shall be obeyed.

If adequate space remains on the tag after the applicable Table 3 data is written (i.e. additional records can be written to the tag), then the data shall be protected at the next data layer by a CRC value. (See Appendix A for details)

Table 3 - Data in the Single Birth-Record Format

No.	Business Name	CSDD Name	TEI	Length		M/C/O
				Min	Max	
1	CAGE Code of Enterprise Controlling Serial Number	Manufacturer Code, Commercial and Government Entity Code or Supplier Code	MFR/CAG/SPL	5	5	M
2	Spec 2000 Unique Serial Number	Part Serial Number or Sequential Part Serial Number or Unique Component Identification Number	SER/SEQ/UCN	1	30	C
3	Part Number	Part Number	PNR	1	32	M
4	UID Construct Number	UID Construct Number	UIC	1	1	C
5	Manufacture Date	Manufacture Date	DMF	8	8	C
6	Life Limited Equipment Indicator	Life Limited Equipment Indicator	LLE	1	1	C
7	Current Mod Level	Part Modification Level	PML	1	100	C
8	Hazardous Material Code at Birth	Hazardous Material Code	HAZ	6	6	C
9	Service Life Expiration Date	Expiration Date	EXP	8	8	C
10	Lot Number	Lot Number/Enterprise Lot Number	LOT/LTN	1	15	C

11	Last Overhaul Date	Overhaul Date	OVD	8	8	C
12	Last Hydrostatic Test Date	Hydrostatic Test Date	DOH	8	8	C
13	Next Hydrostatic Test Date	Next Hydrostatic Test Date	DNH	8	8	O
14	CAGE Code of Enterprise controlling only the Part Number, not the Serial Number	Original Equipment Manufacturer Code	OMM	5	5	C
15	Original Part Number	Original Part Number	PNO	1	32	C
16	Embedded Life Part	See Embedded Life Part Data Structure for further details	ELP	0	0	O

1.1. Requirements and Conditions for Single Birth-Record Format

Note: All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

1. MFR/CAG/SPL – is used to indicate the CAGE code of the enterprise that controls the serial number of the part, or for non-serialized parts the enterprise that assigns the unique identity to the part. Use MFR if the Manufacturer of the part has provided the Serial Number. Use CAG instead of MFR if the CAG assigns only the serial number (not part number). Use SPL if the unique identifier (UCN) is added after the part is in service. Only one MFR, CAG or SPL is permitted in the Record.

2. SER/SEQ/UCN – the serial number of the tagged item that allows for a globally unique number. (see chapter 9-4 for more information) Required for serialized parts; i.e. if the serial number exists, it must be included. There are only four combinations that can be used:

   a. If the Serial Number is globally unique across the Manufacturer (MFR), the combination of MFR/SER shall be used.

   b. If the Serial Number is not unique globally across the manufacturer, but rather is unique within Original Part Number PNO (=Construct 2), the combination of MFR/PNO/SEQ shall be used.

   c. If the Serial Number is assigned by a sub-tier supplier, the combination of CAG/SER will be used

   d. If serialization is added by another company after birth, the combination of SPL/UCN shall be used.

3. PNR - Current Part Number is required and reflects the most recent configuration of the part. Normally this is static during a part's life, however if the part number rolls, a new Birth Record tag should be created, and the original part number can be maintained in the optional PNO field below if desired.

Note: If the Part Number rolls/changes during the life of the part, the existing RFID tag should be removed from the part and a new one applied.

4. UIC is the UID Construct Number– only values of 1 or 2 are allowed. This field is required for serialized parts. A value of 1 indicates the part is serialized using either SER or UCN. A value of 2 indicates the part is serialized using a sequence number only (SEQ) and requires PNO to make a globally unique identity.

5. DMF, the Manufacture Date using the format YYYYMMDD. This field is required for all new parts and whenever the DMF is known. For legacy parts, the entry may be omitted if the DMF is not known.

6. LLE - Life Limited Equipment Indicator is Mandatory if the part is limited life equipment. A value of 1

in the value field indicates a limited life part; otherwise omit the field.

7. PML, Part Modification Level indicates the mod level status of a part at the time it is tagged, if a part is subject to modifications without a part number change. If a part is expected to go through substantial modifications during its life, it is recommended a dual-record or multi-record tag is used to capture the change.

8. HAZ, the Hazardous Material Code is a Conditional field, required if the item has hazard material as defined in [icao]. Up to three data entries for this HAZ field are permitted in the Birth Record for parts that meet multiple hazard material conditions.

9. EXP (Expiration Date) is required if the part has a Service Life Expiration date. This should not be confused with hard time or life limited items which should be tracked external to the RFID tag (hard time & life limited items are those which a maintenance action or scrapping is required at a certain interval – normally based on operating time or cycles. (See also LLE.) Format is YYYYMMDD

10. LOT, Lot Number or LTN, Enterprise Lot Number is used if a part number is not serialized but has been manufactured with tracked Lots. This field is required for non-serialized parts that have Lot Numbers. When a batch of parts is RFID-tagged for tracking purposes, the SPL/UCN using C1 will be utilized and the LOT/LTN is a reference back to the OEM's lot number.

11. OVD, Last Overhaul Date should be used if a part has been overhauled to show the Overhaul Date. Format is YYYYMMDD. Note this would normally only be used on a Single Birth-Record format in cases where the tag is created after it is in service.

12. DOH, Date of Last Hydrostatic Test shall be used to provide the date of the last Hydrostatic Date. Format is YYYYMMDD.

13. DNH, Date of Next Hydrostatic Test can be used to provide the due date of the next Hydrostatic Test. Format is YYYYMMDD

14. OMM, the CAGE Code of the Original Equipment Manufacturer if it owns/controls the part number (but not the serial number) of the part. Only used when the creator of the Part Number is different from the creator of the Serial Number.

15. PNO, Original Part Number shall be provided in cases that the part number has been modified, and the PNR is updated and a new tag is created.

16. ELP, Embedded Life Part data can be provided in cases in which an embedded component such as a battery cannot be tagged, but has a life limit which is less than the component in which it is contained. See Embedded Life Part Data Structure for details on encoding.

1.2. Requirements and Conditions for Single Birth-Record Format

Beyond the standard TEIs associated with the Single Birth-Record Format, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Table 3 - Data in the Single Birth-Record Format. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

2. Single Record Utility Format

Note:	For typical use case guidance see Use Cases (By Industry Sector).

The Single Record Utility Format is intended for tags where business requirements are such that Single Birth-Record Formats do not meet the business requirements. Examples are when airlines tag existing, legacy parts they have on-aircraft and in-stock while waiting for OEM components to come already tagged. Utility tags can be created by any organization for their internal use but are not intended for data interchange between companies.

The Single Record Utility Format shall be encoded using 6-bit ASCII encoding, as defined in Appendix B.

Because Utility tags are not to leave the control of the tagging company, the EPC structure will consist of the supplier of the data (SPL) CAGE Code and a unique component number (UCN). Only a Construct 1 (C1) data structure is allowed in Utility tags. A full Birth Record set of data is allowed in Utility tags but is not required.

After the Record is written to the tag, the tag can be left in an open, rewriteable state, or during its life, the owner may choose to make permanent part or all of the tag. This can be achieved by employing techniques appropriate to the tag such as permalocking or using sections of memory that are inherently archived. Once the data entries are made permanent, there is no possibility to modify or erase. When the tag is left in an open, rewriteable state, adequate alternate business processes should be employed to help confirm the integrity of the data on the tag.

Below in Table 4 are some suggested, typical values that can be used in the Single Record Utility Format. However, if using other fields, it is recommended to follow the Additional Information rules shown in 9-5-3.2.1 below.

Table 4 - Possible Data Elements in the Single Record Utility Format

No.	Business Name	CSDD Name	TEI	Length		M/C /O
				Min	Max	
1	CAGE Code of Enterprise Controlling Serial Number	Manufacturer Code, Commercial and Government Entity Code or Supplier Code	MFR/CAG/ SPL	5	5	O
2	Spec 2000 Unique Serial Number	Part Serial Number or Sequential Part Serial Number or Unique Component Identification Number	SER/SEQ/	1	30	O
3	Part Number	Part Number	PNR	1	32	O
4	UID Construct Number	UID Construct Number	UIC	1	1	O
5	Manufacture Date	Manufacture Date	DMF	8	8	O
6	Location on Aircraft	Location on Aircraft r	LAC	1	13	O
7	Last Inspection Date	Last Inspection Date	PRV	8	8	O

2.1. Additional Information

Beyond the optional above suggested TEIs associated with the Single Record Utility Format, it is possible to add additional information of interest. The additional data should either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

3. Dual Record Format

Note:	For typical use case guidance see Use Cases (By Industry Sector).

The Dual Record Format contains both a locked Birth Record and an unlocked Lifecycle Record to enable updating the tag with more recent information. Thus, this solution can accommodate needs that include not only static part identification (Birth Record) but also changing part attributes (Lifecycle Record). Dual Record Formats are typically created by OEMs and the Birth Record locked, but any company can change the Lifecycle data as appropriate (e.g., new expiration date). If an organization has the authority to create a new or replacement data plate on a part, they have the authority to create the Birth record portion of the Dual-Record Format as well.

If organizations such as airlines or MRO service agencies expect to make use of the Lifecycle Record, it is important that this option be specified when the part is tagged (presumably by the OEM or tag retrofitter) so that adequate storage space is set aside.

3.1. Birth Section (Dual Record Format)

The Birth Record data shall reflect information that was true at the time the part was manufactured. Birth Record contents are listed in Table 5 - Data in the Birth Record for the Dual Record Format below. Items listed in the table shall be included in the Birth Record at most one time, except for HAZ which may be repeated. The order of the elements shown is highly preferred but not mandatory.

Optional ('O') items listed in the table are commonly of interest within the industry but don't carry any specific significance.

After the Birth Record is written it shall be made permanent (cannot be modified or erased) using a means appropriate to the tag (examples include block-permalocking and using sections of memory that are inherently archival) while leaving rewriteable the area dedicated to the Lifecycle Record. Entries into the Birth Record may be written at different times, but the Record must be locked before the tag leaves the control of the tagging authority.

The proper format, limits, and allowed values for each data element are controlled by their definitions in [csdd]. If the maximum field length listed in Table 5 is less than what is specified in [csdd], the maximum described in the table must be obeyed.

Table 5 - Data in the Birth Record for the Dual Record Format

No.	Business Name	CSDD Name	TEI	Length		M/C/O
				Min	Max	
1	CAGE Code of Enterprise Controlling Serial Number	Manufacturer Code, CAGE Code or Supplier Code	MFR/CAG/SPL	5	5	M
2	Spec 2000 Unique Serial Number	Part Serial Number or Sequential Part Serial Number or Unique Component Identification Number	SER/SEQ/UCN	1	30	C
3	Current Part Number	Part Number	PNR	1	32	M
4	UID Construct Number	UID Construct Number	UIC	1	1	C
5	Manufacture Date	Manufacture Date	DMF	8	8	C
6	Service Life Expiration Date	Expiration Date	EXP	8	8	C
7	Part Description	Part Description	PDT	1	32	C

8	Electrostatic Sensitive Device Indicator	Electrostatic Sensitive Device Indicator	ESD	1	1	C
9	Life Limited Equipment Indicator	Life Limited Equipment Indicator	LLE	1	1	C
10	International Commodity Code	International Commodity Code	ICC	1	1	O
11	Lot Number / Enterprise Lot Number	Lot Number / Enterprise Lot Number	LOT/LTN	1	15	C
12	Country of Manufacture	Country of Manufacture	CNT	2	2	O
13	Original Manufacture Weight	Weight	WGT	1	8	O
14	Unit of Measure Code	Unit of Measure Code	UNT	2	2	C
15	Hazardous Material Code at Birth	Hazardous Material Code	HAZ	6	6	C
16	Export Control Classification Number	Export Control Classification Number	ECC	5	14	O
17	Software Indicator	Software Indicator	SWI	1	1	O
18	Airworthiness Certificate Tracking Number from original manufacturer	Certificate Tracking Number	TDN	1	32	O
19	NATO Stock Number	NATO Stock Number	NSN	13	13	O
20	Fabricator (if different from MFR or CAG)	Fabricator	FAB	5	5	O
21	Last Hydrostatic Test Date	Hydrostatic Test Date	DOH	8	8	C
22	Next Hydrostatic Test Date	Next Hydrostatic Test Date	DNH	8	8	O
23	Last Overhaul Date	Overhaul Date	OVD	8	8	C
24	CAGE Code of Enterprise controlling only the Part Number, not the Serial Number	Original Equipment Manufacturer Code	OMM	5	5	C
25	Original Part Number	Original Part Number	PNO	1	32	C

3.1.1. Requirements and Conditions for Birth Record Data in the Dual Record Format

Note:	All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

1. MFR/CAG/SPL – is used to indicate the CAGE code of the enterprise that controls the serial number of the part, or for non-serialized parts the enterprise that assigns the unique identity to the part. Use MFR if the Manufacturer of the part has provided the Serial Number. Use CAG instead of MFR if the CAG assigns only the serial number (not PNO). Use SPL if the unique identifier (UCN) is added after the part is in service. Only one MFR, CAG or SPL is permitted in the Record

2. SER/SEQ/UCN – the serial number of the tagged item that allows for MFR/SER to be a globally unique number. (see chapter 9-4 for more information) Required for serialized parts; i.e. if the serial number

exists, it must be included. There are only four combinations that can be used:

- o If the Serial Number is globally unique across the Manufacturer (MFR), the combination of MFR/SER shall be used.
- o If the Serial Number is not unique globally across the manufacturer, but rather is unique within Original Part Number PNO (=Construct 2), the combination of MFR/PNO/SEQ shall be used.
- o If the Serial Number is assigned by a sub-tier supplier, the combination of CAG/SER will be used.
- o If serialization is added by another company after birth, the combination of SPL/UCN shall be used.

3. PNR - Current Part Number is required and reflects the most recent configuration of the part. Normally this is static during a part's life, however if the part number rolls, a new tag should be created, and the original part number can be maintained in the optional PNO field below if desired.

Note:	If the Part Number rolls/changes during the life of the part, the existing RFID tag should be removed from the part and a new one applied.

4. UIC is the UID Construct Number– only values of 1 or 2 are allowed. It is required for all serialized parts. A value of 1 indicates the part is serialized using either SER or UCN. A value of 2 indicates the part is serialized using a sequence number only (SEQ) and requires PNO to make a globally unique identity. For non-serialized parts, the entry shall be omitted.

5. DMF, the Manufacture Date using the format YYYYMMDD. This field is required for all new parts and whenever the DMF is known. For legacy parts, the entry may be omitted if the DMF is not known.

6. EXP (Expiration Date) is required if the part has a Service Life Expiration date. This should not be confused with hard time items that should be tracked external to the RFID tag (hard time & life limited items are those which a maintenance action or scrapping is required at a certain interval – normally based on operating time or cycles. See also LLE.). Date format YYYYMMDD

7. PDT, the Part Description Text data field, is required when space permits. It must have non-blank and non-null characters in the value field. The Part Description (PDT) field is constrained from the CSDD definition to no more than 32 alphanumeric characters.

8. ESD, the Electrostatic Sensitive Device Indicator, is required, with a value of 1 if ESD handling precautions are necessary or recommended; otherwise do not use the field. For legacy parts this is not required if information is unavailable at the time of tagging.

9. LLE - Life Limited Equipment Indicator is required if the part is limited life equipment. A value of 1 in the value field indicates a limited life part; otherwise do not use the field.

10. ICC, the International Commodity Code is equivalent to the first 6 characters of the International Harmonized Commodity Description code. Those codes may be found online on government web sites. The valid format for the ICC value is numeric only. Current detailed information can be found on the United States International Trade Commission web site: http://www.usitc.gov/tata/hts/index.htm. See Chapter 88.

11. LOT, Lot Number or LTN, Enterprise Lot Number is used if a part number is not serialized but has been manufactured with tracked Lots. This field is required for non-serialized parts that have Lot Numbers. When a batch of parts is RFID-tagged for tracking purposes, the SPL/UCN using C1 will be utilized and the LOT/LTN is a reference back to the OEM's lot number.

12. CNT, Country of Manufacture, indicates which country the component was manufactured in. The list of two character ISO country codes are defined here: http://www.iso.org/iso/country_names_and_code_elements. Components manufactured/assembled in multiple countries should use the Country of Manufacture according to appropriate regulations.

13. WGT is the original manufactured weight of the unit. It shall be used in conjunction with UNT which identifies the Unit of Measure Code (such as LB or KG). One purpose of this data element is to provide technicians with an approximate weight for human factors issues. Thus, it is not necessary for that use to be an exact weight for configuration management purposes, or to include any changeable values like the weight of drainable fluids that may later be loaded into the component. For legacy parts, the entry may be omitted.

14. UNT – Mandatory when WGT data is included. Valid codes are listed in the CSDD (common ones include KG, LB, GM, OZ)

15. HAZ, the Hazardous Material Code is required if the item has hazard material as defined in the [icao]. Multiple HAZ code and value pairs are permitted for parts that meet multiple hazardous material conditions.

16. ECC is the Export Control Classification Number and is an alphanumeric classification used in the Commerce Control List to identify items for export control purposes. Aerospace manufacturers usually are aware of ECC Numbers before shipping a part, but they can also be determined via the following web site: http://www.bis.doc.gov/policiesandregulations/index.htm#ear.

17. SWI, the Software Indicator indicates the part includes an upgradable software component. A value of 1 is used if the part has an upgradeable software component; otherwise do not use the field.

18. TDN, Certificate Tracking Number is the tracking number established by the organization or individual issuing airworthiness or conformance data that uniquely identifies the information set. This represents the unique tracking number found on an FAA 8130-3, EASA Form 1, or equivalent documents. In the context of the birth record, this is the Certificate Tracking Number provided by the manufacturer on the original part. If the Certificate Tracking Number is not available at the time the part is manufactured, but required by regulations upon shipment to the customer, it may be stored in the Lifecycle Record.

19. NSN, NATO Stock Number identifies a stock/classification number often used in Defense applications. The number is stored without dashes even though dashes are often displayed in human readable applications. Source reference for the NSN construct is: www.nato.int/structur/AC/135/ncs_guide/english/e_1-6-5.htm.

20. FAB, Fabricator, represents the CAGE Code of a company that fabricates the part, but does not hold the design authority responsible for the actual Part Number and is different than MFR or CAG. This may be used by the design authority on certain parts.

21. DOH – Hydrostatic Test Date is required when a Hydrostatic Test has been done. The latest DOH, if any will be shown in the Lifecycle Record. Date Format YYYYMMDD. Note values in the Lifecycle record may override.

22. DNH, Date of Next Hydrostatic Test can show the due date of the next Hydrostatic Test. Date Format YYYYMMDD. This might be used in the birth record when tagging a non-new part. An DNH in the Lifecycle Record overrides this data. Note values in the lifecycle record may override.

23. OVD, Date of Last Overhaul is required when an overhaul was last accomplished. Date Format YYYYMMDD. An OVD in the Lifecycle Record overrides this data.

24. OMM, the CAGE Code of the Original Equipment Manufacturer if it owns/controls the part number (but not the serial number) of the part. Only used if creator of part number and serial number are different.

25. PNO, Original Part Number can be provided in cases that the part number has been changed (e.g. through an upgrade or modification), and the PNR is updated and a new tag is created.

3.1.2. Additional Information

Beyond the standard TEIs associated with the Dual Record Format, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Table 5 - Data in the Birth Record for the Dual Record Format. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

3.2. Lifecycle Section (Dual-Record Format)

Note:	All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

In addition to the Birth Record, a Dual-Record Format must contain a rewritable Lifecycle Record.

The Lifecycle Record shall never be locked or permalocked. Since the lifecycle record is left in an open, rewriteable state, adequate alternate business processes should be employed to help confirm the integrity of the data on the tag.

The Lifecycle Record shall be encoded using either 6-bit or 8-bit ASCII encoding as defined in Appendix B. For information about proper pre-allocation of memory on the tag, please refer to Commissioning the Tag - Pre-Allocation

Data can be added to the Lifecycle Record at any time. Some data may be available at the time the Birth Record is written and may be added at that time.

Whenever data is to be added to the Lifecycle Record, the Mandatory and Conditional TEIs listed in Table 6 must be respected. All required data elements must be included whenever the Record is updated.

Table 6 - Data in the Lifecycle Record

No.	Business Name	CSDD Name	TEI	Length		M/C /O
				Min	Max	
1	Current Part Number	Part Number	PNR	1	32	C
2	Current Part Modification Level	Part Modification Level	PML	1	100	C
3	Service Life Expiration	Expiration Date	EXP	8	8	C
4	Last Hydrostatic Test Date	Hydrostatic Test Date	DOH	8	8	C
5	Next Hydrostatic Test Date	Next Hydrostatic Test Date	DNH	8	8	O
6	Last Overhaul Date	Overhaul Date	OVD	8	8	C
7	Most Recent Authorized Release Certificate Tracking Number	Certificate Tracking Number	TDN	1	32	C
8	Additional Hazardous Material Code	Hazardous Material Code	HAZ	6	6	C
9	Embedded Battery Expiration Date	Battery Expiration date	BAT	8	8	C
10	Last Inspection date	Previous Inspection Date	PRV	8	8	C

10	Embedded Life Part	See Embedded Life Part Data Structure for further details.	ELP	0	0	O

A table of commonly used entries is listed in the table below, for illustrative purposes only. Information about the writing additional information is found in Additional Entries

Table 7 - Common additional data items in the Lifecycle Record

No.	Business Name	CSDD Name	TEI	Length		M/C /O
				Min	Max	
1	Location on Aircraft	Location on Aircraft	LAC	1	13	O
2	Station Code	Maintenance Station Code	MNC	3	5	O
3	Weighing Date	Date of Weighing	DOW	8	8	O

3.2.1. Requirements and Conditions for Birth Record Data in the Dual Record Format

Note:	All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

1. PNR – Current Part Number is required if the part number has changed from the part number in the Birth Record.

2. PML - Part Modification Level indicates the current mod level status of a part. This field is required any time a part is modified beyond the basic part number. If more than one mod is included, they are all included in the value field of a single PML entry and separated by commas only (no spaces).

3. EXP – Service Life Expiration Date. If the expiration date is different than what is recorded in the birth record (e.g. Shelf Life has been extended), the updated expiration date shall be written in the Lifecycle record. Format is YYYYMMDD

4. DOH – Hydrostatic Test Date is required when a Hydrostatic Test has been done. The latest DOH, if any will be shown in the Lifecycle Record. Date Format YYYYMMDD

5. DNH, Date of Next Hydrostatic Test can show the due date of the next Hydrostatic Test. Date Format YYYYMMDD

6. OVD, Date of Last Overhaul indicates when an overhaul was last accomplished. Date Format YYYYMMDD

7. TDN, Certificate Tracking Number is the most recent Authorized Release Certificate number (e.g. 8130-3, EASA Form 1, etc.) based on the most recent action returning the part to service. It is required if any Authorized Release Certificate has been issued for the component.

8. HAZ – If material in a component is later deemed Hazardous by the authorities, the new Hazardous Material Code should be added to the Lifecycle Record. Multiple HAZ can be used if required. Each HAZ entry is assumed to indicate an additional hazardous material, not a modification of a previous HAZ entry from the Birth Record or the Lifecycle Record.

9. BAT – indicates the date on which the battery expires. Format YYYYMMDD. If a battery item is part of an Embedded Life part data structure, this field is not used.

10. PRV, previous inspection date. Format is YYYYMMDD

11. ELP, Embedded Life Part data flag can be provided in cases in which an embedded component such as

a battery cannot be tagged, but has a life limit which is less than the component in which it is contained. See Embedded Life Part Data Structure for details on encoding. Note that ELP data is always the last data set in the Lifecycle Record and must be contiguous.

3.2.2. Additional Information

Beyond the standard TEIs associated with the Dual Record Format Lifecycle Record, it is possible to add additional information of interest immediately following the Lifecycle data shown above. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

4. Multi-Record Format

Note:	For typical use case guidance see Use Cases (By Industry Sector).

In the same manner as the other tags covered in this chapter, the multi-record format is initially created with a Birth Record that contains information about the origin and identity of the part. It is also created with a Current Data Record that contains at a minimum the PNR (current part number). Unlike the other tags, the multi-record tag has memory space available for Part History Records in which maintenance event information may be written creating a form of abbreviated maintenance history, providing all maintenance providers write a record. There can be multiple Part History Records, depending upon the size of the tag. These records, however, do not replace the operating organization's System of Record (SoR) and there must be no discrepancy between the tag data and data in the SoR. Lastly, the multi-record tags have a Scratchpad Record which can be used for ad hoc comments regarding the part or maintenance that has been performed upon it. If organizations such as airlines or MRO service agencies expect to make use of the Lifecycle Record, it is important that this option be specified when the part is tagged (presumably by the OEM or tag retrofitter) so that adequate storage space is set aside.

4.1. Birth Record (Multi-Record Format)

The Birth Record is meant to hold the basic identity of the tagged item. Birth Record data shall reflect information that was true at the time the part was manufactured. If an organization has the authority to create a new or replacement data plate on a part, they have the authority to create a new Birth Record as well.

After the Birth Record is written it shall be made permanent (cannot be modified or erased) using a means appropriate to the tag (examples include permalocking, block permalocking and using sections of memory that are inherently archival). Entries into the Birth Record may be written at different times, but the Record must be locked before the tag leaves the control of the tagging authority.

Birth Record contents are listed in Table 8 - Multi-Record Format Birth Record Data below. Each item may be included at most one time, other than HAZ which may be used up to three times. The order of the first five data elements is required while the order of the remainder are optional, although the order shown is strongly preferred.

If a conditional data element is not used, that TEI should be skipped entirely, rather that filling in the data value with zeroes or blank characters.

The proper format for each data element, the limits and allowed values are controlled by the definition in [csdd]. If the maximum field length listed in the data tables below in and Table 8 and Table 9 is less than what is specified in [csdd], the maximum described here must be obeyed.

Table 8 - Multi-Record Format Birth Record Data

No.	Business Name	CSDD Name	TEI	Length		M/C /O
				Min	Max	
1	CAGE Code of Enterprise Controlling Serial Number	Manufacturer Code, CAGE Code or Supplier Code	MFR, CAG or SPL	5	5	M
2	Spec 2000 Unique Serial Number	Part Serial Number or Sequential Part Serial Number or Unique Component Identification Number	SER or SEQ or UCN	1	30	C
3	Original Part NumRober	Original Part Number	PNO	1	32	M
4	UID Construct Number	UID Construct Number	UIC	1	1	C
5	Part Description	Part Description	PDT	1	32	M
6	Manufacture Date	Manufacture Date	DMF	8	8	C
7	Original Manufacture Weight	Weight	WGT	1	8	C
8	Unit of Measure code	Unit of Measure code	UNT	2	2	C
9	Hazardous Material Code at Birth (1)	Hazardous Material Code	HAZ	6	6	C
10	Electrostatic Sensitive Device Indicator	Electrostatic Sensitive Device Indicator	ESD	1	1	C
11	Shelf Life Expiration Date at Birth	Expiration Date	EXP	8	8	C
12	Life Limited Equipment Indicator	Life Limited Equipment Indicator	LLE	1	1	C
13	Lot Number / Enterprise Lot Number	Lot Number / Enterprise Lot Number	LOT / LTN	1	15	C
14	Country of Manufacture	Country Code	CNT	2	2	C
15	Software Indicator	Software Indicator	SWI	1	1	C
16	Airworthiness Certificate Tracking Number from original manufacturer	Certificate Tracking Number	TDN	1	32	C
17	Modification Level at Birth	Part Modification Level	PML	1	100	C
18	NATO Stock Number	NATO Stock Number	NSN	13	13	O
19	International Commodity Code	International Commodity Code	ICC	6	6	O
20	Fabricator (if different from MFR or CAG)	Fabricator	FAB	5	5	O
21	CAGE Code of Enterprise controlling only the Part Number, not the Serial Number	Original Equipment Manufacturer	OMM	5	5	C

4.1.1. Requirements and Conditions for Birth Record Data

Note:	All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

1. MFR/CAG/SPL – is used to indicate the CAGE code of the enterprise that controls the serial number of the part, or for non-serialized parts the enterprise that assigns the unique identity to the part. Use MFR if the Manufacturer of the part has provided the Serial Number. Use CAG instead of MFR if the CAG assigns only the serial number (not PNO). Use SPL if the unique identifier (UCN) is added after the part is in service. Only one MFR, CAG or SPL is permitted in the Record.

2. SER/SEQ/UCN – the serial number of the tagged item that allows for MFR/SER to be a globally unique number. (see 9-4 for more information) Required for serialized parts; i.e. if the serial number exists, it must be included. There are only four combinations that can be used:

    a. If the Serial Number is globally unique across the Manufacturer (MFR), the combination of MFR/SER shall be used.

    b. If the Serial Number is not unique globally across the manufacturer, but rather is unique within Original Part Number PNO (=Construct 2), the combination of MFR/PNO/SEQ shall be used.

    c. If the Serial Number is assigned by a sub-tier supplier, the combination of CAG/SER will be used.

    d. If serialization is added by another company after birth, the combination of SPL/UCN shall be used.

3. PNO, Original Part Number is required. Should reflect the part number at time of manufacture. PNR in the current record will be the same as PNO until such time as the part number rolls due to an upgrade. See Current Data Record and Part History Records for more info.

4. UIC is the UID Construct Number– only values of 1 or 2 are allowed. This field is required for serialized parts. A value of 1 indicates the part is serialized using either SER or UCN. A value of 2 indicates the part is serialized using a sequence number only (SEQ) and requires PNO to make a globally unique identity. For non-serialized parts, UIC shall be omitted.

5. PDT, Part Description Text data field, is always required and must have non-blank and non-null characters in the value field. The Part Description (PDT) field is constrained from [csdd] definition to no more than 32 alphanumeric characters.

6. DMF, the Manufacture Date using the format YYYYMMDD. This field is required for all new parts and whenever the DMF is known. For legacy parts, the entry may be omitted if the DMF is not known.

7. WGT is the original manufactured weight of the unit. It shall be used in conjunction with UNT which identifies the Unit of Measure Code (such as LB or KG). One purpose of this data element is to provide technicians with an approximate weight for human factors issues. Thus it is not necessary for that use to be an exact weight for configuration management purposes, or to include any changeable values like the weight of drainable fluids that may later be loaded into the component. This is a required field if the tagged item weighs more than 75 lbs (34 kg).

8. UNT – Unit of Measure Code is required when WGT data is included. Valid codes are listed in the CSDD (common ones include KG, LB, GM, OZ)

9. HAZ, the Hazardous Material Code is required if the item has hazard material as defined in [icao]. Multiple HAZ value pairs are permitted for parts that meet multiple hazardous material conditions.

10. ESD, the Electrostatic Sensitive Device Indicator, is required with a value of 1 if ESD handling precautions are necessary or recommended; otherwise do not use the field. For legacy parts this is not

required if information unavailable at the time of tagging.

11. EXP (Expiration Date) is required if the part has a shelf life expiration date. This should not be confused with hard time items that should be tracked external to the RFID tag (hard time & life limited items are those which a maintenance action or scrapping is required at a certain interval – normally based on operating time or cycles. See also LLE.) Format is YYYYMMDD

12. LLE - Life Limited Equipment Indicator is required if the part is limited life equipment. A value of 1 in the value field indicates a limited life part; otherwise do not use the field.

13. LOT, Lot Number or LTN, Enterprise Lot Number is a Conditional field indicating whether this component was part of a batch of parts that the OEM wanted to track by a batch number. This field is required for non-serialized parts that have Lot Numbers.

14. CNT, Country of Manufacture, is a Conditional code indicating which country the component was manufactured in. The list of two character ISO country codes are defined here: http://www.iso.org/iso/country_names_and_code_elements. Components manufactured/assembled in multiple countries should use the Country of Manufacture according to appropriate regulations. This field is required if a manufacturer's local regulations require Country of Origin to be shown on the part.

15. SWI, the Software Indicator indicates the part includes an upgradable software component. This field is required, with a value of 1 if the part has an upgradeable software component; otherwise do not use the field. Note that software part numbers are not normally listed in the birth record.

16. TDN, Certificate Tracking Number is the tracking number established by the organization or individual issuing airworthiness or conformance data that uniquely identifies the information set. This is a Conditional data element that represents the unique tracking number found on an FAA 8130-3, EASA Form 1, or equivalent documents. In the context of the birth record, this is the Certificate Tracking Number provided by the manufacturer on the original part. If the Certificate Tracking Number is not available at the time the part is manufactured, but required by regulations upon shipment to the customer, it will be stored in a Part History Record and reflected in the Current Data Record. If regulations require the submittal of this document, the TDN is required either in the birth record or in the part history record.

17. PML, Part Modification Level, indicates the mod level status of a part before it leaves the OEM's facility as a new part. Note that in the context of the birth record, this only shows the modification level of the part at the time it leaves the factory. On-going changes to the mod level will be stored in the Current Data Record and the Part History Records. This field is required if the part has been modified beyond its basic part number at time of delivery. If more than one mod is included, they are all included in the value field of a single PML entry and separated by commas only (no spaces).

18. NSN, NATO Stock Number identifies a stock/classification number often used in Defense applications. The number is stored without dashes, even though dashes are often displayed in human readable applications Source reference for the NSN construct is: www.nato.int/structur/AC/135/ncs_guide/english/e_1-6-5.htm

19. ICC, the International Commodity Code is equivalent to the first 6 characters of the International Harmonized Commodity Description code. Those codes may be found online on government web sites. The valid format for the ICC value is numeric only. Current detailed information can be found on the United States International Trade Commission web site: http://www.usitc.gov/tata/hts/index.htm. See Chapter 88.

20. FAB, Fabricator, represents the CAGE Code of a company that fabricates the part, but does not hold the design authority responsible for the actual Part Number and is different than MFR or CAG. This may be required by the design authority on certain parts.

21. OMM, the CAGE Code of the Original Equipment Manufacturer if it controls the part number (but not the serial number) of the part. Only used if creator of part number and serial number are different.

4.1.2. Additional Information

Beyond the standard TEIs associated with the Multi-Record Format Birth Record, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Table 8 - Multi-Record Format Birth Record Data. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries

4.2. Current Data Record (Multi-Record)

There are a few key pieces of data that are almost always needed by the end user. For the fastest possible data access, the most recent versions of these crucial data items need to be stored in a known location on the AIT tag. A prime example is the Current Part Number, which may or may not be the same Original Part Number until it is changed due to modification or upgrade. Each update to the current Part Number (PNR) will be stored in a different Part History Record, but to prevent the reader from needing to read the entire chip in order to determine the Current Part Number, this important piece of data will be written into the Current Data Record (CDR) when the tag is initially written and each time it is changed in a Part History Record. Note that the CDR is not simply a copy of the most recent Part History Record; it is a collection of certain data elements and their most recent values, which may be scattered over the Birth Record and several Part History Records.

All Multi-Record Tags must contain exactly one CDR. The CDR must be capable of holding all mandatory data items and all conditional items that are required by the conditions. For information about proper pre-allocation of memory on the tag, please refer to Commissioning the Tag - Pre-Allocation.

The data contents of the CDR are listed in Table 9 - Current Data List. If any of the items listed in the table appear in the Birth Record or in a Part History Record, the most recent version of that item must be included in the CDR. While the order of the data elements in the table is preferred, it is not mandatory.

Hence the CDR will often contain a subset of the items listed in the table; new items will appear in the CDR once the TEI is used in a Part History Record. TEIs shall only be removed from the CDR if a corresponding Part History Record removes the need for the CDR record (e.g. LAC would be removed if the most recent part history was a part removal). Only the most recent value of a TEI is used in the CDR.

Only those items listed in the data table are allowed and each item may be used up to one time, other than HAZ which may be used up to three times. No additional entries such as those defined in Additional Entries shall be used in the CDR.

The CDR shall never be locked or permalocked. Since the CDR is left in an open, rewriteable state, adequate alternate business processes should be employed to help confirm the integrity of the data on the tag.

The entire CDR can be rewritten at any time, provided it reflects the most recent versions of the data contained in the Birth Record and all Part History Records, and includes all the necessary data elements. The exception is the Hazardous Material Code (HAZ) which is required in the CDR only if new ones are added beyond those originally listed in the Birth Record.

Table 9 - Current Data List

No.	Business Name	CSDD Name	TEI	Length		M/C /O
				Min	Max	
1	Current Part Number	Part Number	PNR	1	32	M
2	Current Part Modification Level	Part Modification Level	PML	1	100	C
3	Condition Code	Condition Code	CND	3	3	C
4	Current Shelf Life Expiration	Expiration Date	EXP	8	8	C
5	Most Recent Authorized Release Certificate Tracking Number	Certificate Tracking Number	TDN	1	32	C

6	Additional Hazardous Material Code (1)	Hazardous Material Code	HAZ	6	6	C
7	Additional Hazardous Material Code (2)	Hazardous Material Code	HAZ	6	6	C
8	Additional Hazardous Material Code (3)	Hazardous Material Code	HAZ	6	6	C
9	Owner's Code	Owner Code	ONR	2	5	C
10	Location On Aircraft	Location On Aircraft	LAC	1	13	C
11	Airline Stock Number	Airline Stock Number	ASN	1	11	C

4.2.1. Requirements and Conditions for Current Data Record

As described above, only the items listed in Table 9 - Current Data List are allowed in the CDR.

The Current Part Number (PNR) is mandatory. All the other items are Conditional based on whether a Part History record was added to change this data.

All other elements shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.

Note: Condition Code (CND) while accurate at the time that the corresponding Birth Record or Part History Record was written, is not always reflective of the current condition of the part. For example, if a fault, damage or other issue has occurred but the RFID tag has not yet been updated, the part would be considered unserviceable until that point in which it is certified as serviceable and the new part history record is written.

4.3. User Scratchpad Record (Multi-record)

A Multi-Record Tag shall include one User Scratchpad Record. It is a rewritable record intended to be the equivalent of an electronic 'sticky note' to facilitate communication between Line Mechanic and Bench Mechanic, or between any interested parties concerning helpful information about the tagged component. It is meant to be a source of unofficial information that may be useful to someone at a later point in time (e.g. "component was hot when removed").

The User Scratchpad Record is a single record that may contain multiple entries. Each record entry shall use the format ACO__*ACD ___*REM ___* (or ACO_*ACD_*xxx_ in the case an alternate TEI is used) as shown in Table 10 – User Scratchpad Record Entry Contents. As additional Scratchpad entries are added each will include the appropriate ACD__*ACD__*… data. As with other records, the * character delimits between data elements. If the next TEI is ACO, it marks the beginning of another scratchpad entry. The end of the payload is still the null terminator (or the end of the record).

The Scratchpad Record shall always be encoded using 8-bit ASCII encoding as defined in Appendix B.

Before a new scratchpad entry is written, if there is adequate space in the existing Scratchpad Record then new entries may be appended without deletions. If space must be allocated for the new entry, then previous entries are deleted starting with the oldest. Only complete entries are to be deleted, including all data elements and delimiters.

The User Scratchpad Record shall be a rewritable record and shall never be locked, even if an unlock capability is provided. If an entry is considered worthy of being archived, it can be moved to a Part History Record.

Table 10 - User Scratchpad Record Entry Contents

Business Term	TEI	Length		Mand/Cnd	Remarks
		Min	Max		
Action Company CAGE Code	ACO	5	5	M	Identifies which company is making the comment
Action Date	ACD	8	8	M	YYYYMMDD
Comment/remark	REM	1	344	C	Free text

4.3.1. Requirements and Conditions for Scratchpad Record Data

ACO is required whenever a scratchpad entry is written. It shall hold the CAGE Code of the company making the entry.

ACD is required whenever a scratchpad entry is written and shall use the YYYYMMDD date format. The data value shall represent the date the entry is written to the tag.

REM is required if no other TEIs beyond ACO and ACD are included in the entry. If other TEIs are included, REM is optional. The value shall be a string of up to 344 ASCII characters.

4.3.2. Additional Information

Beyond the standard TEIs associated with the Scratchpad, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Table 10 - User Scratchpad Record Entry Contents. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

4.4. Part History Records (Multi-Record)

Part History Records (PHR) are permanent records related to maintenance and operations activities associated with a tagged part. Multi-Record Tags are required to have space to accommodate at least one Part History Record, although more commonly many PHRs will be written to a single tag. The organization commissioning the tag should use its knowledge of the part category to determine size to store enough part history records as may typically be expected for that part category.

After writing a Part History Record, it shall be made permanent (cannot be modified or erased) using a means appropriate to the tag. Corrections to individual PHRs shall be made by writing a replacement PHR as described in Record Corrections.

Part History Records are expected to be written to Multi-Record tags to record the results of significant actions taken on the tagged part. However, since components using the Multi-Record tag may not have always been updated, adequate business processes should be used to determine if all significant events to a component have been recorded. The descriptions in this section provide requirements for when PHRs are to be created and what information is to be included. Additionally, the Traceability Data Standard found in 9-6 Traceability Data Standard can be referenced for additional guidance.

The contents of all Part History Records can be divided into four sections: The action code, the traceability data, the standard information, and the additional information. All information including the action code is entered in the standard TEI-value format. There is no separator between the different sections as they are only used here for descriptive purposes.

It is possible that Hazardous Material (HAZ) entries may be made in Part History Records. The only allowed use of HAZ in a Part History Record is to add additional information beyond what is included in the Birth Record, as opposed to modifying information contained in the Birth Record.

4.4.1. Action Code

An action code is the three-letter value assigned to the ACT TEI. The first entry in a Part History Record is always ACT with action code. Only the action codes defined in the following two sections are allowed as values for ACT.

4.4.1.1. Mandatory History Records

Whenever a part is installed, removed, repaired, overhauled, modified, inspected, or has its data tag(s) replaced, a Part History Record shall be written to the tag using the appropriate action code from the list below.

Action codes for mandatory history records:

- INS – installed

  The intent of INS is to associate the unit with the aircraft in which it is installed and optionally identify its location on that aircraft.

- RMV – removed

  The intent of RMV is to provide reason for removal and information about the aircraft and optionally location on the aircraft from which the component was removed.

- RPR – repaired

  See [csdd] for the description of RPR.

- OVH – overhauled

  See [csdd] for the description of OVH.

- MOD – modified

  The MOD action includes updates to a part's data, not just updates to the part itself. So for example, if a part has not been physically modified but new software is loaded that changes the form, fit, or function of the part and its part number has been updated, this can be recorded using a Part History Record with an MOD action code. Another example would be a service bulletin change that requires a 'mod ball' change on the data plate.

- PHC – Part History Record Correction

  See Record Corrections

- DIG – Data Digest Record used on replacement tag

  See Tag Replacement

4.4.1.2. Optional History Records

In addition to the actions that result in mandatory history records, there are likely to be other events related to a tagged part that warrant a part history record. It is expected that history records will be written for these events although consideration will need to be given for the amount of storage space remaining in the tag. The allowable ACT values are listed below.

Action codes for optional history records:

- TST – tested

- SRV – serviced

- WHR – warehoused
- SHP – shipped
- RCD – received
- INP – inspected - refers to inspections not associated with another actions and should be used only if inspection is the main purpose of the action. For example, if a unit is repaired and then inspected prior to returning to the customer, RPR would be the only code that is mandatory for that action.
- OTH – other

4.4.2. Traceability Data

Following the action code entry are three required entries that make up the traceability data for the part history record, as described in Table 11.

Table 11 - Traceability Data – Mandatory in all Part History Records

Business Term	TEI	Length		Mand/ Cnd	Remarks
		Min	Max		
Action Code	ACT	3	3	M	Value is 3-letter code from section 3.1.4.1
Action Company CAGE Code	ACO	5	5	M	The company performing the action
Action Date	ACD	8	8	M	YYYYMMDD
Condition Code	CND	3	3	M	Value is one of: SRV - serviceable UNS - unserviceable UNK - unknown

4.4.3. Standard Information

Following the action code and the traceability data in the Part History Record is the standard information used to describe the action. Table 12 and Table 13 list all of the possible action codes and the TEIs associated with each action code.

All TEIs identified as “Conditional” (C under the Mand/Cnd column) are conditional based on existence; meaning if the data is available it must be included in the PHR. For the REM entry under the OTH action code, the entry is optional if there are any additional TEIs in the record (see Appendix 11 Additional Entries), otherwise the entry is required.

Table 12 - Part History Record – Specific fields for all mandatory action codes

Action code	Expected data for this action code	TEI	Length		Mand/ Cnd	Remarks
			Min	Max		
INS	Next Higher Assembly Part Number	NHA	1	32	O	
	Aircraft Identification Number	AIN	1	10	M	
	Aircraft Flight Hours at installation	FHL	1	6	C	
	Aircraft Flight Cycles at installation	FCL	1	6	C	
	Location at Aircraft at installation	LAC	1	13	C	
RMV	Next Higher Assembly Part Number	NHA	1	32	O	
	Aircraft Identification Number	AIN	1	10	M	
	Aircraft Flight Hours at removal	FHL	1	6	C	
	Aircraft Flight Cycles at removal	FCL	1	6	C	
	Location at Aircraft at removal	LAC	1	13	O	
	Removal Reason Text	RMT	1	30	M	Shorter than CSDD
	Removal Tracking Identifier	RTI	1	50	C	
RPR	Repair Description	RMD	1	50	C	Shorter than CSDD
	Repair Approval Reference Text	RAP	1	20	C	Shorter than CSDD
OVH	New Expiration Date	EXP	8	8	C	
	Overhaul Manual Reference Number	OHM	6	20	C	
MOD	New Part Number	PNR	1	32	C	
	Modification/STC Number	STN	1	25	C	
	Part Modification Level	PML	1	100	C	
	Software Part Number	SFT	1	32	O	

Table 13 - Part History Record - Specific fields for all optional action codes

Action code	Expected data for this action code	TEI	Length		Mand/ Cnd	Remarks
EXC	Exchanged part Cage Code	MFR	5	5	M	
	Exchanged part Serial Number	SER	1	30	M	
	Exchanged Part Number	PNR	1	32	M	
SRV	Maintenance Action Station Code	MNC	3	5	C	

SHP	Ship-To Code	SHT	1	5	C	
RCD	Cage code of previous holder	MFR/SPL	5	5	C	
INP	Inspection Findings Code	IFC	1	3	C	
	Inspection Method Description	IMD	1	25	C	Shorter than CSDD
OTH	Action Description	ACR	1	25	M	
	Remarks Text/Description Text	REM	1	50	C	Optional if other TEIs follow
	Current Owner of the Part	ONR	2	5	O	
	Airline Stock Number	ASN	1	32	O	

NOTE: The TST and WHR action codes do not have prescribed TEIs.

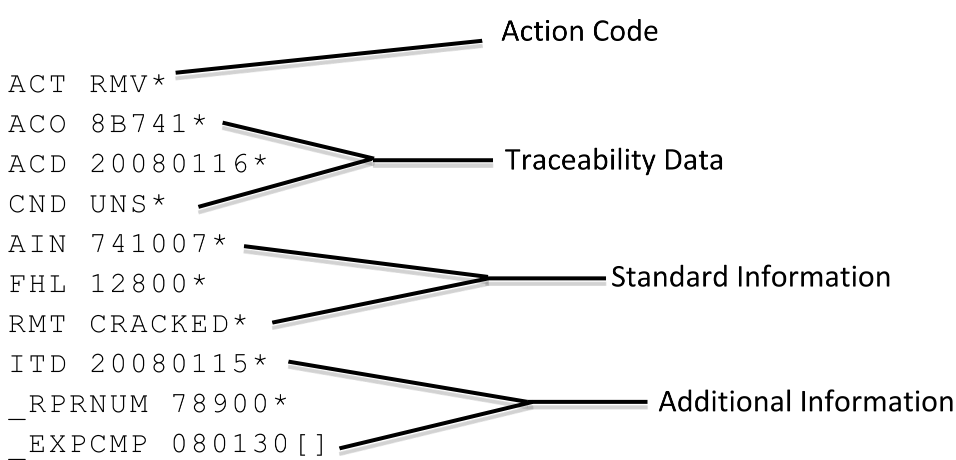
4.4.4. Additional Information

Beyond the standard TEIs associated with each action code, it is possible to add additional information of interest in a Part History Record. The standard information described in the previous section is the information that is typically needed to record an action. To accommodate additional data in unique or atypical circumstances, any number of additional entries may be added to Part History Records by following the requirements described in Additional Entries.

4.4.5. Example Part History Record

An example Part History Record is shown below. For convenience, each entry is shown on a newline, while in an actual ATA record the newline character is not allowed. The non-printable Null character is represented by "[]".

Figure 26 – Example Part History Record



9-5-4. Implementation Guidelines

> Note: The ATA e-Business Program web site will maintain an implementation web site in which examples and other changing information can be reviewed. Please go to http://www.ataebiz.org/Pages/WG-rfid.aspx for more information.

AIT tags allow storing data on a tag attached directly to the part without requiring any connection to an external database. That connection might exist via 802.11 (WiFi) or 3/4/5G networks, but it allows a mechanic to obtain valuable maintenance information directly from the component he is dealing with. This point-of-use data offers many advantages to a mechanic who typically makes expensive decisions about replacing components based on very little data. Though not perfect or complete, this lifecycle data offers the opportunity for more data than the mechanic can easily obtain in the current IT environment of most repair organizations.

> Note: This requires the implementation of appropriate business processes to ensure the proper synchronization of those data. In the past, the OEM, the airframer, the airline, and the repair agency all had small pieces of the necessary data. With the AIT tag, more of that data can be gathered in one place for faster troubleshooting. The data on the tag is neither the database nor the System of Record (SoR) for that component. It is more like an indicator and a pointer into the necessary databases. The FAA and EASA consider the data on the AIT tag to be "secondary and supplemental" to the required data in the SoR database.

The following are guidelines to how the business process can be accomplished. They are not exact, mandated processes that are being defined, just guidelines for achieving the desired industry goal. The primary goal is listed for each section, and it is expected that each company implementing these standard processes will attempt to accomplish the same goal using their own processes. It is important that the goal be attained so that the industry as a whole develops confidence that they can trust the not only the data, but the company behind the data.

1. Business Processes for Securing the Data

Goal: Provide confidence for others reading the AIT tag data that the data is secured by an authorized System of Record (SoR), just as they believed when they received paper records from that company.

This translates in a requirement for data integrity described below. It is to be noted that the process below will evolve with the work of the project team on the data security mechanism and the option offered by various AIT products and standards.

The business process behind the technology requires a minimal amount of security and process to ensure that the data is accurate, backed up, and is reliable. This will involve locking permanently each Record onto the AIT tag. This is preferably done after the system has determined that the data has also been written to the regulatory-approved System of Record (SoR) in the maintenance providers' back office system. It is important to ensure that critical maintenance data on the tag is not the only place where this data can be found. In consequence it is important to ensure in all situations the SoR does contain the data that is locked onto the tags.

2. Data Verification

Verifying the company that wrote the data on the tag can be accomplished in several ways:

1. A preliminary, but simplistic, means is simply to check the recorded CAGE Code of the action company (ACO) to insure that is valid and reasonable.

2. Mistakes in the way data are recorded (ToC or data structure) would not negate the data, but would cause the data reading company to want to double check the data with the source before taking significant action on that part.

3. Every data record written to the tag includes a CRC error check, so a mismatch between the writing and

reading CRC might indicate that a bit in the data structure might have gotten corrupted. If questioned, the data should also be checked against the source data.

4. Additional means of data verification are under review by the ATA project team and might impact this in the future.

Any inconsistency found in the tag should be verified with the company System of Record.

3. Usage of Tag Data for Business Operations

Asset and inventory management, configuration management, and part repair/maintenance are the most common use cases for the airframe manufacturers, airlines, and Maintenance, Repair and Overhaul (MRO) organizations. To carry out asset and inventory management, unique ID data from the EPC field may be sufficient. However, in order to carry out component diagnostics, part repair or maintenance, data additional to the EPC; ie the ATA records such as Birth Record, Lifecycle, Current Data Record, and Part History Records are necessary. The data encoding standards defined in this chapter support these use cases but there are two scenarios when the RFID tags are affixed to the aircraft part: a. During production of new aircraft; and b. After the delivery of the aircraft to airlines often called legacy tagging.

Airplane configuration management during production of a new aircraft requires accurate information about the parts and this is only achieved with the permalocked Birth record, hence a tag without a Birth Record must not be used for this purpose, thus complying with civil aviation authority requirements. Aviation regulations require the part marking can only be done under the authority of the original equipment manufacturer or authorized PMA/TSO holder, and thus permalocking of the Birth record will ensure trustworthiness of the data prior to installing the part on aircraft. Note that the birth record also defines the use of the SPL/UCN option for in service parts, to support identities of items tagged after their manufacture. Since this option is not meant to convey information about a part's original birth, it remains open to be used by organizations other than those defined above.

4. Use Cases (By Industry Sector)

4.1. Airline Use Cases

4.1.1. General

In general, the typical airline Use Cases described below involve reading only the EPC and require fast and long distance reads to improve the maintenance and logistics operations. This can normally only be achieved with smaller sized tags associated with Single or Dual-Record Formats. The birth record is read once during part induction, then usually only the EPC is read after that. Thus, an accurately encoded birth record along with long distance and fast reads of the tag are of most importance.

Data on the tag that supplements the birth data, such as historic parts maintenance records, drawings, specifications, etc. is not recognized as official records or official Methods of Compliance (MOC) and therefore does not generally add value for the operator under currently prevalent use cases.

4.1.2. Part Induction

When an RFID tagged part is introduced into an airline's operations, the following steps typically take place. The human readable, 2D and RFID birth record are read, compared to confirm accuracy, and then imported into the airline's internal IT system and related to the part's EPC. Once this is accomplished, many subsequent use cases can simply read the EPC and with appropriate tie to the IT system, the operator has all the data required for these other use cases.

4.1.3. Time controlled/Life-limited Components

Time controlled/Life-limited Components often require operators to inspect and track service life on the shelf and on-wing. Operators face multiple challenges to perform inspections due to component installed location, access, environmental conditions and limited touch time. Installing the long-read-distance small memory tags using Single Record Birth Formats, Single Record Utility Formats and/or Dual-Record Formats onto components provides opportunities to inspect faster and more frequently without adding significant overhead.

4.1.4. Repairable/Rotable Components

Repairable/Rotable Components are often serialized and tracked in the SoR (system of record). However, manually transcribing or hand-typing details about these components is inefficient and error-prone for operators and should be avoided. A 2D barcode encoded per Spec2000 chapter 9-4 will provide identification details at close-range, so an RFID tag with a short-read distance doesn't provide significant incremental benefit. Longer read range RFID tags, such as smaller memory tags with Single-Record or Dual-Record Formats, will allow these parts to be identified more quickly and efficiently at a distance (and without requiring line-of-sight), which enables better part tracking through parts' repair and logistics flows.

4.1.5. Incoming Inspection/Receiving

Long read distance small tags with Single Record Birth Format or Dual Record Format installed on the component can be read through the box during Incoming Inspection/Receiving against packing list and bypass physical inspection. (If condition check is not necessary) This digital data can be used to improve accuracy of goods receipt. 2D barcodes printed on the Authorized Release Certificate (8130-3, Form 1, etc.), or an electronic ARC can be used to capture and confirm certification or return to service information and compared to the part's ID information read from the RFID Tag. Data sharing between OEM and Airline can also be done using methods other than exchanging data on the RFID tag, e.g., using barcoded receiving/repair tags. There are other ATA specifications focused on these type of data exchanges such Spec 2000 Ch. 7, 11, 16 and 18.

4.1.6. Inventory Management (Parts, GSE, Tools etc.)

Operators are required to manage inventory at the multiple locations and events such as warehouse, shop, stores, and modification sites and it is often difficult to take inventory manually. Installing long read distance tags using Single Record Utility Formats, Single Record Birth Formats and/or Dual-Record Formats are an efficient method to help solve inventory management challenges with minimum equipment purchase/installation and infrastructure set up. BLE, Active, GPS tag can be used for Non-aircraft parts such as GSE.

4.1.7. Logistics/Parts tracking (Off-wing)

Developing capability to accurately track parts movement is critical. Long read distance small memory tags using Single Record Birth Formats, Single Record Utility Format or Dual-Record Formats on the component can be used with other track/trace processes that may be in use.

4.1.8. Tagging of parts by airline after the parts have been received or are in-service.

It is not economical to overhaul or replace a serviceable unit just because it was not RFID tagged by original manufacturers. For already owned equipment, operators can simply install tags with Single Record Birth Format and/or the Single Record Utility Format that are readable over 10 feet away when installed to identify and start tracking on-wing or off-wing. Recommended minimum data required on the Single Record Birth Tag Formats are the Birth Record data, defined in Single Birth-Record Format. Recommended minimum data required on the Single Record Utility Formats are MFR, and the uniquely serialized number, the combination of which is often called "social security number". These flexible, adaptable, and low-cost tag types will work on rotable, repairable and expendable components. Variations of color, size, artwork, and method of attachment can be used as needed.

4.1.9. Presence Check and MEL Items

Another common airline use case is to be able to quickly and correctly check an aircraft for the presence of items that may not be life limited but must be present. Examples include items as diverse as the coffee makers, trash cart, aircraft certificates, and many others that are part of the Minimum Equipment List (MEL) that must be present. By applying RFID tags to these items, the airline can quickly determine if everything is present to be in compliance. Additional related use cases are checking that tamper seals are intact.

4.1.10. Cleaning Cycles

A number of items in the interior have a limit to the number of cleaning cycles they may go through before the flammability rating of the material has become unsafe. Embedded RFID tags can track the number of cleaning cycles and cause an alert before they have reached their limit. Such items include fabric seat covers, curtains, pillows and carpet.

4.1.11. Configuration Assistance

Using RFID tags on parts when they are installed can assist in avoiding configuration mistakes by not allowing a part to be installed if it has not been engineering approved, and/or database flagging that part for later follow-up to determine if it is correct or not. A brief study has shown that RFID data capture has caught a 30% error rate over manual data entry, avoiding countless hours of manual re-checking for things like correct Part Number and Serial Number.

4.2. Typical Manufacturer Internal Closed-Loop Use Cases

4.2.1. General

A typical manufacturer use case depends greatly on the type of component. For example, manufacturers of Life Vests, Slides, Oxygen Generators, Avionics, Seat Assemblies, Ovens, IFE, etc. might look to the airline use cases for AIT tagging recommendations. On the other hand, manufacturers of a broad variety of mechanical, electrical and/or electronic components -- which do not require frequent RFID scans by the airlines for serviceability/presence -- may prefer to leverage the long-term benefits of collecting supplemental data, e.g., to better illuminate prognostics.

4.2.2. New Component Reliability & Maintenance Tracking

For such purposes, a desirable solution is to install a single high-memory AIT tag to new parts, in order to fulfill short-, mid-, and long-term goals: a. robust Birth Record data; b. Embedded Life Part details; and c. space for recording maintenance and/or operational history data. Regardless of the extent to which airframe manufacturers, airlines, and independent MRO operators may eventually populate the AIT tag with supplemental data, Component Manufacturers may desire to enable that future potential to benefit their own MRO operations and to permit collection of reliability data.

4.2.3. New Component Assembly Configuration

Typically, and historically, part identification media is added at the end of the assembly & test processes. The addition of functionalities such as Embedded Life Part data may provide incentive for manufacturers to look more closely at using AIT tags for tracking throughout the manufacturing/assembly process.

4.3. Use Cases for Different Tag Types

The following table is meant to illustrated advantages / disadvantages and typical use cases for the tag types described in this specification.

Table 14 - Use Case Table

Data Format	Re commended Memory Size	Recommended Usage	Properties/Advantages	Obstacles/Limitations/Concerns
Single Record Utility	512 - 2k Bits	- Airline tagging of existing, legacy parts - Any industry sector using them for internal-only item tracking - For items that require frequent serviceability/presence checks - Intended for internal, closed-loop processes	- Longer read distance than high memory tag - Data is rewritable, or can be locked in part or in whole - Due to memory size, higher read rates are possible	- 6-bit encoding only (limits the allowed character set) - If unlocked, requires control to ensure data authenticity - Not used on OEM or OAM parts that will ship with Aircraft without trading partner agreement
Single Birth Record	512 - 2k Bits	- For items requiring longer read distances - For items that require Birth Record-only encoded information - For items that require frequent serviceability/presence checks	- Longer read distance than high memory tag - Birth Data is locked, so is secure and can be trusted - Simpler business process to follow than having various entities write to tag. - Due to size, higher read rates are possible	- Has to be replaced if any of encoded information changes - 6-bit encoding only (limits the allowed character set)
Dual Record	2k Bits to 2 Kbyte	- For items requiring longer read distances - For items that require frequent checks - For items that benefit from rewritable current data - Items that have embedded life parts	- Longer read distances (although it diminishes as memory size increases) - Birth data is locked, but tag contains rewritable area for current data - Data can be written in 6-bit or 8-bit format (more character options)	- Unlocked Life Cycle Record requires controls to ensure data authenticity - Reduced read distances as memory size increases
Multi Record	8k Bytes plus	- Items requiring higher memory - When robust PDI records are required - Items NOT requiring frequent operator checks - Where trading partners agree to update part history - For items used in a closed loop process	- Birth data is locked, but tag contains rewritable area for current data - Ability to write & lock historical information related to repair, maintenance, traceability, and/or operational parameters - Ability to encode ad-hoc, free-form data (Scratch Pad)	- Significantly shorter read distance than other tag types - Unlocked Current Data Record requires controls to ensure data authenticity - Part History rules/option add significant complexity and expense

9-6. Traceability Data Standard

9-6-1. Purpose

The purpose of this standard is to define the minimum specification for traceability data for a part. This would be used by a company to define a traceability transaction and a database specification to store the data, as well as a file definition to transmit the data to the OEM or other trading partners. These are the minimum number of data elements necessary to reconstruct the physical history of a part. Each company that accomplishes a "transaction" on a part would retain, at a minimum, at least this amount of data in their database. A transaction is defined as any significant event which changes the state or ownership of the particular part. Examples might be the date of manufacture, sale, inspection, installation, removal, repair, overhaul, exchange, or scrappage. Currently, this data is typically retained in a mixture of paper and digital forms, even within one company, and is very difficult to assemble into a coherent history. This standard will create consistent, minimum data specification, whether on paper or in a digital database, for the industry to follow. The focus of this specification is the physical state of the part - not virtual or design information about the part or the family of parts.

From the International Standards Organization comes a definition - ISO 8402 traceability definition: Traceability is the ability to trace the history, application or location of an entity by means of recorded identifications. Many requirements mandating part traceability come from FAA references.

Part Traceability is built on, and is dependent, on the CAGE Code and a unique Serial Number within that CAGE Code as described in 9-4 Permanent Bar Code Parts Identification. This data is bar coded with universal, open systems standards that any company in any country of the world can read quite simply into older, legacy systems or new web-based systems. Utilizing the bar code is not required. Data can still be collected manually as it was in the past because the data is also in human readable form.

In Section 9-4 the concept of the "social security number" for the part was introduced. That social security number is a universally unique item identifier that remains with the part throughout its entire life. It is made up of an enterprise identification (e.g. CAGE Code) plus a serial number of that item that is unique (used only once) within that CAGE Code.

This "social security number" concept can be implemented in several different ways depending on whether it is a new part, a legacy (used) part, or a new or legacy part with a reduced marking area requirement. A summary of these implementation choices is presented here, but the complete source material is in Section 9-4. This UID_ data is created in one of the following manners:

1. New parts: use a combination of MFR, CAG, DUN or EUC with SER_ data
2. Legacy parts: use SPL, CAG, DUN or EUC with UCN_ data
3. New parts with reduced marking area: use USN_ data
4. Legacy parts with reduced marking area: use UST_ data

This standard describes the minimum amount of data that must be collected for traceability purposes. It is expected that each company will collect more data than this, including textual data describing the transaction in more detail or whatever other data is needed to fulfill their own, internal data requirements. See the Supporting Technical Information section for other examples. Also shown is where Traceability Data fits between Permanent bar Code ID and other data such as Reliability Data found in Spec 2000 Chapter 11.

Each of the common required data elements has a data definition in the Common Support Data Dictionary ATA CSDD. Manufacturers marking new parts and companies marking in-service parts should follow those industry standards. This minimum data standard could be the foundation for integrating internal systems. It is definitely the foundation for transmitting data between supplier and airline, airline and repair agency, and airline and airline. The means of transmitting that data is not specified as there are multiple, excellent transmission vehicles that will depend upon the capabilities of the two trading partners. Examples include, but are not limited to, FTP (file transfer protocol), E-Mail with attachments, database export/import, database-to-database direct linkage etc. using the Internet, floppy disks, magnetic tape or paper.

9-6-2. Traceability Data Elements

This section identifies the data elements required for traceability and gives a number of examples of how the elements would apply for different action codes.

1. Common Required Data Elements in All Processes

The first six data elements described below are mandatory for all processes.

1. CAGE Code of the manufacturer (MFR) or supplier (SPL)
2. Part Serial Number (SER) or Unique Component Number (UCN)

Note	If USN/UST is used, it should be parsed into the first 2 fields.

3. Current Part Number (PNR)
4. Action company's CAGE Code (ACO)
5. Action Date (ACD)
6. Action Code (ACT). Approved Industry Action Codes are:
    a. MRK - Marked By (initialized) Unit
    b. MFG - Manufactured By
    c. SHP - Shipped To
    d. INS - Installed On/In
    e. RMV - Removed From
    f. RPR - Repaired By
    g. OVH - How Overhauled / Remanufactured
    h. EXC - Exchanged For/With
    i. SLD - Sold To
    j. BUY - Bought From
    k. DES - How Destroyed
    l. WHR - Warehoused At
    m. OTH - Other (Requires the mandatory data element of Description) - freelance note
    n. RCD - Received From
    o. UPG - Upgrade New Part Number is
    p. INP - Inspected/Tested/Adjusted What
    q. ODO – Original Design Activity Is/Was
    r. CDO – Current Design Activity Is

s. Additional Data Elements Needed, depending on Action Codes

The following describe the data elements for each of the action codes and give examples of each usage.

1.1. MRK - Marked Unit

When a part is given its 'social security number' for the first time it is important to record when that happened and who did it. It is extremely important to accomplish this for in-service parts as they had an original, non-unique serial number to which the new, permanent, social security number must be linked in this data record.

1. **OEM Name (Mandatory)** - Whether the part is new or in-service, the alpha name of the Original Equipment Manufacturer should also be included as a Mandatory element. This should agree with the OEM's CAGE Code previously entered. Format 3 - 20 characters A/N.

2. **Original Serial Number (Conditional)** - For In-Service Parts being marked for the first time with the SPEC2000 Permanent Bar Code ID, the OEM's original serial number (typically non-unique) marked on the data plate or the part should also be collected so that adequate cross-references exist to trace the In-Service part back to its birth. Format: 1 - 15 characters A/N.

Figure 27 - Action Code MRK - Marked Unit

Minimum Traceability Standard						Particular to Action Code		Data You Want		
Social Security #						none req'd for a new manufactured part				
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	OEM Name	Original Serial #	Cond. Code	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**MRK**	Collins	1234567	SRV	P7DTR26	

1.2. MFG - Manufactured

The six common required data elements are sufficient for a new part being manufactured with a SPEC2000 unique identification on the part/data plate. The 'birth' record of the part contains the necessary social security number.

Figure 28 - Action Code MFG - Manufactured

Minimum Traceability Standard						Particular to Action Code		Data You Want		
Social Security #										
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	OEM Name	Original Serial #	Cond. Code	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**MFG**	Collins	1234567	SRV	P7DTR26	

1.3. SHP - Shipped To

Shipped To Location (Mandatory) – when any part is shipped from one location to another (within a company), or from one company to another (outside the company), a mandatory Shipped To Location text field should be included to track the part's destination. The text should be descriptive enough for a non-expert to make sense of whether the location is an outside vendor, the OEM, or an internal warehouse. Format: 3 - 30 characters A/N.

Figure 29 - Action Code SHP - Shipped To

Minimum Traceability Standard						Particular to Action Code	Data You Want		
Social Security #									
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Ship To Location	Cond. Code	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**SHP**	Honeywell - Phoenix	UNS	P7DTR26	
61G49	A234567	P7DTR26	20020420	81979	**SHP**	UAL - MIAJL	SRV		
61G49	BB34567	P7DTR26	20020420	81979	**SHP**	BA - LHRJJ	SRV		
61G49	123456S	P7DTR26	20020420	81979	**SHP**	AC - YVL depot	UNS		

1.4. INS - Installed On/In

Installed Into Next Higher Assembly or Aircraft Number (Conditional) – when installed on an aircraft this record will keep the current composition of the aircraft up-to-date. When installed on a Next Higher Assembly it will provide the needed piece part traceability. Format: 3 - 30 characters A/N.

Figure 30 - Action Code INS - Installed On/In

Minimum Traceability Standard						Particular to Action Code	Data You Want		
Social Security #						Installed on Next Higher Assembly or Aircraft #			
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Installed On:	Cond. Code	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**INS**	F176543	SRV	P7DTR26	
61G49	1234567	P7DTR26	20020420	81979	**INS**	A/C N6425	SRV		
61G49	1234567	P7DTR26	20020420	81979	**INS**	A/C N1223	SRV		
61G49	1234567	P7DTR26	20020420	81979	**INS**	MFR 2F348/ SER 9876542	SRV		

1.5. RMV - Removed From

Removed from Next Higher Assembly or Aircraft Number (Conditional) - when removed from an aircraft this record will keep the current composition of the aircraft up-to-date. When removed from a Next Higher Assembly it will provide the needed piece part traceability. Format: 3 – 30 characters A/N

Figure 31 - Action Code RMV - Removed From

Minimum Traceability Standard						Particular to Action Code	Data You Want		
Social Security #						Removed from Next Higher Assembly or Aircraft #			
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Removed From:	Cond. Code	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**RMV**	A/C N7362	UNS	123-4567	
61G49	1234567	P7DTR26	20020420	81979	**RMV**	P&W 92D45209	UNS	123-4567	
61G49	1234567	P7DTR26	20020420	81979	**RMV**	SPL 73T11/UCN 872615	UNS	123-4567	

1.6. RPR - Repaired

Condition Code (CND) after completion of Repair (Mandatory). Options for the Condition Code (CND):

1. SRV - Part is Serviceable
2. UNS - Part is Unserviceable
3. SCP - Part has been declared Scrap
4. DES - Part has been destroyed
5. UNK - Unknown condition of the part

Figure 32 - Action Code RPR – Repaired

Minimum Traceability Standard						Particular to Action Code	Data You Want			
Social Security #										
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Cond. Code	OEM Name	Original Serial #	Your Part #	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**RPR**	SRV	Collins	1234567	P7DTR26	

1.7. OVH - Overhauled

Condition Code (CND) after completion of Overhaul (Mandatory). Four options for the Condition Code (CND):

1. SRV - Part is Serviceable
2. UNS - Part is Unserviceable
3. SCP - Part has been declared Scrap
4. UNK - Unknown condition of the part

New life limit in cycles or hours (conditional) Format: 1 - 15 A/N characters. This would be used if the overhauled unit has a different life limit.

Figure 33 - Action Code OVH – Overhauled

Minimum Traceability Standard (Social Security #: CAGE Code, Unique Serial #)						Particular to Action Code		Data You Want		
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Cond. Code	New Limits (Conditional)	Original Serial #	Your Part #	Other Data
61G49	1234567	P7DTR26	20020420	81979	**OVH**	SRV	1000 cycles	1234567	P7DTR26	
61G49	6757	P7DTR26	20020420	81979	**OVH**	SRV				
61G49	92DS3	P7DTR26	20020420	81979	**OVH**	SRV	600 hours			

1.8. EXC - Exchanged With

When an unserviceable unit is exchanged for another, with either the OEM, a distributor, or another airline, traceability control requires that the Serial number of the new, replacement unit be logged in the database. This process tracks Serial Numbers out of your inventory with exchanged Serial Numbers back into your inventory. The CAGE Code, Unique Serial # and Current Part # in the Minimum Traceability area is for the unit going out; the Exchange area shows similar data to track who it was exchanged with.

Five data elements are required at a minimum to provide traceability in this complex transaction:

1. **CAGE Code (Mandatory)**– CAGE Code on the replacement part or enter a -1 if the replacement part does not contain a SPEC2000 social security number.
2. **Unique Serial Number (Mandatory)** – or enter the original Serial Number if a -1 was entered in the previous field.
3. **Replacement Part Number (Mandatory)** – the Replacement Part Number may not be identical to the old one, the replacement unit being a new or older version but still approved for use.
4. **Action Date (Mandatory)** – the date the Exchange transaction was completed is often times different from when the process was initiated. This is the date the replacement part was received into the system.
5. **Action Company (Mandatory)** – this is the CAGE Code of the company with which the exchange was accomplished which may the OEM, a distributor, or repair agency.

Figure 34 - Action Code EXC - Exchanged With

Minimum Traceability Standard						Particular to Action Code: Data on the replacement Unit — Action Company is the exchange partner				
Social Security #										
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	CAGE Code	Unique Serial #	Replacement Part #	Action Date	Action Company
61G49	1234567	P7DTR26	20020420	81979	**EXC**	KD992	MR73521	P7DTR26-2	20020420	D734K
61G49	1234567	P7DTR26	20020420	81979	**EXC**	43AH7	8626537	P7DTR27	20020420	39877
61G49	1234567	P7DTR26	20020420	81979	**EXC**	42P11	8934	P7DTR26-3	20020420	2YY11

1.9. SLD - Sold To

When a Serialized unit is sold, the selling company should provide traceability records indicating that it has left their inventory and ownership has passed to another company. The buying company should have a corresponding data record showing addition to its inventory. Two mandatory data elements are required and one is conditional:

1. **Name** of Buying Company (Mandatory)
2. **CAGE Code** of Buying Company (Conditional)
3. **Condition Code** of sold unit (Mandatory) – Serviceable (SRV), Unserviceable (UNS), Scrap (SCP), Destroyed (DES) or Unknown (UNK)

Figure 35 - Action Code SLD - Sold To

Minimum Traceability Standard						Particular to Action Code			Data You Want
Social Security #									
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Name of Buyer	CAGE Code of Buyer	Cond. Code	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**SLD**	Parts-in-Formation	T5611	SRV	

1.10. BUY - Bought From

When a Serialized unit is bought, the buying company should provide traceability records indicating that it has been added to their inventory. The selling company should have a corresponding data record showing a deletion from its inventory. Two mandatory data elements are required and one is conditional:

1. **Name** of Selling Company. (Mandatory)
2. **CAGE Code** of Selling Company. (Conditional)
3. **Condition Code** of purchased unit (Mandatory) – Serviceable (SRV), Unserviceable (UNS), Scrap (SCP), or Unknown (UNK)

Figure 36 - Action Code Buy - Bought From

Minimum Traceability Standard (Social Security #: CAGE Code, Unique Serial #)						Particular to Action Code			Data You Want
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Name of Seller	CAGE Code of Seller	Cond. Code	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**BUY**	Parts-in-Formation	T5611	SRV	D734K
61G49	HD83838	G66612	20020420	81979	**BUY**	Parts-in-Formation	T5611	UNS	Partially Repaired
61G49	1234567	P7DTR26	20020420	81979	**BUY**	Parts-in-Formation	T5611	SRV	2YY11

1.11. DES - Destroyed

The method by which a unit was destroyed. One mandatory data element is required:

1. **Method of Scrapping**. (Mandatory) Format 50 characters A/N

Figure 37 - Action Code DES - Destroyed

Minimum Traceability Standard (Social Security #: CAGE Code, Unique Serial #)						Particular to Action Code	Data You Want
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Method of Destruction	Other Data
61G49	1234567	P7DTR26	20020420	81979	**DES**	Crushed	
61G49	1234567	P7DTR26	20020420	81979	**DES**	Saw cut 40% through unit	
61G49	1234567	P7DTR26	20020420	81979	**DES**	Disassembled - parts destroyed separately	

1.12. WHR - Warehoused

When a Serialized unit is not actively being installed, removed, repaired, bought, sold, etc. it may just be waiting in a warehouse in either a serviceable or unserviceable condition. The time spent waiting in a warehouse is also part of the traceability record of a serialized part. The two mandatory data elements used are:

1. **Warehouse Location** (Mandatory) - Internal company description of warehouse location. Format 30 characters A/N

2. **Condition Code** of warehoused unit (Conditional) – Serviceable (SRV), Unserviceable (UNS)

Figure 38 - Action Code WHR - Warehoused

Minimum Traceability Standard (Social Security #: CAGE Code, Unique Serial #)						Particular to Action Code		Data You Want
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Warehouse Location	Cond. Code	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**WHR**	UAL-JFKJL, Bin 354R	SRV	

1.13. OTH - Other

This is a miscellaneous category to allow other, not-yet-defined processes that companies feel are part of the traceability record.

1. **Description** (Mandatory) - Format 50 characters A/N

Figure 39 - Action Code OTH – Other

Minimum Traceability Standard						Particular to Action Code	Data You Want
Social Security #							
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Description for Other Category	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**OTH**	Unit re-calibrated	

1.14. RCD - Received From

When a Serialized unit is bought the transaction and ownership is quite clear. Sometimes, however, the transaction is not quite as distinct such as when a part is transferred to another company on consignment. In that case the transference of the part may need to be registered without implying that money or ownership changed hands. Two mandatory data elements are required and one is conditional:

1. **Name of Company** Which Previously Held the Unit. (Mandatory)
2. **CAGE Code of Company** Which Previously Held the Unit. (Conditional)
3. **Condition Code** of unit (Mandatory) – Serviceable (SRV), Unserviceable (UNS), Scrap (SCP), or Unknown (UNK)

Figure 40 - Action Code RCD - Received From

Minimum Traceability Standard						Particular to Action Code			Data You Want
Social Security #									
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Name of Previous Holder	CAGE Code of Previous Holder	Cond. Code	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**RCD**	Parts-in-Formation	T5611	SRV	

1.15. UPG - Upgrade

Some components may go through an upgrade that does not involve a repair or overhaul procedure. An example may be if new software was loaded into an avionics component to fix software bugs or report information more clearly. The component was not repaired or overhauled and it may not even have been removed from the aircraft, but the unit was upgraded. Presumably the "form, fit, or function" of the unit was not changed that would cause the Part Number to be altered. One mandatory data element is required:

1. **Description of Upgrade** (Mandatory). Format: 50 characters A/N

Figure 41 - Action Code UPG - Upgrade

Minimum Traceability Standard						Particular to Action Code	Data You Want
Social Security #							
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Description of Upgrade	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**UPG**	Software bugs fixed	

1.16. INP - Inspected

A serialized component may also be inspected to ensure that it is still serviceable or still within the operational time limits applied to that unit. It may come off the warehouse shelf, be inspected, and put right back again, or it may be inspected on an aircraft (e.g., via an Airworthiness Directive) and left in place, and the fact that it was inspected needs to be logged. Two mandatory data elements are required:

1. **Condition Code** (Mandatory) – Serviceable (SRV) or Unserviceable (UNS)
2. **Comments** (Mandatory) - Format 30 characters A/N

Figure 42 - Action Code INP – Inspected

Minimum Traceability Standard						Particular to Action Code		Data You Want
Social Security #								
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Cond. Code	Comments	Other Data, etc.
61G49	1234567	P7DTR26	20020420	81979	**INP**	SRV	Not part of AD Note	

1.17. ODO - Original Design Activity & CDO - Current Design Activity

Knowledge of the design activity is needed to help quickly solve parts problems. For engineering analysis it is important to know the original design activity and the current design authority, if and when the design activity changes.

1. **Company Name** (Mandatory) – Format A/N 50 characters

Figure 43 - Action Codes ODO/CDO Original Design Activity/Current Design Activity

Minimum Traceability Standard						Particular to Action Code	Data You Want
Social Security #							
CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Company Name	Other Data
61G49	1234567	P7DTR26	20020420	81979	**ODO**	Rockwell Collins – Cedar Rapids, IA	
61G49	1234567	P7DTR26	20020420	81979	**CDO**	Honeywell – Phoenix, AZ	
61G49	1234567	P7DTR26	20020420	81979	**CDO**	Honeywell – Seattle, WA	

2. Supporting Technical Information

A history of transactions for a given company 81979 (CAGE Code of Action Company), whether on paper, in a spreadsheet, or in a database, might look something like shown below. The CAGE Code and Unique Serial # are the key data elements that make up the Social Security # and, as such, should be kept together. The Current Part # is the Part # after the action is accomplished on the part, i.e., if the part was overhauled it would be the upgraded Part #. Mandatory and Conditional fields shown below is the general description since different Action Codes require different data fields to be included.

Figure 44 - Example Part Transaction History

Minimum Traceability Standard — **Particular to Action Code** — **Data You Want**

Social Security #

CAGE Code	Unique Serial #	Current Part #	Action Date	Action Company	Action Code	Data here depends on the Action Code			Your Part #	Other Data
61G49	1234567	P7DTR26	20020425	81979	MRK	SRV	T42D611	Collins	123-4567	
91673	83H6290	459873L8	20020425	81979	RMV	A/C N7221		Collins	934-8858	A/C N7221
91673	SS12932	9J9846	20020426	81979	OVH	SRV	1000 hrs, new limit		921-4747	
1283S	836	LPY67FF	20020429	81979	INP	SRV	Not part of AD Note		744-2749	A/C N1263
91673	9943	28374-22	20020429	81979	SHP	Honeywell - Phoenix			345-1294	
83845	489GD5	938475-1	20020501	81979	RPR	UNS			855-0965	
83845	MR32121-143	P9475-503	20020501	81979	MRK	UNS	75463	Lucas	274-9104	

3. Minimum Traceability Data

The CAGE Code and Unique Serial Number within the CAGE Code make up the Universal Serial Number, or the "social security number" of the particular part. An alternate source of data off the bar coded part could also be a data element called the Universal Serial Number (USN) which is a simple concatenation of the five character Manufacturer's CAGE Code followed by the unique Serial Number. This USN Text Element Identifier might typically be used when marking space is at a premium. If USN is used on the bar coded part, the data should be parsed and stored in two separate fields. This format represents the lowest common denominator for all systems across all companies, whether simple or complex, and should be used when transmitting data between companies. If an In-Service Part is to be marked in this way, the TEI is a Universal Serial Tracking (UST) number. The UST is equivalent to the SPL and UCN combination. See Section 9-4 for more detail.

For all the companies that will touch a part throughout its life, each will have differing data requirement depending upon whether they are the manufacturer, the airframe manufacturer installing the part, the airline operator of the part, or the repair shop overhauling the part. This standard is meant to represent the minimum amount of data that every company will need in order to trace the part as it moves from a serviceable to an unserviceable state, and from one company to the next over its entire life. As such, there are certain other, not mandatory, data elements that make sense to collect depending on the particular action. This data would be retained in the section titled above as "Data You Want". If the part was being sold, you would want to track who it was sold to. If the part was being installed, you would want to track what next higher assembly or what airplane it was installed on. If the part was being shipped, you would want to know who it was shipped to – an internal company warehouse or an outside company? Those other data elements are not mandatory and each company will need to use common sense, keeping in mind the goal of cradle-to-grave traceability of the part.

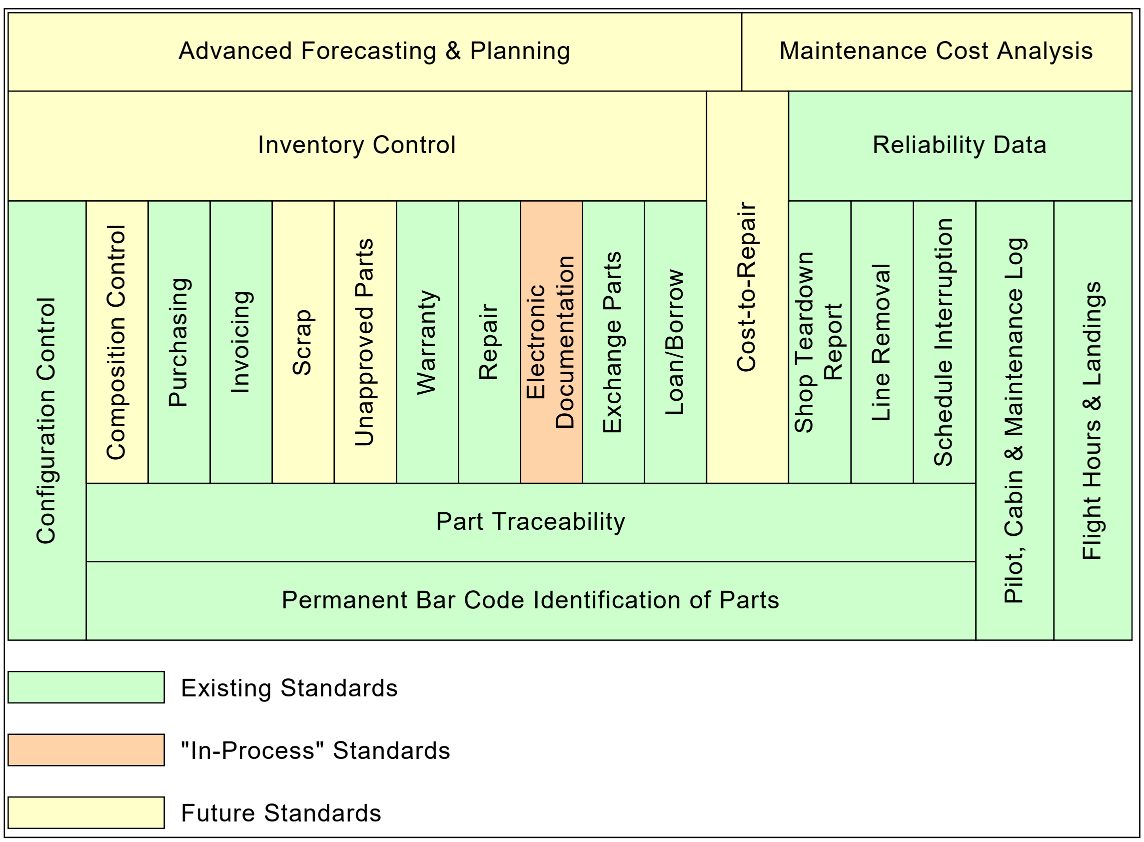
4. Uses for this Data

The below figure shows how this traceability data is built on the Permanent Bar Code ID data and together how they form the foundation for data flow into other internal and external business systems. This data can certainly flow into external systems like the Reliability Database that is a centralized repository for common data. At the same time, it can flow into an equivalent internal reliability system or other business systems. There is no requirement that this data needs to flow outside the company that collected it, but where it makes business sense to do so this standard defines the common, minimum data format. An example may be where an airline does not want to share its data in a central database due to concerns about security of that data. But they will see an advantage of sharing that data with the original equipment manufacturer so that the OEM can create a fix for a current problem or engineer a better part in the future.

The CAGE Code and unique Serial Number of the part, sometimes called the social security number, form a universal Serial Numbering system that gives each company the flexibility to number their parts in the best way for them, and yet still create universal uniqueness via the use of a company "social security number" called the CAGE Code. The CAGE Code may be obtained for free through the DLIS web site: http://www.dlis.dla.mil/cageserv.asp .

The combination of CAGE Code and unique Serial Number are then utilized as the unique identifier of that part and also as a pointer into databases, either yours, the OEMs, or another company who has transacted that part in the past. Part traceability can then be achieved by linking up the data found in many different databases, and everyone has identified the part by the same name. This standard is not meant to be a highly complex, tightly defined system for accomplishing this goal. It is meant to be a minimum standard that adds value without interfering with each company's business process, but allows for data sharing if desired.

Figure 45 - Functional & Data Architecture



Appendix A. ATA RFID Technical Programming Details

A-1. Overview

This appendix specifies a structure for the layout of the User Memory Bank of an EPCglobal Class 1 Gen 2 or ISO/IEC 18000-6C, RFID UHF passive tag. This specification was developed with continued input from members of the ATA e-Business Program ("ATA") including end-user organizations and technology. As an open standard, it can be adopted and used by other organizations and industries, but it was specifically designed to support the requirements of commercial aerospace companies.

A-1-1. Design Goals

Table 15 - Design Goals

Goal	Feature
1. Support the aerospace industry's requirements for long-lived data on high-value components.	• Distinguish between archival (i.e. permalocked) and reusable data. • Separation of structure from content.
2. Scalability	• Support tags having from 256 bits up to gigabits of user memory • Support up to 64,535 variable length records
3. Reliability	• Recovery and restart of encode operations in the event of power failure and/or RF interference. • Provide redundant record location information to allow data to be recovered if the table of contents is damaged.
4. High performance and efficient use of memory	• Fast directory reads and support for random access of records and sequential (block read) access. • Support for variable length records via dynamic allocation of record locations and for fixed record lengths via pre-allocation of static length records. • Support 6 or 8 bit characters for data compaction
5. IT integration	• Support an optional UTC timestamp recorded with 1 second accuracy to allow for future development of a globally unique transaction number.
6. Future proof	• Provide version information to enable major and minor field software upgrades. • Provide a "user" record type for closed loop and proprietary applications.

Table 16 - Non-Goals

Goal
1. Define (or interpret the contents of) the record types or their formats themselves.
2. Define a security model - this proposal does not define data integrity and security issues (esp. authentication).
3. Provide support for allocation and de-allocation of records and reuse of space from a storage pool (as is typical of a file system).

A-2. Introduction to Tag Storage Schemes

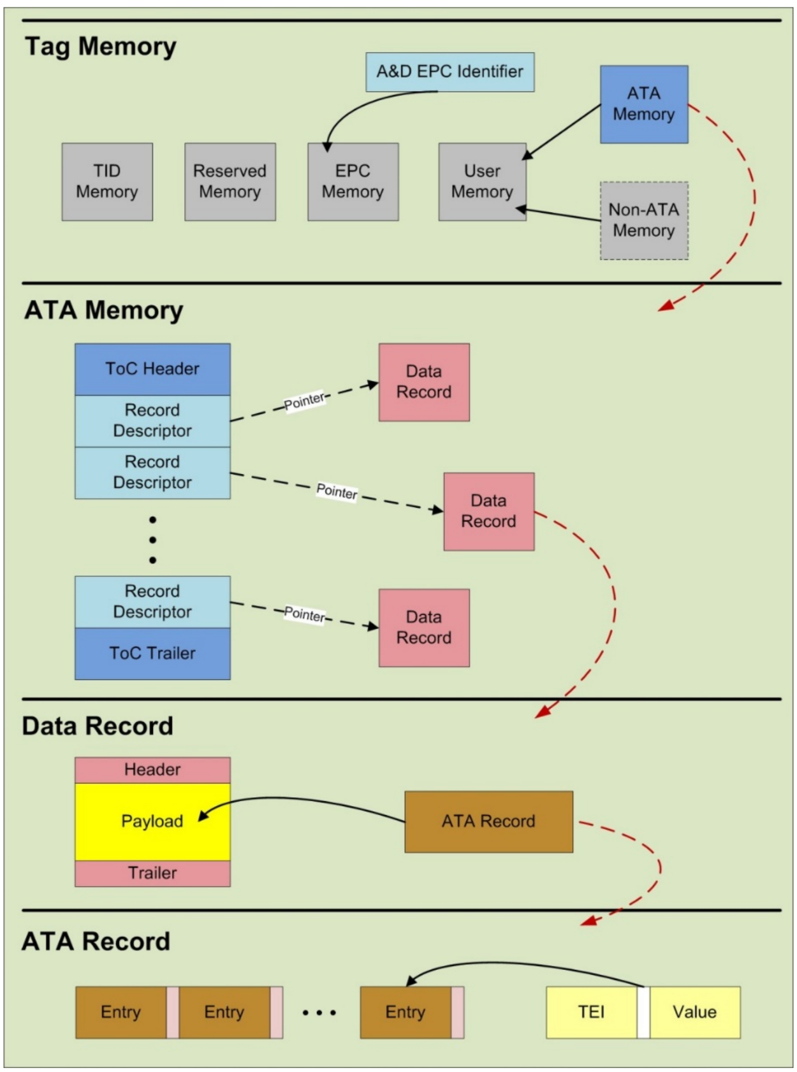
A-2-1. High level structure

User data that is stored on an ATA tag begins with the EPC identifier stored in the EPC bank of tag memory. This identifier includes a prefix that indicates the tag is used by Aerospace and Defense industries (A&D) and that the remainder of the tag is encoded according to A&D rules and includes things like CAGE Code, Part Number and Serial Number. The identifier value of the prefix and the rules for encoding the remainder of the EPC identifier are standardized and described in the GS1 EPC Tag Data Standard [tds] and is briefly described in A-3-3 EPC Memory (Memory Bank 01b)

Beyond the EPC identifier, the remainder of user data stored on the tag is stored in the User Memory bank. All user data on the tag is self-describing using TEI codes and values assigned to those TEIs. Groups of TEI-value pairs are assembled into ATA Records. ATA Records are stored in User memory according to a standardized file management scheme. The file management scheme required by this standard is known as ToC and is described here in Appendix A.

The entire structure is shown in Figure 46 – Layered Structure Used to Store On-tag Data below.

Figure 46 – Layered Structure Used to Store On-tag Data



A-2-2. The Data Storage Format

The high memory and low memory solutions described above are addressed by using different tag types. These tag types (Single-Record, Dual-Record, and Multi-Record) address different business needs by defining what types of records are stored on each of the tag types. With these definitions in mind, data storage formats can be selected to make most efficient use of tag memory while providing the necessary amount of flexibility. The tag container refers to the overall layout of the data in the User Memory bank. The container consists of a Table of Contents (ToC) (or directory) and the data records.

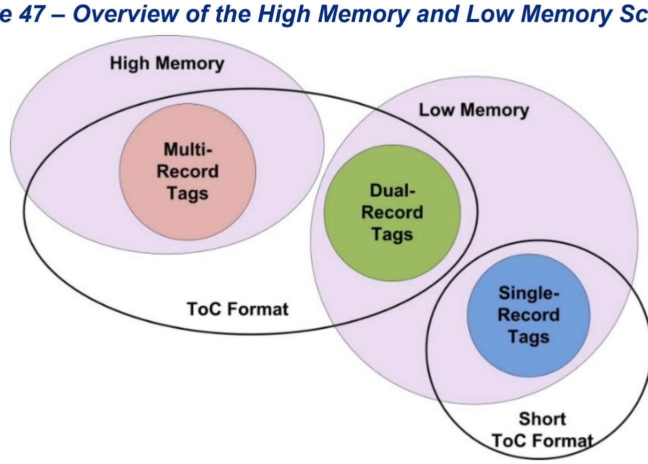
There are two styles of ToC provided – the full ToC and the short ToC. Requirements for using the respective storage formats are described below. Both formats allow for variable length records while still keeping to a compact memory footprint, thus making them appropriate for RFID tags and still useful for record keeping on aviation parts.

Referring again to Figure 46 – Layered Structure Used to Store On-tag Data, the ToC is a container structure that includes a directory overview which points to any number of stored Data Records. Data Records are envelopes that contain ATA Records, which carry the A&D business data in the form of TEI-Value pairs. The Dual-Record Format uses this structure to store two required records. The Multi-Record Format is expected to hold a large number of records, again using the pointer structure shown in the diagram. The Single-Record Formats store only one record so use an abbreviated version of the storage format that contains no pointers.

A-2-3. Business recommendations

Both high memory and low memory technology solutions have their place when tagging aerospace components, so this document addresses both. Details of the business usage of both is contained in Business Data Contents. Below depicts those formats and adds the appropriate Table of Contents format that the tag is supported by.

Figure 47 – Overview of the High Memory and Low Memory Schemas



A-2-4. Tag Size Requirements

The minimum size requirement for a Single-Record Tag is the size required to store a properly formatted EPC identifier as described in EPC Memory (Memory Bank 01b) and [tds], the condensed version of the ToC as described in Short ToC Format and all of the data required by the Single-Record tag that is chosen. Since many of the fields are variable length, the actual size required will be different for each end user so an absolute minimum size requirement is not stated here.

The minimum size requirement for a standard Multi-Record Tag is the size required to store a properly formatted EPC identifier as described in EPC Memory (Memory Bank 01b) and [tds], the Full version of the ToC as described in Full ToC Format, a Scratchpad Record, a Birth Record, and as many Part History Records as makes sense for a part's lifecycle. These are typically 8KB (kilobyte) tags.

The minimum size requirement for a Dual-Record Tag is the size required to store a properly formatted EPC identifier as described in EPC Memory (Memory Bank 01b) and [tds], the complete version of the ToC as described in Full ToC Format, a Birth Record, plus space for an appropriately sized Lifecycle Record. These typically are 2kb (kilobit) tags.

Single Record Birth and Single Record Utility tags are typically in the 512 bit to 2 kb memory size.

There is no maximum size requirement for any of the tag types.

A-2-5. HF Technology and Requirements

General requirements for the preferred UHF RFID technology for parts marking are listed below:

- Tags must be compliant with [gen2] and [iso6] and be interoperable with conforming readers.
- Tags must operate passively (powered only by the RF energy from a reader).
- Tags shall be operable over the frequency ranges of 860 MHz and 960 MHz. These ranges cover the carrier center frequencies for worldwide operation with consideration for frequency hopping and are shown on the EPC web site for each country.

Additionally, depending on the use of the tag, other standards and regulations may be applicable. Examples include FAA regulations for aviation products and equipment (passive only, reader talk first, emissions etc.), SAE AS 5678 and RTCA DO 160E for environmental conditions. These are listed as examples only. This standard makes no attempt to define which standards or requirements are applicable in a given situation.

A-2-6. Version Control

Versions in several different areas are covered by this standard, and they are kept separate so that changes in one area do not require changes in another. Each area is covered by its own version number stored on the tag so that software can discover the version in use and act accordingly.

The following table lists the version numbers currently covered by this standard and where those numbers can be found on the tag. Future updates of this standard will update this table to reflect what data versions have been affected. Note that the ToC format uses major and minor revision numbers. The distinction between major and minor is not firmly defined, so numbering will be decided on a case-by-case basis in future revisions. A useful guideline is that standards changes that allow previously existing software to continue to read previously defined structures will be considered a minor revision.

Table 17 - Version Control

Item	Storage Structure	Described In:	Stored In:	Current Version
Business Data Contents	- Which TEI's included - Format of value	Business Data Contents	BD Version field in the Data Record	3 (0b 0001 1)
ATA Record Format	- TEI-value Scheme - separator, terminator	ATA Records	DR Version field in the Data Record	1 (0b 001)
Data Record Format	- contents and formatting of header - trailer	Data Record Format		
ToC Format	- header - RD format - Record Types - New Tag Type	Container Description	ToC Major Version, ToC Minor Version in ToC Header	4.2 Major: (0b 0100) Minor: (0b 010)

1. Data Record Compatibility

Some data version areas, such as the ToC format, are global to the tag, therefore once a tag is commissioned using a particular formatting version, the tag must always be updated according to the same version. Business data contents and record formats affect only the local scope of the containing record, therefore new records shall always be added to the tag using the most recent version that is compatible with higher layers on the tag. For example, a tag might begin life using ToC version 4.0 and Data Record format version 1.0. Years later, a Part History Record may be added that uses version 3.5, provided version 3.5 is compatible with ToC version 4.0.

The Data Record Version described in this document is Version 1. It is compatible with all previous versions of the ToC format, therefore when new Data Records are added to a tag, Data Record Version 1 shall be used, regardless of the ToC version in use.

A-3. RFID Tag Memory

A-3-1. Overview

As per [iso6] and [gen2], tag memory is divided into four logical memory banks: Reserved memory, EPC memory, TID memory and User Memory. The banks are numbered 0 through 3 respectively.

Memory locations are addressable by including the bank number in the relevant field of an air interface command, along with the word address(es) of interest.

A-3-2. Reserved Memory (Memory Bank 00b)

The Reserved memory bank holds the kill password and/or access passwords if those features are available on the tag.

1. Kill Password

Although tags are required by [gen2] to support the Kill command, the kill password and the memory locations that store the kill password are optional, making kill functionality optional in aviation. This standard does not make it mandatory to implement the kill functionality.

If a tag does support the kill password, then tags must not be left open to being killed by anyone with a reader. Therefore, at the time tags are commissioned or when the birth record is written, the kill password must be permanently write-locked. A zero-valued kill password when locked will result in a tag that can never be killed. If the kill password is non-zero when locked, the tag can only be killed by issuing the correct password. It is assumed this option will only be taken if proper password security and management procedures will be maintained. Since there are significant security risks associated with using a non-zero kill password, the value of this approach should always be weighed carefully against the cost of implementation.

2. Access Password

The Access command and the access password are optional in [gen2]. While these features are not specifically required by this standard, it must be possible to permanently lock certain data records after they are written to the tag, for example Birth Records and Part History Records as described later in the specification.

Since some of the tags described in this specification are meant for exchange of information between companies throughout the industry once the technology and processes mature, Access passwords should not be used. If a tag does support the access password, at the time tags are commissioned or when the birth record is written, the access password must be permanently write-locked so no one else can change the data.

A-3-3. EPC Memory (Memory Bank 01b)

The EPC/UII (Electronic Part Code/Unique Item Identifier) memory bank contains a cyclic redundancy check (CRC), a Protocol-Control code and a globally unique code (e.g. UII or EPC) that identifies the object to which the tag is or will be attached.

The CRC is calculated by the chip whenever the contents of EPC memory change so is not covered here.

1. EPC Field

The EPC or UII is a globally unique code that identifies the object to which the tag is attached or will be attached.

An RFID tag used for Aerospace or Defense purposes and in accordance with this specification shall follow the Aerospace and Defense Identifier (ADI) requirements found in [tds]. A description of the EPC identifier structure is included here for convenience only; the final authority shall be [tds].

The tagging organization shall write and permanently write-lock the properly formatted EPC identifier before the tagged item leaves the control of the tagging authority or the control of the item proprietor.

The unique value aviation's ADI format offers is that all the EPC data is written in standard ASCII characters, allowing point of use intelligence without needing to look up every tag in a network database. The ASCII table is included in Appendix B

The purpose of the EPC identifier is NOT to convey business information; rather its purpose is to uniquely identify the tagged item. Hence the information encoded in the EPC number could be different than the business data found in User Memory, and for that reason is included in both places in case there is a difference. Only the data found in User Memory is to be used as business data.

The ADI EPC data structure provides for the creation of a globally unique item identifier, even in the presence of items from other industries. An overview of the data structure is shown in Figure 48 and Figure 49 with the description of the individual fields following.

Figure 48 – EPC Format for Aerospace and Defense – Construct 1

EPC Header (mandatory)	Filter Value (mandatory)	Manager No: CAGE Code (MFR, CAG, or SPL) or DODAAC (mandatory)	Delimiter (mandatory)	Serial number (SER or UCN) (mandatory)	Terminator (mandatory)
Fixed 8-bit value is assigned by GS1, specifically: 0011 1011	See Filter Value section below	A Space and 5-character CAGE Code, or 6 character DODAAC (military)	00 0000	Up to 30 alphanumeric characters	00 0000
8 bits	6 bits	36 bits	6 bits	<180 bits	6 bits

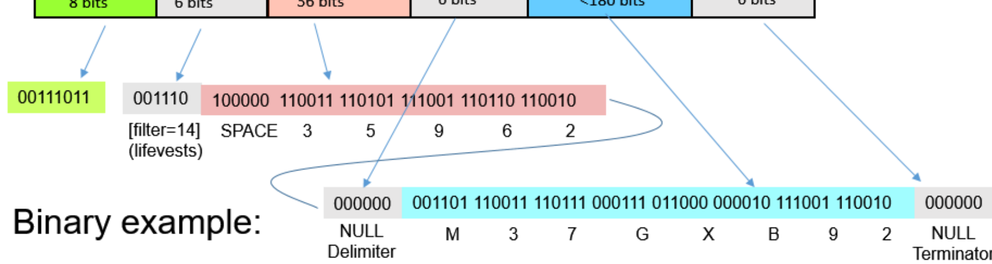
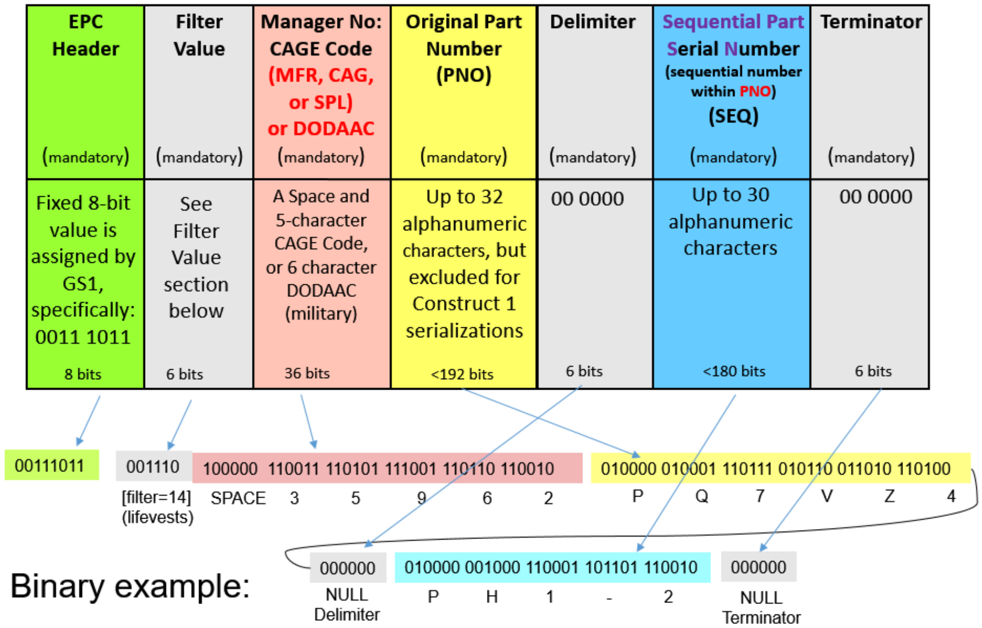


Figure 49 - EPC Format for Aerospace and Defense - Construct 2



The ADI EPC is made up of the following elements:

1.1. EPC Header/Scheme

This is a fixed number assigned to the ADI EPC data structure by GS1 EPCGlobal, unique from the header fields used by other industries. The purpose of the header field is to indicate this particular EPC identifier was composed in accordance with the ADI data structure. The value of this header can be found in [*tds*] and in hex code equals 3B

1.2. Filter Value

The filter value is control information that allows an RFID reader to select or deselect tags corresponding to certain physical objects, thus making it easier/faster to read the desired tags in a dense tag environment. For example, if the goal is to read all the oxygen generators in the aircraft cabin, performance of the capturing application may improve by using the Gen 2 air interface filter values to select the oxygen generators but instruct all other tags with different filter values to not respond.

The Filter Value is “control information” that is not part of the UII, i.e. the filter value does not contribute to the unique identity of the EPC. It is not permissible to attach two RFID tags to two different physical objects where both tags contain the same UII, even if the filter values are different on the two tags. Only the CAGE, PNO, and SEQ/SER are the data elements whose combination ensures the uniqueness of the item identifier.

The table of filter values for ADI is found in [*tds*] and is reproduced here for convenience only. If there is any discrepancy, the value in the [*tds*] should be used.

When assigning filter values to tagged parts, the filter values chosen should be as specific as possible. In general, the lower numbered values in the table below are for specific categories of items that the aerospace and defense industries have identified thus far. The more generic categories are located later in the list and should be used only if a lower number value is not an accurate description. For example, a filter value of 17 (Avionics) is a better choice for a radar black box than the more general category of 20 (Other Rotables). On the other hand, a filter value of 20 (Other Rotables) would be appropriate for a radar antenna in the nose cone of a plane since 17 (Avionics) would not be accurate.

Note also, based on the imprecision of assigning filter values as discussed in the previous chapter, a user may have to deselect the use of the filter during a read where a part is not found, to confirm that it was not deselected due to an imprecise filter assignment.

Table 18 - EPC Filter Values for Aerospace and Defense

Note:	See http://www.ataebiz.org/Pages/WG-rfid.aspx for any updates to table between spec revisions

Product Type	Filter Value	Binary	Comments
All others (see tds)	0	000000	
Item, other than an item to which filter values 8 through 63 apply	1	000001	
Carton (see tds)	2	000010	
Reserved (see tds)	3-5	000011 thru 000101	
Pallet (see tds)	6	000110	
Reserved (see tds)	7	000111	
Seat Cushions	8	001000	
Seat Covers	9	001001	
Seat Belts, Seat Belt Extensions	10	001010	
Galley, Galley Carts and Other Galley Service Equipment	11	001011	Including items such as Bar Units, Chillers, Coffee Makers, Galley Carriers, Galley Fans, Galley Insert, Galley Units (Monument), Heat Exchangers (galley related), Lavatories, Ovens, Trash Compactors, etc.
Unit Load Devices, Cargo Containers	12	001100	
Aircraft Security items	13	001101	TSA search required items
Life Vests	14	001110	All life vests including demo, crew, infant, etc.
Oxygen Generators, and any other assembly containing Oxygen Generators for passengers, crew, lavs	15	001111	Does NOT include compressed gas cylinders or bottles (see 19)
Engine, and Engine Components	16	010000	
Avionics (i.e., ATA Ch 42 components)	17	010001	
Experimental ("flight test") equipment	18	010010	Also known as red label parts
Other Emergency Equipment	19	010011	Emergency Locator Transmitter (elt), Portable Fire Extinguisher First Aid / Medical Kits Flashlights (and Bracket if applicable) Flashlight Battery Pack, Smoke Detectors Lavatory Fire Extinguisher, Megaphones, Compressed Oxygen Bottles, Oxygen Masks Survival Kit, Escape Slide Assy Fire Extinguisher Squibs / Cartridges Smoke Hood Personal Breathing Equipment (PBE) Safety Cards Wireless Emergency Lighting Systems Battery Unit
Other Rotables (e.g. Line or Base Replaceable)	20	010100	Electrical Motor Control Units Spoiler Remote Electronic Units

			PSQ Squibs
Other Repairables	21	010101	Emergency Powered Assist System (EPAS) Wheel & Column Assy - Cockpit Auxiliary Power Unit (APU) Start Contractor CVR (cockpit voice recorder) FDR (Flight Data Recorder) RIPPS, Fuel Spar, EEPLS Backup Lighting, Flight Lock Flow Control Unit, NGS Oxygen Sensor Doors, Door Assist Bottle Potable Water System, Waste Water System Power Drive Unit, Pressure Switch Self Lift Power Drive Unit (PDU) Stab Fittings, Slats High Lift Electric Motor Temperature Controller Humidifier, Zonal Dryer
Other Cabin Interior	22	010110	Program Switch Module Passenger Service Module Overhead Bins Lavatory Monument & Lavatory Parts
Other Repair (excluding components) e.g. Structural item repair	23	010111	
Seat & Seat Components	24	011000	Note: Seat Cushions (8), Seat Covers (9), Seat Belts (10) are not included in 24
IFEs (In Flight Entertainment) Systems including all IFE related repairables and rotables	25	011001	
Reserved for future use	26 thru 55	011010 thru 110111	
Location Identifier (1)	56	111000	Used to identify a location such as aircraft tail number, a toolroom or warehouse location
Documentation	57	111001	Could be on-aircraft required documentation or any other documentation that needs to be identified and tracked
Tools	58	111010	
Ground Support Equipment	59	111011	including Hangar Support Equipment
Other Non-flyable Equipment	60	111100	
Reserved for internal company use	61-63	111101 thru 111111	

1.3. Manager Number

This is he CAGE of the company that commissioned the tag with this specific EPC identifier. The manager number field is always 6 characters in length (36 bits) – an ASCII space character followed by a 5-character CAGE code. 6-bit ASCII encoding as defined in Appendix G of [tds] is always used for the individual characters. Note [tds] allows DODAAC as shown in the diagrams, but this is not used in commercial aviation.

1.4. Original Part Number

For companies who serialize uniquely within their CAGE code, the Part Number will be left off, meaning the next character will be a null character. This defines the unique ID in the EPC as a Construct 1 serialization schema (Serial # unique with CAGE Code). It represents how the OEM uniquely identifies its part and therefore must be maintained as this part's unique ID throughout the part's life.

If the part is uniquely serialized only within the Part Number (UID Construct 2), the Original Part Number is encoded here and can have a maximum 32 characters. This part number must be coded using the 6-bit ASCII encoding rule as defined in [tds].

1.5. Alphanumeric Serial Number

This is also a variable-length data field and can have a length between 1 and 30 characters so that the resulting ADI EPC value is globally unique. This Serial Number must be encoded using the 6-bit ASCII encoding rule as defined in [tds]. This data field shall contain SER for Construct 1 (Serial Number unique within CAGE code) or SEQ for Construct 2 serialization (Serial Number Unique within Original Part Number) as defined in [csdd]

Alternatively, for purposes of identification within the ATA Spec 2000 framework, the ADI EPC scheme may be used for assigning a unique identifier for RFID purposes to a part that is traditionally not serialized or not required to be serialized for other purposes. In this situation, the first character of the serial number component of the ADI EPC shall be a single '#' character. This is used to indicate that the serial number does not correspond to the serial number of a traditionally serialized part because the '#' character is not permitted to appear within the values associated with either the SER or SEQ text element identifiers in Spec 2000. The remainder of the alpha-numeric string immediately following the # character for these non-serialized parts can follow any numbering scheme as long as it is unique within the organization assigning the number. Note that this number is only used for creating uniqueness for tagging purposes and will not be considered an item's unique serial number for non-RFID purposes, e.g., when a batch or lot of items packaged together need to be uniquely identified and tracked.

1.6. Delimiter/terminator

The Original Part Number and Serial Number fields are variable-length and therefore need to be followed by a delimiter character. The six-bit null character (000000) is used as the delimiter, which also acts as the EPC word terminator when following the Serial Number.

2. TID Memory (Memory Bank 10b)

The TID memory bank holds information that is related to the identification of the tag, and of the manufacturer of the tag and/or chip, and information about optional capabilities of the chip. TID memory contents and formatting are standardized in [tds]. That standard requires TID memory to contain the ISO/IEC 15963 allocation class identifier, the mask designer identifier and the tag model number.

Unique tag serial numbers are useful for many purposes including the prevention of tag cloning and the detection of counterfeit parts. The TID memory shall be encoded using the ISO/IEC 15963 allocation class identifier of E2h as described in [tds] so that the mask designer identifier and the tag model number can be determined. In addition, the TID shall contain a unique chip serial number that is programmed into TID memory by the chip or the tag manufacturer at the time of manufacture and in accordance with [tds]. This unique tag serial number can be coded using the Extended Tag Identifier (XTID) format as described in [tds].

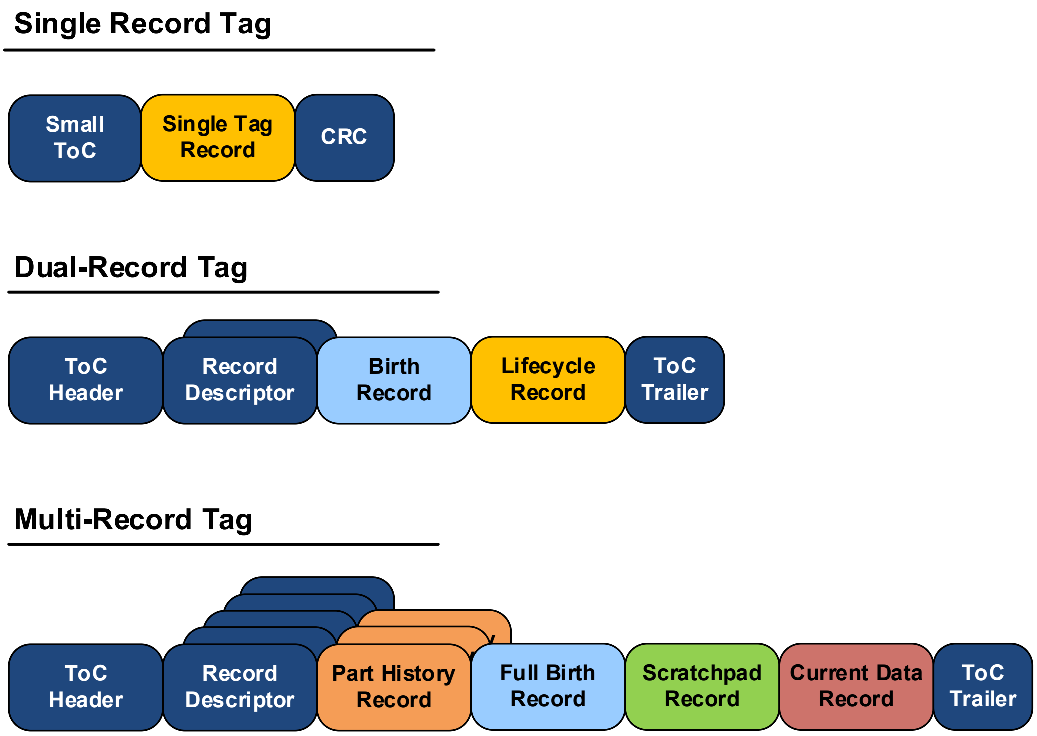
Once programmed by the chip manufacturer, TID memory shall be locked so that it cannot be modified or erased.

A-3-4. User Memory (Memory Bank 11 b)

1. Structure

The following diagram provides a graphical overview of the three data formats addressed by this standard, including details of the storage format used by each.

Figure 50 - Overview of Tag Formats



The various data format types, which are defined in 9-5 shall use the User Memory storage formats as defined in Table 19 - User Memory Storage Formats

Table 19 - User Memory Storage Formats

Tag Type	Storage Structure	Described In:
Single Record Formats	Short ToC	Short ToC Format
Dual-Record Format (Birth Record + Lifecycle Record)	ToC	Full ToC Format
Multi Record Format	ToC	Full ToC Format

ATA data in User memory shall be organized into ATA Records, which are described below. The ATA Records occupy the payload area of a Data Record with type and length information reflected in the Data Record header, or the payload area of a Single-Record Tag.

The ToC structure must start at address 0 in User memory.

Note that the ToC scheme includes a 'Size of ATA Memory' field, which points to the end of the ToC structure (that is, the end of ATA Memory). The end of ATA Memory may not be the end of User memory. The region beyond the end of ATA Memory is known as "non-ATA Memory" and is not defined by this standard.

2. Data Structure Format Identifier (DSFID)

The Data Structure Format IDentifier (DSFID) occupies the first word of User Memory (address 0) and specifies the data format for the remainder of the User Memory bank. The DSFID is typically eight bits in length but may be extended to 16 bits, and it shall be coded in the first 16 bits of the user memory bank (see Appendix 11). The format of the 8-bit and 16-bit DSFID is defined in ISO/IEC 15961 and 16962. Both ISO and GS1 EPC standards follow this naming convention, and it is used in other industries as well. Since the Table of Content encoding method is not part of existing ISO/IEC 15961 and 15962 encoding methods, it is considered as a "closed system with proprietary encoding" method, to be compliant with ISO/IEC 15961-1, a value of 0x1E (decimal 30) shall be encoded in the first 8 bits of the user memory. Since 16 bits have been reserved in the ToC header, the remaining 8 bits shall be encoded with 0x00h, hence, the value of 0x1E00h shall be used in the first 16 bits of the user memory bank as part of the ToC header.

3. ATA Records

3.1. Overall Requirements and Standard Entries

All ATA business data that is stored in User Memory shall be organized into ATA records. The general form of an ATA Record is a series of entries separated by delimiters and terminated by the record termination character, as show below.

<entry>< delimiter><entry><delimiter> … <entry><terminator>

The record structure places no limitations on the number of entries that can be included or on the length of the entries.

Entries are made of up TEI-value pairs, or, when allowed by the record type, proprietary-identifier-value pairs.

TEIs are text element identifiers. Allowable TEIs are described in the relevant sections of this document.

Each TEI must have a data value associated with it, separated from it by a single space character. The data value is of variable length and always followed by the field delimiter or the record terminator.

Data values can be any length, as defined in this document, and made up of any character valid for the encoding type used for the record (6-bit or 8-bit), other than the characters used for, the delimiter and the terminator.

The field delimiter is the star/asterisk character ('*').

The record terminator is a single Null character. The field delimiter "*" is not allowed in this location. If the record length is such that the end of the ATA Record, not including the terminator, ends on a word boundary or with less than the space of one character remaining before the word boundary, the record terminator is optional. In the case of the Single-Record Tag, the Null terminator must be included, unless the end of the record coincides with the end of ATA Memory. Data must be contiguous in User Memory with no embedded nulls until the end of the tag.

ATA records shall be encoded in their entirety, including the delimiters and terminator, using either 6-bit or 8-bit ASCII encoding as defined in Appendix B. Encoded characters shall be stored in tag memory in big endian fashion, with the msb (most significant bit) of the character positioned towards the msb of the memory word.

The encoding type (6-bit or 8-bit) used in a particular ATA record is not dictated or limited by this section. Other data layers or formats may place requirements on the encoding of the record.

When reading (decoding) ATA Records, if an entry is unrecognizable, the remainder of the entries shall be considered valid, provided the remainder of the record is properly formatted.

3.2. Additional Entries

Business record types (Birth Record, Part History Record etc.) include lists of standard entries as part of their definition. Standard entries shall always be listed first in the ATA Record.

All record types except the Current Data Record within the Multi Record Tag allow for additional information to be included after the standard entries, using the following two mechanisms:

1. TEIs from the Data Dictionary

When allowed by the business record type, additional entries may be made using three-letter TEIs that are defined in [csdd].

All standard rules for ATA Records (listed above) apply.

These items may appear in any order but must follow the standard data entries, unless otherwise specified.

2. Proprietary Data Identifiers (PDI)

When allowed by the business record type, entries using proprietary data identifiers may be added to an ATA record. The proprietary data identifier is used in place of the TEI and must be preceded by the underscore character (_) with no intervening space character.

Following the "_", the data identifier may contain only characters included in the set [0 to 9, 'A' to 'Z']. Note also that the identifier used may be identical to a 3-letter TEI already defined in [csdd] but the meaning of the identifier is likely to be different. For clarity, however, it is recommended that custom identifiers use different identifiers whenever possible.

The data identifier can be any length.

All standard rules for ATA Records (listed above) apply.

These PDI items may appear in any order but must be the last group of entries in the ATA record, unless otherwise specified (i.e. after the standard entries and any additional entries from the [csdd]).

If proprietary data identifier is included, it shall be coded in the order after the standard TEI entries and the additional TEI from the [csdd].

3.3. Example

An example of a properly formatted ATA record follows. "ITD" does not appear in as a standard data entry in any business record, but is defined in [csdd]. "RPRNUM" does not have an industry standard definition and is used as an example of a proprietary identifier. "[]" represents the non-printable Null character:

MFR 12345*SER A61711*PNO XYZ123-7*UIC 1*ITD 20080115*_RPRNUM 78900[]

A-4. Container Description

A-4-1. General

The tag container refers to the overall layout of the data in the User Memory bank. The container consists of a Table of Contents (ToC) (or directory) and the data records. Two styles of containers are provided here. The Short ToC is targeted at tags that have a limited amount of User Memory and will only store one record. It includes the short ToC Header, the record payload of one record (no record overhead), and an optional CRC.

The Full ToC is used for tags that will have more than one record. It consists of a full ToC header, an array of Record Descriptors (RDs) and a trailer, and can accommodate as many records as the User Memory bank can hold. In the Full ToC format, each record descriptor describes and points to a data record. As data records are added to the tag, RDs are added at the end of the array, growing toward high memory. The data records start at high memory and grow toward the record descriptors (low memory). Between the record descriptors and the records themselves is free, or unallocated space. In this way, a tag can accommodate a large number of small records or a small number of large records, using the same directory structure.

It should be noted that this container structure has been designed primarily to store “archival” data. This means the design is intended for tags where most records are added but never modified or deleted. However, the container can accommodate “reusable” records where records of the same record type are written over each other in a pre-allocated space for each reusable record.

In all Figures in this Appendix, the most significant bit is on the left and is transmitted first over the air interface.

A-4-2. Short ToC Format

The Short ToC storage format is shown in Figure 51 - Short ToC Format and is used for both the Single Birth-Record Format and Single Record Utility Format. This format stores the record payloads of one record only.

Once the ToC Header is written, if the tag type is a Single-Record Birth Format, it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.

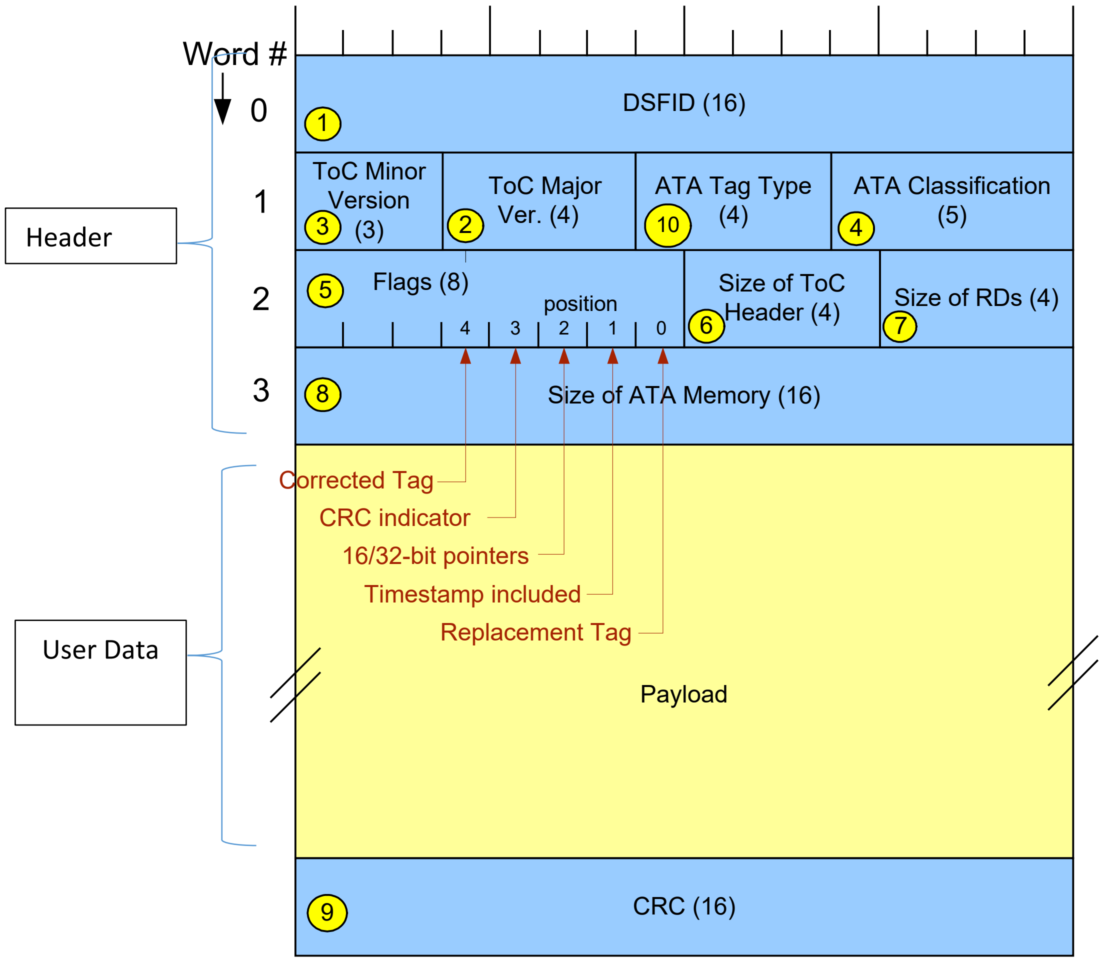
The Short ToC header has exactly the same format as the full ToC header, however the field containing the Size of the Record Descriptors shall be set to 0 to serve as the indicator that this is a Short ToC tag. The Size of the Record Descriptors field (set to 0) is insufficient to determine that the header contains four words. The Size of ToC Header field shall indicate the number of words in the ToC header and may change along with the ToC Major and Minor Version numbers.

In this format, there are no record descriptors; the record payload starts immediately after the ToC header and is written down towards higher memory addresses. The record payload can extend up to the boundary of the ATA memory if the CRC indicator is set to 0. If CRC indicator is set to 1, CRC will occupy the last word in the ATA memory and the payload can extend up to the CRC word. The CRC word is optional, although it may be required by a higher data layer. See CRC Calculation for background information on the purpose and value of the CRC.

If a CRC is encoded and if the tag type is a Single-Record Birth Format, it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.

There is no Record overhead used in this format and hence no Record length field. The payload contents must include its own terminator if it does not end at the CRC word boundary. If the CRC word is omitted and the payload ends at the boundary of ATA Memory, then the payload terminator may be omitted.

Figure 51 - Short ToC Format



1. Field Definitions and Requirements

1. **DSFID** - Shall be set to 0x1E00, which indicates that the data format of the User Memory bank does not follow any of the ISO/IEC 15962 data encoding methods (as of 2012)

2. **ToC Major Version -** Version control number, set by the ATA, covering the ToC format and what record types are included. Version number can be found in Table 16 - Versions.

3. **ToC Minor Version** – Version control number, set by the ATA, covering the ToC format and what record types are included. Version number can be found in Table 16 - Versions. In general, minor revisions do not require software changes to read previously defined structures.

4. **ATA Classification** - Chapter 9-5 currently covers aircraft parts and can be applied to other aviation equipment such as ground service equipment. The original intent of this field was to allow for other groups (ex. ground equipment) to create their own record definitions if necessary. Currently this field is not used and shall be set to 00001b (binary), 0x01 (hex), since this was the value shown for flyable parts in the previous version of this standard.

5. **Flags** – see Flag Bits section below.

6. **Size of ToC Header** - Size of ToC Header (in words). Set to 0x04.

7. **Size of RDs** - Size of record descriptors. Set to 0x00 to indicate the Short ToC format.

8. **Size of ATA memory** – The number of words in ATA memory. This indicates the portion of User Memory that is dedicated to the ToC container and its contents which include the optional CRC if it exists. This can be set smaller than the physical size of the User Memory bank to allow non-ATA data to be stored past the container structure. ATA memory starts with the first word of the header and ends at the address pointed to by this field. For example, if 1024 words were allocated for ATA data, this field would get set to 0x0400.

9. **CRC on the ToC and Payload** – Optional Cyclic Redundancy Check calculated over all of ATA Memory, starting at address zero (the DSFID word), up to but not including the CRC word, using the method described in CRC Calculation If this word is included it occupies the last word in the ATA Memory.

10. **ATA Tag Type** – Indicates the type of ATA Tag (shown in 9-5) that is encoded:

    0000 – Multi-Record Tag

    0001 – Dual-Record Tag

    0010 – Single Birth-Record Format

    1010 – Single Record Utility Tag

2. Flag Bits

Position #0 – Replacement Tag

0 = tag is a new tag (original),
1 = tag is a replacement tag and contains data sourced from an earlier tag on the same asset

In earlier versions the right-most bit in the flags field indicated 6-bit (when 0) vs. 8-bit ASCII encoding for all records. It is no longer used for this purpose.

Position #1 – Timestamp included

This bit is not applicable to the short ToC format, and shall be set to 0.

Position #2 – 16/32-bit pointers

This bit is not applicable to the short ToC format, and shall be set to 0.

Position #3 – CRC indicator

0 = there is no CRC written to the tag,

1 = there is a CRC written to the tag

Position #4 – Corrected Tag

Indicates the Birth Record has been corrected by an enterprise other than the one who created the original record.

0 = Original record or correction done by company which created the original record

1 = Record corrected by company other than the one who created the original record.

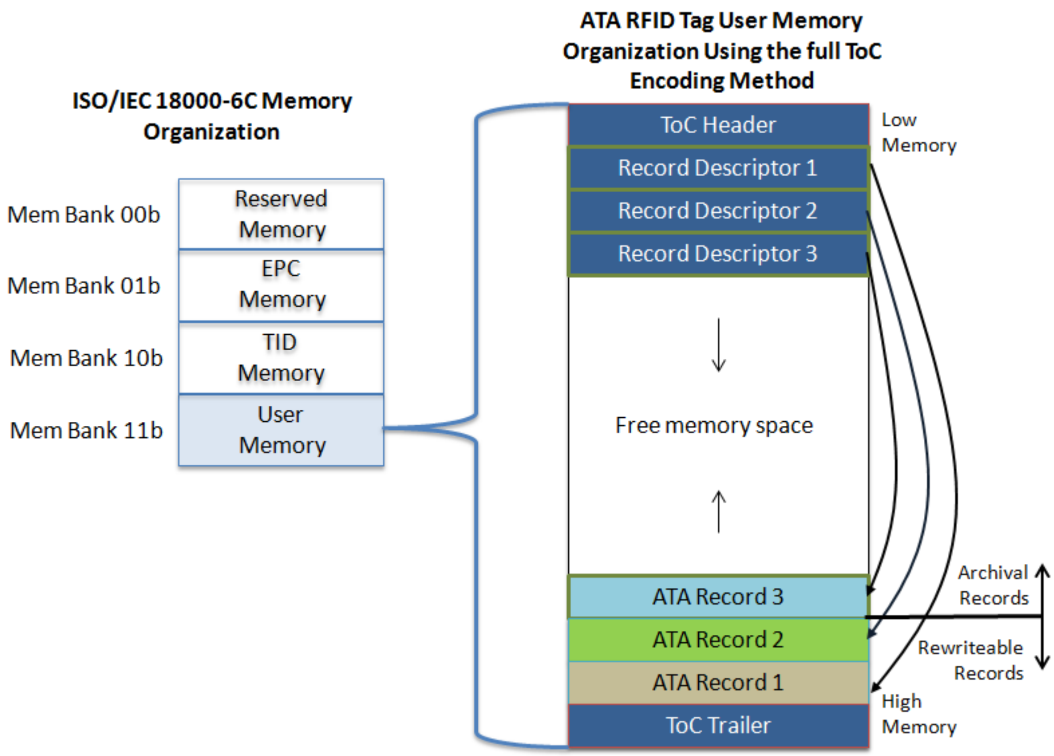
Position #5 and 7 – Reserved.

The remaining bits in the Flags field are reserved for future use and should be set to zero.

A-4-3. Full ToC Format

As discussed above, Dual and Multi-Record tags require a Full ToC. This structure has a TOC Header, a ToC Trailer and at least one Record Descriptor (for a Dual Record tag) and multiple Record Descriptors (RDs) for a Multi Record Tag. Each RD points to where the record begins in memory and may contain other information via the bit flags that are set. Figure 52 - Overall Table of Contents Layout below shows the overall structure of the container in a tag using the Full ToC format. In this example, the container holds three data records. The Table of Contents (ToC) Header, Record Descriptors (RDs), ToC Trailer, and the record format itself are all described in greater detail below.

Figure 52 - Overall Table of Contents Layout



1. ToC Header and ToC Trailer

The ToC Header contains several fields that describe the version of the container, the size of the User memory on the tag, and related fields.

The ToC Header must be stored at the very beginning of the User Memory bank; hence the DSFID (Data Structure Format Identifier) field must be stored at word address zero in User Memory.

Once the ToC Header is written, it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.

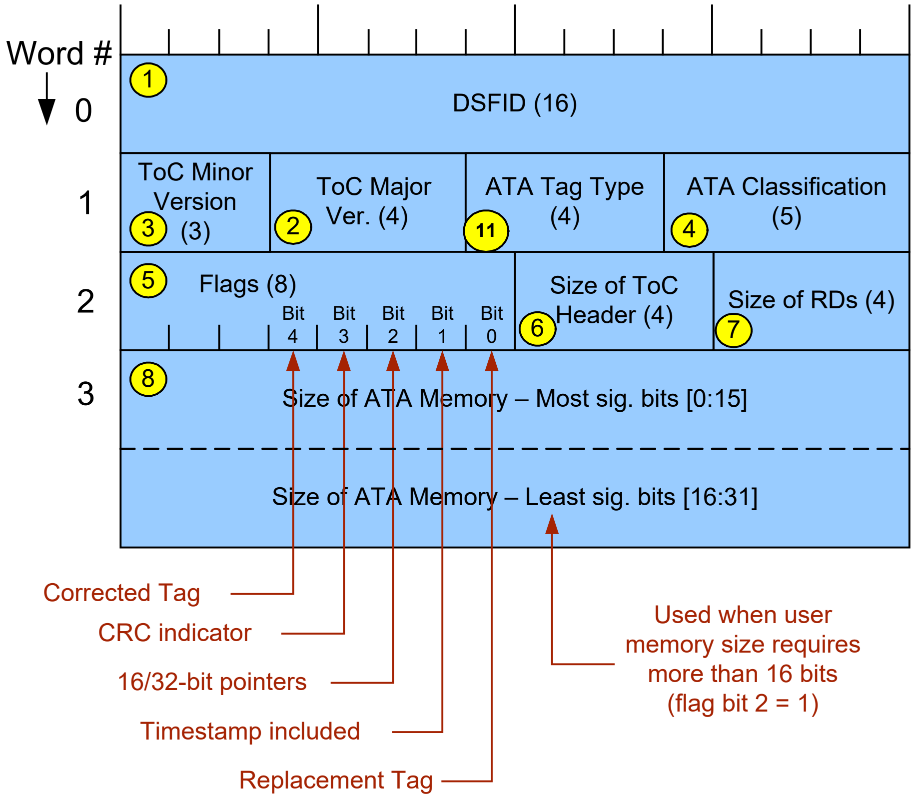
The ToC Trailer is conceptually part of the table of contents but is stored at the very end of ATA memory (higher addresses) rather than at the beginning (lower addresses). This is because the trailer consists of two fields that are read/write while the remainder of the header is write-once (archival). Some tag architectures (in silicon) are optimized to store all read/write areas together and placement of the extension at the end of the tag allows it to be adjacent to any records that are read/write (e.g. the current data record).

The ToC Trailer shall be stored at the end of ATA memory as defined by the Size of ATA Memory field in the ToC Header such that the CRC word is stored in the last word of ATA memory and the Number of Records stored is in the penultimate memory word. Locations of all other fields in the ToC shall be as shown in Figure 52 - Overall Table of Contents Layout.

Record Descriptors shall immediately follow the ToC header in User Memory.

Because it must be updated whenever a new record is added to the tag, the ToC Trailer must never be locked or made permanent.

Figure 53 - ToC Header



1.1. ToC Field Definitions and Requirements

1. **DSFID -** Shall be set to 0x1E00, which indicates that the data format of the User Memory bank does not follow any of the ISO/IEC 15962 data encoding methods (as of 2012)

2. **ToC Major Version -** Version control number, set by the ATA, covering the ToC format and what record types are included. Version number can be found in Table 17 - Version Control.

3. **ToC Minor Version** – Version control number, set by the ATA, covering the ToC format and what record types are included. Version number can be found in Table 17 - Version Control. In general, minor revisions do not require software changes to read previously defined structures.

4. **ATA Classification** - Chapter 9-5 currently covers aviation parts and can be applied to other aviation equipment such as ground service equipment. The original intent of this field was to allow for other groups (ex. ground equipment) to create their own record definitions if necessary. Currently this field is not used and shall be set to 00001b (binary), 0x01 (hex), since this was the value shown for flyable parts in the previous version of this standard.

5. **Flags Bits** – see Flags Bits section below.

6. **Size of ToC Header** - Size of ToC Header (in words). If two words are used to indicate the Size of ATA Memory (flag for 16/32-bit pointers is set to one), this field shall be set to 0x05, otherwise it is set to 0x04.

7. **Size of RDs** - Size of record descriptors in words (16 bits).

8. 0x00 = the tag uses the Short ToC and has no record descriptor, i.e. Single-Record Tag type.
   0x02 = the tag uses the full ToC format with 16-bit record addresses (Figure 54 - Record Descriptor with 16-bit Record Address)
   0x03 = the tag uses the full ToC format with 32-bit record addresses (Figure 55 - Record Descriptor with 32-bit Record Address)

9. **Size of ATA memory** – The number of 16-bit words in ATA memory. This indicates the portion of User Memory that is dedicated to the ToC container and its contents. This can be set smaller than the physical size of the User Memory bank to allow non-ATA data to be stored past the ATA container structure. The second word is only included if the number of words cannot be expressed using 16 bits. In this case, the *16/32-bit pointers* flag is set to one and the size is expressed as a 32-bit value. ATA memory starts with the first word of the header and ends with the CRC word of the ToC trailer. For example, if 1024 words were allocated for ATA data, this field would get set to 0x0400.

10. **Number of data records stored** - Indicates how many data records have been stored. Must be incremented when new records are added to the tag, including empty records (placeholder records that have a header/trailer but no payload). For example, if 4 records were written, this field would get set to 0x0004.

11. **CRC on ToC** - A Cyclic Redundancy Check calculated over the ToC Header, the Record Descriptors and the Toc Trailer not including the CRC word, using the method described in CRC Calculation. The Data Records and empty space between the RDs and records/trailer are not included in the calculation.

12. **ATA Tag Type** – Indicates the type of ATA Tag (shown in 9-5) that is encoded:

    0000 – Multi-Record Tag/Format

    0001 – Dual-Record Tag/Format

    0010 – Single Birth-Record Format/Format

    1010 – Single Record Utility Tag/Format

1.2. Flag Bits

Bit # 0 – Replacement Tag

0 = tag is a new tag (original),
1 = tag is a replacement tag and contains data sourced from an earlier tag on the same asset

In earlier versions the right-most bit in the flags field indicated 6-bit (when 0) vs 8-bit ASCII encoding for all records. It is no longer used for this purpose.

Position #1 – Timestamp included

0 = timestamp is not included,
1 = timestamp is included in record header

Position #2 – 16/32-bit pointers

0 = 16 bit pointers used in the record descriptors; Size of ATA Memory field encoded in 16 bits
1 = 32 bit pointers used in the record descriptors; Size of ATA Memory field encoded in 32 bits

Position #3 – CRC indicator

0 = there is no CRC written to the tag,

1 = there is a CRC written to the tag

Position #4 – Corrected Tag

Indicates the Birth Record has been corrected by an enterprise other than the one who created the original record.

0 = Original record or correction done by company which created the original record

1 = Record corrected by company other than the one who created the original record

Others (positions 5 thru 7)

The remaining bits in the Flags field are reserved for future use and should be set to zero.

2. ToC Record Descriptors

Following the ToC header is an array of Record Descriptors (RDs). These describe and point to each record stored on the tag. This array is not of fixed size. It grows as needed toward high memory until the tag runs out of space (when the data records growing toward low memory reach the RDs). Record Descriptors can have 16 bit record addresses for tags with less than 64K words of User memory and 32 bit addresses for tags with greater than 64K words of memory. The *16/32-bit pointers* flag in the ToC header indicates the size of the record address.

When a new Record Descriptor is written, it must be made permanent using a means appropriate to the tag.

Locations of all fields in a Record Descriptor shall be as shown below in Figure 54 and Figure 55.

Figure 54 - Record Descriptor with 16-bit Record Address

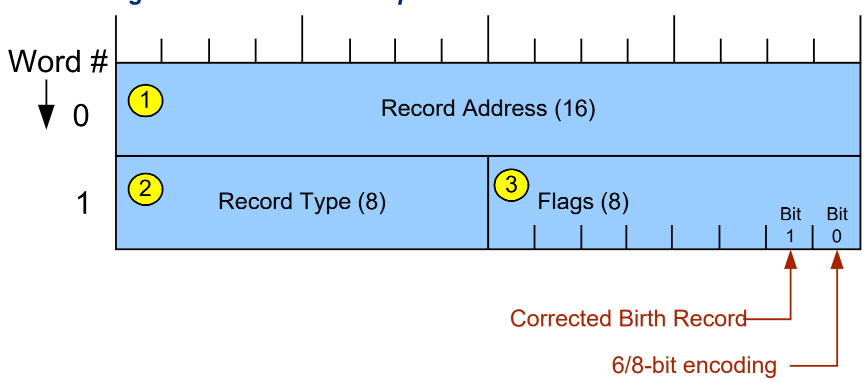
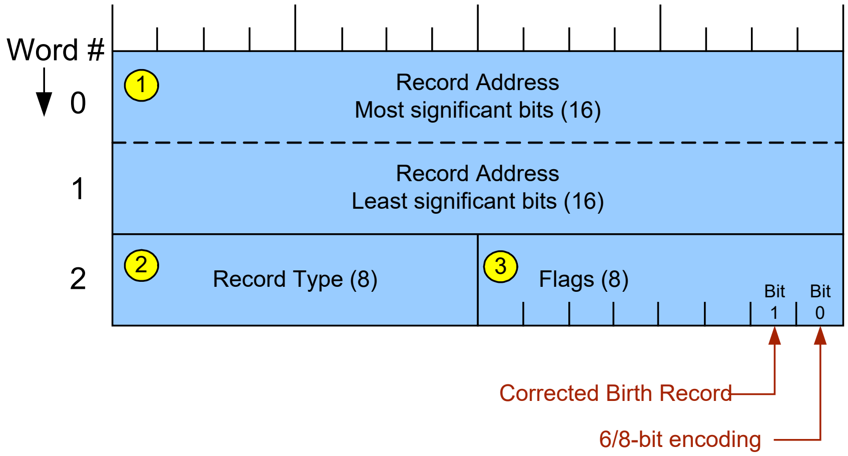


Figure 55 - Record Descriptor with 32-bit Record Address



2.1. Record Descriptor - Field Definitions and Requirements

1. **Record Address** - The absolute address in the user bank where the record starts (number of words away from zero).

2. **Record Type - Indicates the type of record using the following values;**

   - - Birth Record: 0x00
   - - Current Data Record: 0x01
   - - User Scratchpad Record: 0x02
   - - Part History Record: 0x03
   - - Lifecycle Record: 0x04

2.2. Record Descriptor - Flag Bits

1. **Bit 0 - 8-bit encoded**

   Indicates the encoding type used in the record pointed to by this Record Descriptor

   0 = 6-bit ASCII encoding is used in the payload of this record

   1 = 8-bit ASCII encoding is used in the payload of this record

2. **Bit 1 – Corrected Birth Record indicator**

   Indicates the Birth Record has been corrected by an enterprise other than the one who created the original record. Applicable only to Birth Records in a replacement tag; other records types are corrected using Correction Records.

   0 = Original record or correction done by company which created the original record

   1 = Record corrected by company other than the one who created the original record.

3. Data Record Format

The Data Record format is shown in Figure 56 and Figure 57. A Data Record is made up of a Record Header, the payload, and a Record Trailer.

The Record Header includes fields for Record Size (which is coincident with the start address of the record), Record Type, version numbers for the data record format and contents of the payload, and possible timestamp. The Trailer consists of a one word CRC.

The Record Payload contains the data contents plus padding to reach the end of the record as defined by the Record Size field. If the data content includes a termination character, then padding can be any value; if no terminator is present then padding must be all zeros.

Data is stored immediately following the Record Header and written left to right then top (near the header) to bottom (near the trailer).

Payloads can be encoded using either 6-bit or 8-bit ASCII encoding as indicated by the *6/8-bit encoding* flag in the corresponding Record Descriptor. Encoding shall be as defined in Appendix B.

The ToC format allows for Data Records to be either rewritable or permanent, as dictated and indicated by the Record Type. Since a Data Record's corresponding Record Descriptor cannot be rewritten, the size of a Data Record will always be the same. In a rewritable record, the payload contents may grow and shrink within the payload envelope, using padding to fill out the space.

If the timestamp flag is set in the corresponding Record Descriptor, then the timestamp field shall be included as part of the Header.

Two version control numbers are included in the header, with their positions as shown in the diagram. Both numbers reflect the versions used in the current record only. The Data Record format version (DR Version) covers the contents and formatting of the header and trailer of the Data Record. The Business Data version (BD Version) covers the contents and format of the payload. New records shall be written to the tag using the latest versions that are compatible with the ToC version in use on the tag.

Locations of all fields in a Data Record shall be as shown below in Figure 56 and Figure 57

Figure 56 - Data Record Format - Without Timestamp (overhead = 3 words)

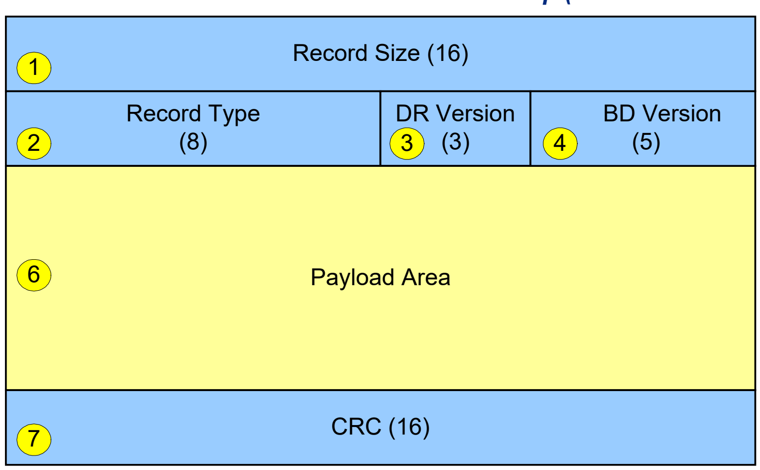
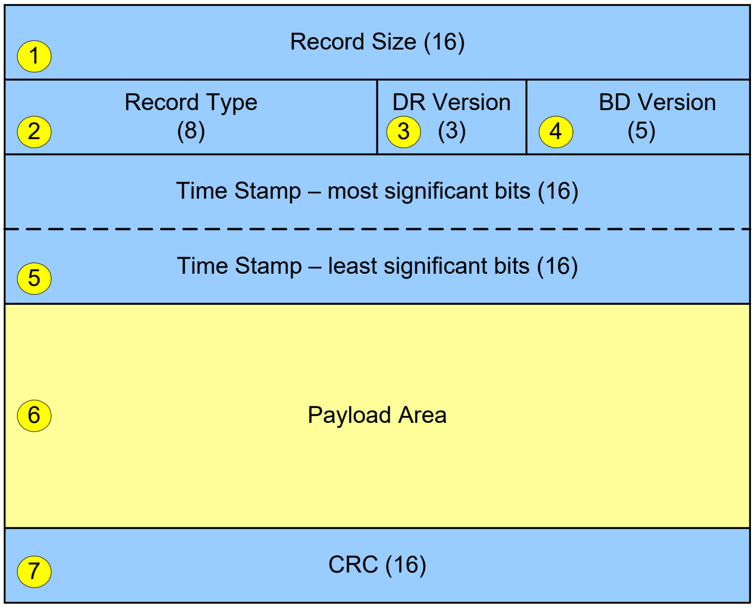


Figure 57- Data Record Format – With Timestamp (overhead = 5 words)



3.1. Field Definitions and Requirements

1. **Record Size** - The size of the record in words (16 bits), including the Header, Trailer and all Payload Area words.

2. **Record Type** – Indication of record type, using the same values as used for Record Descriptors.

3. **DR Version** – Data Record Version Number. Current version number can be found in Table 16 - Versions.

4. **BD Version**. Business Data Version Number. Current version number can be found in Table 16 - Versions.

5. **Timestamp** – Except for certain records in a replacement tag as described in Tag Replacement, the timestamp shall indicate the time that the record is written to the tag, expressed as the number of elapsed seconds since Jan 1, 2000, 0:00 UTC. Use UTC for local time when calculating this timestamp. For rewritable records, the timestamp shall be updated whenever the payload is modified. See Sample Time Stamp Code for details.

6. **Payload Area** - Contains the ATA record (the Payload) as defined in ATA Records. ATA Records and any necessary padding to reach end of the Payload Area. The ATA record must start at the beginning of the Payload Area. The end of the ATA record might not fill the last memory space of the Payload Area but might land anywhere within the Payload Area.

7. **CRC** - CRC value calculated using the method described in CRC Calculation. The calculation is performed over the entire record excluding the CRC word, so any padding present in the payload is always included.

Table 20 shows how to compute the size of various data elements. All sizes are in words.

Table 20 - Formulas for Computing Key Items

Data Element	Computation
TimeStampSize	0 if ToC flag bit 2 = 0x00 2 if ToC flag bit 2 = 0x01
OverheadSize	TimeStampSize + 3
TotalRecordSize	DataSize + OverheadSize

Data Element	Computation
DataSize	TotalRecordSize – OverheadSize
TagFreeSpace	Record address of last record – address of ToC entry for last record - 2
Tag full if:	TagFreeSpace < 6 (assumes 1 word data, no timestamp)

A-4-4. Commissioning the Tag - Pre-Allocation

Dual-Record and Multi-Record Tags must have certain records pre-allocated at the time the tag is initially formatted as an ATA tag. This initialization process, sometimes referred to as commissioning, involves writing the EPC identifier, and writing structural information to User Memory, for example the Toc Header and Trailer. It may also include setting up areas of User Memory as archival versus re-writable, if it is required by the tag.

The purpose of record pre-allocation is to simplify writing data to re-writable records after they have been created. The tag originator is presumably well versed in the details of how a particular tag operates in order to handle the commissioning process. Once a record has been pre-allocated, the setup details have been taken care of and adding data to the existing record is an easier process. It is not possible to pre-allocate a permanent record, since they must be locked at creation.

Pre-allocation means a rewriteable record has been created along with all of the necessary structural elements required by the User Memory storage format. Data contents may be added during pre-allocation, with the expectation that the contents will be modified or appended to in the future.

1. Dual Record Tags – Memory Pre-Allocation

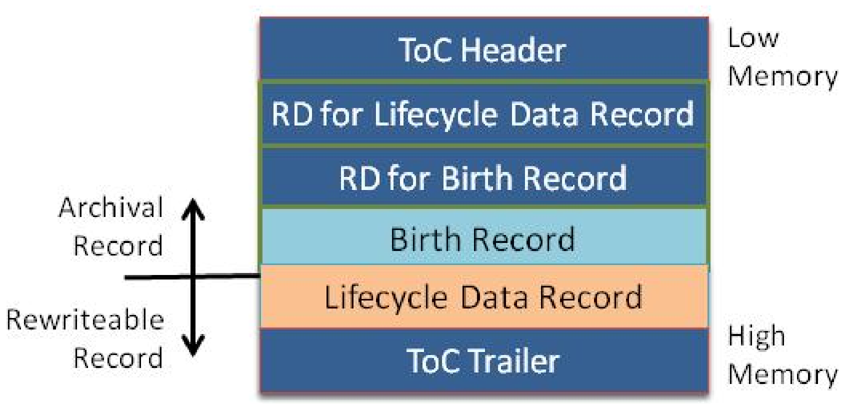
All Dual-Record tags shall be initialized with a Lifecycle Record, with enough space remaining to store the Birth Record.

The Lifecycle Record shall be the first record written, and the Birth Record shall be the second written. The resulting tag structure is shown in Figure 58 - Dual-Record Memory Layout With Record Pre-Allocation below. The two Record Descriptors for their corresponding records shall be created in the exact order as shown in Figure 58.

The Lifecycle Record may include data in the payload when it is first written, or it may be pre-allocated as an empty record. If empty when pre-allocated, the payload area must be filled with NULLs only.

The size allocated for the record shall be at least large enough for the ATA Record portion (the record payload) to store all of the standard (Mandatory and Conditional) elements defined for the Lifecycle Record using the maximum field width for each. If other data needs are anticipated, additional space should be allocated when the record is initially created.

Figure 58 - Dual-Record Memory Layout With Record Pre-Allocation



2. Multi Record Tag - Memory Pre-Allocation

All Multi-Record Tags shall be initialized with a Current Data Record, and a Scratchpad Record, with enough space remaining for the Birth Record and at least one Part History Record.

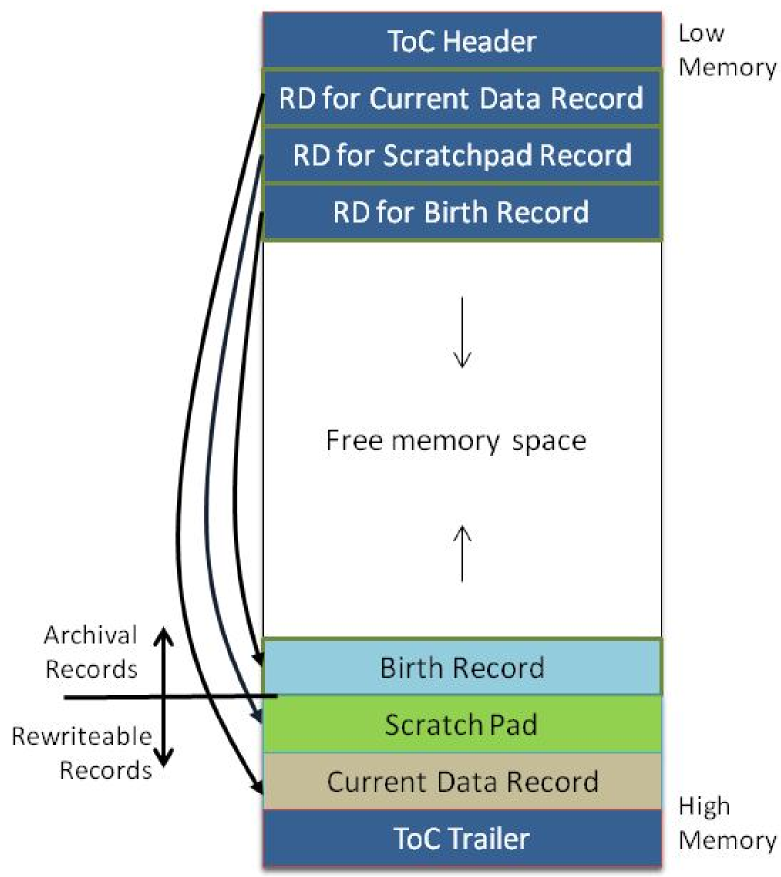
The Current Data Record (CDR) shall be the first record pre-allocated. Care should be taken to allocate enough space to hold its expected future contents.

If the yet-to-be-written Birth Record contents are known at the time the CDR is pre-allocated, the CDR may be populated with data contents at this time. Otherwise, the CDR will need to be populated with Birth Record Data immediately after the Birth Record is written. See Figure 62 - Preferred Order of Writes for details. At the time the Scratchpad Record is pre-allocated, the payload must be filled with NULLs only.

The Scratchpad Record shall be the second record pre-allocated. The minimum space allocated for the payload region (the ATA Record) of this record shall be 496 bits. For most rotables or other complex parts, greater space should be reserved to allow for more feedback from end users. At the time the Scratchpad Record is pre-allocated, the payload must be filled with NULLs only.

Following the Scratchpad Record, the Birth Record must be the next record written. The resulting tag structure will be as shown in Figure 59 - Multi-Record Memory Layout With Record Pre-Allocation below. Note that these three records, i.e. Current Data Record, Scratchpad Record and Birth Record, shall be created in the exact order as shown in the figure. The three Record Descriptors for their corresponding records shall be created in the exact order as shown in Figure 59

Figure 59 - Multi-Record Memory Layout With Record Pre-Allocation



3. Pre-Allocation Summary

The below table summarizes which records need to be pre-allocated.

Table 21 - Pre-allocation Summary

Record type	Archival/rewritable	Pre-allocation Requirement?
Birth Record	Archival	NO
Current Data Record	Rewritable	YES
Scratchpad Record	Rewritable	YES
Part History Record	Archival	NO
Lifecycle Record	Rewritable	YES

A-4-5. Timestamps

1. Timestamps – Single Record Tags

Timestamps are not used on Single Record tags.

2. Timestamps – Dual Record Tags

Timestamps are optional on the Dual-Record Tag. See Figure 57- Data Record Format – With Timestamp (overhead = 5 words). Ref Sample Time Stamp Code for more information.

3. Timestamps - Multi Record Tags

Timestamps are required for all records in a Multi-Record Tag. Timestamps shall be included by making use of timestamp features at the next higher data layer. For the ToC format, the timestamp bit shall be set in the ToC Header, and timestamps included in all Data Record Headers. See Figure 57- Data Record Format – With Timestamp (overhead = 5 words). Ref Sample Time Stamp Code for more information.

A-4-6. Record Corrections

As previously described, once a Part History Record is written to an RFID Tag, it can neither be modified nor erased. However, it is possible that some time after a PHR is written to the tag it is discovered to contain one or more errors.

Since it must be possible to read the Birth Record and use the contents without performing any other steps, Birth Records are not correctable within a tag. If an error is discovered in a Birth Record, it shall be corrected by replacing the tag following one of the methods defined in Tag Replacement.

If an error is discovered in a Part History record it can be corrected using a Correction Record, which is a Part History Record with the PHC (part history record correction) action code. Corrections are only necessary for data entries that are known to be incorrect; if new information needs to be added that is simply more current then that contained in a previous record, the original record will stand as part of the historical record.

Since the purpose of the Current Data Record is to locate key data in one place, Correction Records can also be used to make corrections to the CDR and can be expected to trigger updates to the CDR as described below.

User Scratchpad Record entries shall be corrected using a new Scratchpad Record entry. Text in the REM field may be added to describe the correction (optional), or the new entry may simply contain the correct data.

1. Valid Part History Records with Erroneous Data

To correct Part History Record data, a Correction Record is written that contains an indication of which record is being corrected along with the corrections themselves. A Correction Record is a Part History Record, hence all the requirements of PHRs still apply. The first TEI is the action code with the value 'PHC'. The next three TEIs are the same traceability data. In this case, ACO reflects the CAGE code of the company writing the correction, and ACD is the date the correction is written to the tag. UNK (unknown) shall be used for the condition code (CND) unless the condition is known with certainty, at the time the correction record is written, in which case it can be used.

Following the traceability data is a pointer to the Part History Record that is being corrected, using the PHP TEI. The value assigned to PHP is an integer that indicates which record is being corrected. The numbering method used to determine this value is to number the first record written to User Memory as 0 (zero), then count up 1 (one) for each subsequent record in the order they appear in memory. Using this absolute addressing scheme, the Current Data Record is numbered zero, the Scratchpad Record is numbered one, and the Birth Record is numbered two, although the Birth Record and Scratchpad Record will never be referred to by a Correction Record. The first Part History Record written to tag memory will be numbered three. Correction Records, if present, are part of the count and are numbered the same as any other record, in the order they are written to memory.

Following the PHP indicator are the corrections themselves. Two methods are allowed here. Either the entire record can be included with the correct values in place, or just the TEI-value pairs that need corrections can be included. If the correction is to delete a TEI from the erroneous record, the DEL shall be added to the correction record with the deleted TEI as its value. For example, DEL LAC, where LAC is the TEI should be deleted from the erroneous record. A REM entry can either correct the older REM entry or add information about the correction. If both a REM correction and an explanation are needed, two REM entries shall be used.

Table 22 - Part History Record Correction - Specific Fields for the PHC Action Code

Action code	Expected data for this action code	TEI	Length		Mand/Cnd	Remarks
			Min	Max		
DIG	Tag Identifier	TID	1	124	M	496 lsbs in hex, copied from source TID

2. Valid Current Data Records with Erroneous Data

An erred Current Data Record is one that does not reflect the most recent data found in the relevant Part History Record. Entries in the CDR that are incorrect due to errors in Part History Records must not be directly corrected since the entries will automatically be updated when the PHRs are corrected. However, if CDR entries are discovered that do not reflect the corresponding entries in the PHRs, they shall be corrected by recreating the CDR from scratch. The following process will be triggered by encoding a new Correction Record on the tag that points to the CDR index (which should be zero) in the PHP. No TEIs should be entered in this CDR Correction Record, except for an optional REM entry to briefly describe the error.

The Current Data Record TEIs must be re-initialized using the Birth Record's values. Then, all of the existing PHR and any Correction Records on the RFID tag must be examined one by one, and the relevant TEI values within the CDR updated accordingly. Once the entire contents of the tag have been reviewed, the newly created CDR will accurately reflect the unit's current status.

3. Corrupt Records

A corrupt record is one that has a CRC violation detected in its Data Record wrapper. Corrupt records can be corrected using Correction Records provided that the corrections are known with certainty. Data correction algorithms may be employed, with or without external knowledge, provided corrections are certain. The standard

Correction Record method shall be used, including the traceability data and PHP pointing to the corrupt record. All original TEIs must be included since the original record is invalidated by the CRC error.

4. Correcting Corrections

It is possible that a Correction Record contains an error. To correct an erroneous correction, another Correction Record is created that points to the erroneous correction. This has the effect of invalidating the errored Correction Record. No TEIs following PHP are allowed in this record since its only purpose is to invalidate the erroneous correction. Next, a new Correction Record is written that re-corrects the original errored record.

5. Example Correction Record

An example Correction Record is shown below. For convenience, each entry is shown on a newline, while in an actual ATA record the newline character is not allowed. The non-printable Null character is represented by "[]". This correction record corrects the AIN (Aircraft Identification Number) that was previously written as part of the Part History Record, see example in Figure 26 – Example Part History Record

Figure 60 - Example Correction Record

```
ACT PHC*
ACO 8B741*
ACD 20080116*
CND UNS*
PHP 3*
AIN 741-008*[]
```

A-4-7. Tag Replacement

During the lifetime of a tagged part, it may become necessary or desirable to replace the attached RFID tag. Tags might need to be replaced for a variety of reasons: the RFID transponder chip is out of memory, the tag is malfunctioning, an upgrade to an improved tag, an error is discovered in the Birth Record, the tag color no longer matches the cabin décor, etc. At the discretion of the owner/operator, a tag may be replaced at any time.

Multi Record tags may also be replaced with Dual or Single record tags as long as the essential birth record data elements are preserved. In the event there is important data in a Multi Record Part History record, this can be added to the new tags' Birth Record or the Traceability Record to capture the data. Alternately, the system or record can be referred to. The proper process for doing this is left to the tagging entity.

In the following descriptions, the "source tag" is the tag being replaced and the "destination tag" is the tag that will replace the source tag thus becoming the new tag for the part. "Copy" indicates duplicating data from the source tag onto the destination tag.

Whenever a tag is replaced, either the Replacement with Full-Copy Procedure, or the Replacement with Data-Digest Procedure must be followed as described below. The source tag must be removed from the asset before it is deployed with the destination tag in place.

Note:	There are use cases where removal or destruction of the original tag is not possible. The Spec 2000 RFID technical team will develop a process to support this in a future revision.

1. General Tag Replacement Requirements

The following requirements are applicable to both replacement procedures:

1. The source tag must be removed from the asset and replaced with the destination tag.

2. The destination tag must follow all of the requirements outlined in Spec 2000 Chapter 9-5, allowing for the exceptions described in this section.

3. Note if a tag is replaced by a tag with fewer records, traceability data on the tag should be accounted for by the operator in a system appropriate for that operator's maintenance system.

4. The ToC structure on the destination tag shall use the latest available format as defined in Spec 2000 Appendix 11, even if it is different from that used on the source tag. ToC header and trailer contents shall be set as appropriate for the destination tag, not copied from the source tag.

5. The appropriate flags in the ToC header and/or Data Record headers shall indicate that this is a replacement tag.

6. When creating records on the new tag, the latest available ATA Record Format and Data Data Record Format shall be followed.

7. If timestamps are included in any records on the source tag, then timestamps shall be included in those records on the destination tag. The timestamp value on the destination tag shall be the same value that was used on the source tag (not the time the record is written on the destination tag).

8. When copying records, the exact contents shall be copied into the new record using rules governed by the Business Data Contents that were in force when old tag was written. This means for example, that the Birth Record on the new tag may not contain all of the TEIs that are required by the current version of Spec 2000. Tracebility Data in Part History Records (Ref Traceability Data) shall reflect data from the source tag and shall not refer to the process of writing the record to the destination tag.

9. If a tag replacement includes a Birth Record Correction, the Birth Record on the destination tag shall include the REM value "Corrected by xxxxx on yyyymmdd", where xxxxx is the CAGE code of the entity performing the replacement and yymmdd is the date of the replacement. Only if this remark does not fit in tag memory may it be omitted.

10. The destination tag must have an EPC number written in accordance with EPC Block and [tds] and may be the same EPC number used on the source tag. If the tagging enterprise is using a numbering system that allows for a unique EPC number on the destination tag, then that is allowable provided all data requirements are observed (note, the system must be capable of having two identification numbers that refer to the same part and the EPC number must be based on PNO not PNR). In either case the source tag must be destroyed or removed from circulation. Additional information in EPC Memory Section.

11. The EPC number must be made permanent after it is written to the destination tag.

2. Tag Replacement With Data-Digest

At the discretion of the owner/operator, tags may be replaced using the data-digest method. In this case, a portion of the data from the source tag is copied to the destination tag. Because this results in a loss of traceability, the full-copy method should be followed whenever space allows.

The following requirements apply to tag replacement using the data-digest method:

1. The Birth Record shall be copied in its entirety.

2. If any Data-Digest Records exist on the source tag (source tag is a replacement tag), they shall be copied in their entirety.

3. When the destination tag is a Multi-Record Tag:

4. If the source tag is a Multi-Record Tag, the Current Data Record shall be copied in its entirety. Note the CDR may need to be updated after the replacement is complete.

5. If the source tag is a Single-Record or Dual-Record Tag, the Current Data Record on the destination shall

be constructed from all available TEI values present on the source tag.

6. A subset of the Part History Records from the source tag may be copied to the destination tag. This might be, for example, a collection of records that are deemed significant, or they might be the last few records written to the source tag. It is required to copy at least one PHR if one exists; three are recommended.
7. If any of the Part History Records copied from the source have been corrected by Correction Records, then both the original PHR in its entirety and its corresponding Correction Record(s) must be copied to the destination tag.
8. When the source tag is a Dual-Record Tag, the Lifecyle Record shall be copied in its entirety. If the destination tag is a Multi-Record Tag, the Lifecycle Record shall be positioned where the first Part History Record normally goes, and shall be made permanent at the time it is written to the destination tag.
9. Copying the Scratchpad Record contents is optional.
10. When the destination tag is a Multi-Record tag, a Data Digest Record shall be created such that it is positioned as the last (most recent) Part History Record on the tag.

3. Tag Replacement With Full-Copy

If a large amount of free memory space will be available on the destination tag after the replacement is complete, then the full-copy procedure can be used, which maintains full traceability directly on the tag.

The following requirements apply to tag replacement using the full-copy method:

1. Records on the source tag shall be copied in their entirety except the Scratchpad Record is optional.
2. When replacing a Multi-Record Tag, a new Part History Record shall be added to the destination tag and become the last (most recent) PHR. This PHR shall use the MOD TEI, and include the REM value “Tag replaced, full copy”.

4. Data Digest Record

A Data-Digest Record is used on the destination tag to capture the current data state at the time a tag is replaced. It is only used when the destination tag is a Multi-Record Tag.

The Data-Digest Record is a Part History Record and shall follow all the requirements of PHRs. The value for the action code shall be “DIG”.

The traceability data, ACO and ACD, shall reflect the CAGE code of the company replacing the tag, and date the Digest Record is written to the tag, respectively. The value of the condition code (CND) shall be copied from the Current Data Record on the source tag if it exists, otherwise the value UNK (unknown) shall be used.

If the source tag is a Multi-Record tag, following the traceability data shall be a list of TEIs and their values that are copied from the Current Data Record on the source tag. If the source tag is a Dual-Record Tag, then these TEIs shall be copied from its Lifecycle Record. If the source tag is a Single-Record Tag, this list shall be empty.

Next shall be the TID TEI, containing the Tag Identifier of the source tag, up to 496 bits converted to hexadecimal (up to 124 characters). If the TID on the source tag is longer than 496 bits, the 496 lsbs shall be used.

An additional REM TEI, and the last TEI in the record, shall be added to indicate the type of source tag involved, for example “Sourced from a Single-Record Tag”. Optionally, this field may also include the number of records on the source tag at the time of replacement, for example “Sourced from a Multi-Record Tag containing 97 PHRs”, alternatively “MR,97”.

Beyond the traceability data, the list of TEIs copied from the source tag, and the final REM, no other TEIs are allowed in the Data-Digest Record.

Table 23 - Data Digest – Specific Fields for the DIG Action Code

Action code	Expected data for this action code	TEI	Length		Mand/Cnd	Remarks
			Min	Max		
PHC	Part History Correction Pointer	PHP	1	5	M	Integer count to record being corrected.

5. Replacing Malfunctioning Tags

If all of the data on a tag can be read, it can be considered functional for the purposes of replacement; one of the methods described above can be followed.

If little or no data can be read from a tag, it will need to be replaced with a new tag, but the general replacement requirements outlined in the Tag Replacement section above must be followed. The new tag will need to be created from data sourced elsewhere, much like tagging a legacy part. The guidelines in Section 4 may be useful here.

If a portion of tag data is readable, then it may be possible to copy some data from the source tag; these decisions are left to the discretion of the enterprise performing the tag replacement.

6. Informational – Duplicate EPC Numbers

In the RFID system, the EPC number refers to the tagged item. A separate number in the tag, the TID number, refers to the tag itself. However, RFID interrogators use the EPC number to distinguish between different tags. A process known as "singulation" relies on the EPC number to pick one tag out of crowd of tags. If multiple tags in the reader's field share the same EPC number, the system falls apart.

When replacing tags as described above, it is likely that the destination tag will ultimately have the same EPC number as the source tag. This makes sense since they both refer to same tagged item. There are many ways to deal with this, a few of which are described here.

When starting the replacement process, it should be possible to initialize the destination tag with a temporary EPC number, allowing it to be singulated and also distinguished from the source tag. After the necessary data is copied from the source tag to the destination tag, the source tag can be destroyed/removed, at which point the EPC number on the destination tag can be updated to its final value and permalocked.

Alternatively, it should be possible to carefully isolate the source tag from the destination tag so that the interrogator only 'sees' one tag at a time. This process is error-prone and could result in erroneous data being written to the destination tag, so should only be used if robust error checking is in place.

Finally, it is possible to singulate tags based on their TID numbers or a combination of the EPC and TID, but specialized software needs to be running on the interrogator for this to be possible.

A-4-8. Embedded Life Part Data Structure

> Note: This section is recently added and may be updated as companies implement it. Please contact ATA e-Business Program if you have recommended updates. It will be moved from the appendix into the main part of Chapter 9-5 after it becomes stable.

One of the more challenging problems facing the airlines is to keep track of components that are composed of various subassemblies that each have their own part numbers and expiration date. These are known here as Embedded Life Parts (ELPs). The example addressed below is for slides/rafts that will have batteries, reservoirs and survival kits each with their own life limit, but it may equally pertain to many other assemblies that have subcomponents that need to be date-tracked.

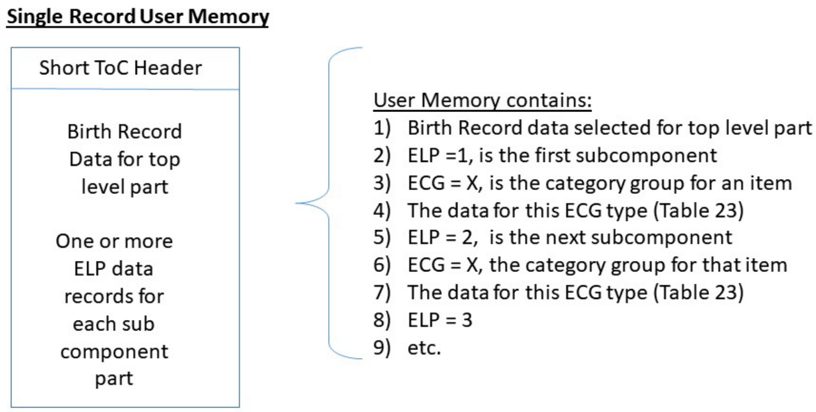
Having a tag formatted with this ELP data on the highest assembly avoids putting a tag on every subcomponent and the possible confusion and/or technical difficulty of reading multiple tags in the small confines of say, a slide assembly on the main entry door. Using this ELP tag process, if a subassembly approaches a removal date, the tag on the highest assembly contains the data to guide maintenance to the appropriate subassembly.

ELP data is defined for Single and Dual-Record tags.

1. Embedded Life Part Data on Single Record Tags

If a single record tag is chosen by the implementer, then the ELP process will be as shown in this diagram:

Figure 61 - Embedded Life Parts Structure - Single Record Format



The data string will start with desired Birth Record data for the top-level component followed by each subcomponent starting with an ELP of the first item, its ECG category code, then the data for that item. The needed data for each category is shown in Table 23 –Specific Data for Each Category of Subcomponent. Each new ELP record indicates the next subcomponent part with its category and data. The ELP values should start at 1 and increment by 1 for each subcomponent up to the number of subcomponents specified. If an ELP TEI is recorded the subcomponents ECG code and, at a minimum, the required data for that category must be specified. The first ELP TEI code will indicate the end of the top-level component data and all subsequent data will refer to subcomponents.

When a Single Record tag format is chosen to carry ELP data, the user memory size will need to be large enough to hold all the needed data. Because of the 'written and locked' nature of Single Birth-Record Formats, the change of any subassembly items will require that the old tag be discarded and a new tag be applied. Cost of the tag and simplicity of the business process make this a cost-effective option.

Table 24 - Specific Data for Each Category of Subcomponent

ECG Category	Category Name	PNR	SER/SEQ/ UCN/LOT	DMF	EXP	DNH	BID
1	Battery or Power Unit, e.g. in ELT, in escape slide assembly	M	M	O	M		
2	Pressure Vessel, e.g. reservoir	M	M	O	O	M	
3	Kit, e.g., survival or medical kit	M		O	M		
4	ELT, e.g., Emergency Locator Transponder and beacon HEX code	M	M	O	M		M

1.1. Requirements and Conditions for ELP Data

Note:	All items described below should be used in conjunction with the CSDD entries at the end of the specification that define and describe full characteristics of the field. Any differences from the CSDD will be highlighted below.

1. ELP – is used as an index to indicate the following data is in a different structure than the Birth Record data, and to indicate each ELP item in sequential order.

2. ECG – Embedded Category Group indicates the type of subcomponent and therefore the data required for that item.

3. SER or SEQ or UCN or LOT – If the embedded subcomponent has one, it must be included. Which of the four choices is used is dependent on whether the subcomponent is serialized via the UID Construct 1 or 2 method or is a LOT number with no specific serial number. If a SER, SEQ, or UCN, this number in combination with the MFR/CAG/SPL of the tagged item (and for Construct 2 the PNO) must create a globally unique number.

    - Use SER if the serial number is the globally unique within that CAGE Code (MFR or CAG). (known as UID Construct 1)

    - Use SEQ if the serial number is unique within the combination of CAGE Code and Original Part Number. (known as UID Construct 2)

    - Use UCN if serialization is added by a non-OEM (e.g., SPL) after birth. The UCN must always be unique within the SPL CAGE Code (known as Construct 1).

    Only one of SER or SEQ or UCN is permitted in the Birth Record of a tag, but additional entries are allowed for each ECG subcomponent (including LOT), thus making ELP a different data structure from other part marking applications.

4. PNR – Current Part Number of the Embedded Life Part

5. DMF – Manufacture Date is optionally included if available and useful (format YYYYMMDD)

6. EXP – Expiry Date is required if the ELP has an expiry (such as batteries, survival kits, etc.) and an earlier DNH is not specified (format YYYYMMDD)

7. DNH – Required if the part has limit prior to which a Hydrostatic Test must be done. (e.g. Pressure Vessels, Reservoir) (format YYYYMMDD)

8. BID – Beacon Identification – The 15-character HEX code which uniquely identifies a beacon. This is required for beacons.

1.2. Additional Information

Beyond the standard TEIs above associated with the ECG, it is possible to add additional information of interest. The additional data shall be added following the data in Table 24 for each ECG item. They shall either be Other TEI's described in the [csdd] or Proprietary Data Identifier (PDI). The encoding scheme for such data is described in Additional Entries.

1.3. ECG Category Codes

Table 24 identifies the requirements for each ECG category and some of the most common part types to belong in a category. These are the categories for slides/rafts and as other uses cases are established the categories can be extended via this standard. A specific category may or may not be included on any given slide depending on several variables, and there may be more than one occurrence of the same ECG subcomponent item on a single component.

Note this information may be updated more frequently than the specification and therefore the table will be maintained on the ATA e-Business Program web site to meet future business requirements. Please check there for the most current information.

Note:	The goal is to identify the embedded part (PNR), the item (SER, SEQ, UCN or LOT), and the date it will need to be removed from the assembly or aircraft – based on the EXP or DNH.

2. Embedded Life Part Data on Dual Record Tags

If ELP data is desired to be stored on a Dual Record format, the Dual Record data structure must be used with the full TOC header information. The Birth Record section will contain the birth record data of the top assembly and be locked. The LifeCycle Record will contain any unlocked data from the top level assembly (e.g., EXP data) followed by all the subcomponent ELP data and will remain unlocked.

The ELP data within the LifeCycle Record of the Dual Record tag will be exactly the same structure as found in the single record tag above (Embedded Life Part Data on Single Record Tags)

When a subcomponent is to be updated, the Birth Record of the top-level assembly will remain the same and the entire Lifecycle section will be rewritten with all the current top level assembly and new subcomponent data.

A-4-9. Miscellaneous Information

1. CRC Calculation

This section describes the Cyclic Redundancy Check (CRC) that is used in several places in the container format. See the relevant sections of Appendix A for requirements on what memory words are to be included in each CRC value.

A CRC is a data integrity check. It provides little, if any, security protection. However, it indicates (with a high probability) if any data in the record has been corrupted for some reason (e.g. a gamma ray flipping a bit). Another reason for CRC protection is that it detects what is expected to be a common failure condition: the failure to completely add a record and update the table of contents. If the CRC in the table of contents is updated as the last step when a record is added, then if the complete update is not performed when adding a record (e.g. the tag stops responding for some reason, possibly environmental RF noise), this failure will be detected by a CRC error.

Note that this CRC is not redundant with the CRC sent over the air in the EPC Gen2 spec as. The "over the air" CRC protects against transmission errors while the stored CRC protects against storage errors.

The CRC for the Table of Contents and for records is computed using the polynomial x16 + x12 + x5 + 1 with an initial value of 0xFFFF. This is also known as the CCITT CRC-16 (described in ISO/IEC 13239). This is the same CRC algorithm used by the EPC Gen2 spec for over the air transmission.

The calculation for the Table of Contents proceeds from low word addresses to high word addresses and within words, most significant bits (bits 0 – 7) first then least significant bits (8 – 15).

For the Table of Contents calculation, the words included in the computation of the Container header, record descriptor, and the # of records field in the Toc trailer field.

Sample C code to compute this CRC is located on this web page:

http://www.eagleairaust.com.au/code/crc16.htm

This web page can be used to check the output of a CCITT CRC-16 implementation:

http://www.zorc.breitbandkatze.de/crc.html

To generate a test value, press the button labeled ‘CRC-CCITT’, make sure the radio button labeled ‘Direct’ is set. Enter ASCII characters into the field labeled ‘Data Sequence’.

Test CRC values are:

“A”	0xB915
“AB”	0x4B74
“ABC”	0xF508

2. CRC Background Information

A CRC provides error detection capability in the form of a checksum. A checksum can be thought of as a message digest, or simply put, an abbreviated version of the message based on the contents. In our case, the message is a data record being stored in memory. We take the data record, do some number crunching, and end up with a shortened version of the record that gets stored along with the original data record. If you look at the data record format, you see a record header, followed by the payload (or contents), and then the CRC. The CRC is the checksum that has been calculated over the header and payload. With a good checksum algorithm, a small change in the message, even a single bit error, results in a substantial change in the checksum value.

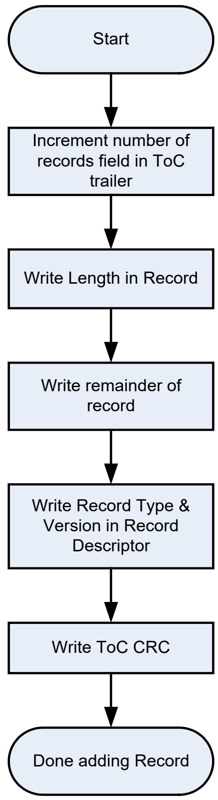
Once the record has been stored in memory along with its checksum, the checksum can be used to check for data errors. To do this, the data record is read out of memory, and a new checksum value is calculated over the data just read. Then the stored checksum is read out of memory and compared to the just-calculated checksum. If the two checksums are different, then there has been an accidental error introduced into the data record. If the two checksums are the same, then in all likelihood the data record has been retrieved with no data errors. The actual probability of there being no errors is dependent on the effectiveness of the algorithm used to calculate the checksum, and that is where CRC comes in.

CRC stands for cyclic redundancy check and is simply the mathematical algorithm used to calculate the checksum. There are many different types of checksums, including simple parity checks and modular sums. CRCs provide a big improvement over those methods because they are sensitive to data position as well as value (a message can have the order of bits/characters/words scrambled and still have the same parity). Basically, CRCs have become popular because they are powerful, easy to compute, and easy to analyze mathematically. As a result, we have CRCs today that are particularly good at detecting errors common in data transmissions and stored data. It is the nature of error detection that some errors will go undetected, but with the CRC-32 algorithm specified in Spec2000 and with the record lengths we are looking at, it is guaranteed that all single, double and triple bit errors in a record will be detected. The CRC-32 is also very good at detecting burst errors - something more useful for data transmission but also a nice-to-have for stored data.

Moving beyond the procedure of how to use a checksum, we should consider the motivation. Errors in data transmission are quite common, as are errors in stored data. The failure mechanisms and probabilities of electronic memory are well understood today. For that reason, all healthy system designs include error detection for all stored content-data, and error correction for all stored control-data. Every electronic system you can think of includes a CRC check value at every layer of the design. The hard drive in your computer includes a CRC for every page, sector, and file, as well as a CRC for the transmission link to the motherboard and another CRC for the interface to the OS. Cell phone voice communications have CRC checks for at least four different layers, cellular data communications have CRC checks for at least six layers. Your digital camera uses CRC protection when writing to the memory card, and the memory card has a CRC for each image file, and several others to cover the overall memory. Anytime you want to trust the data stored in electronic memory, it needs to have a reliable form of error detection.

3. Preferred Order of Tag Writes When Adding a Record to the Container

Figure 62 - Preferred Order of Writes



4. Sample Time Stamp Code

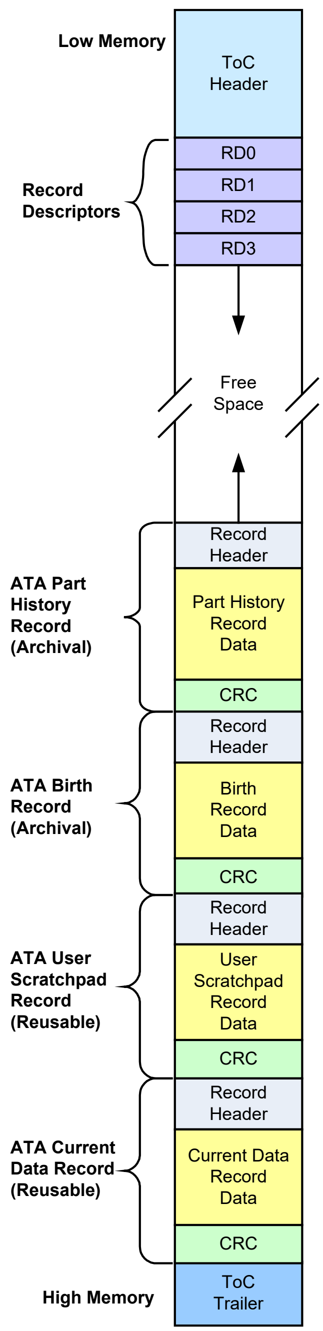
This sample Java code generates a timestamp representing the number of seconds since Jan. 1, 2000 00:00:00.

```
package com.tegoinc.ata.test;

import java.util.GregorianCalendar;
import java.util.Calendar;

public class AtaTime {

  public static void main(String[] args) {
      GregorianCalendar baseTime = new GregorianCalendar(2000, 1, 1, 0, 0, 0);
  // 1/1/2000 in default time zone
      GregorianCalendar rightNow = new GregorianCalendar();
  // Now in default time zone
      long timeDiffInSecs = (rightNow.getTimeInMillis() -
baseTime.getTimeInMillis()) / 1000;    // Difference in seconds
      System.out.println("Time in seconds since 1/1/2000 00:00:00 is " +
timeDiffInSecs);
  }
}
```


A-4-10. Example Record Allocation Showing Positions of Archival and Reusable Records

Figure 63 - Record Allocation for Multi-Record Tag shows an example of how records might be arranged to accommodate a device in which all rewritable data is grouped at the end of User Memory (higher addresses), with archival data grouped at the beginning of User Memory.

Figure 63 - Record Allocation for Multi-Record Tag



Appendix B. 6 Bit ASCII Encoding

B-1. Overview

There are cases such as encoding data for use on RFID tags where compaction is beneficial. This Appendix describes the preferred method for using 6-Bit ASCII encoding.

The mapping rules between 6-bit compacted ASCII and 8-bit compacted ASCII are:

ASCII characters 32-63: 001xxxxx <-> 1xxxxx

ASCII characters 64-95: 010xxxxx <-> 0xxxxx

By definition 6 zero bits are to be used as a null character. The detailed conversion is shown in the below table. Valid 6-bit characters are shown with the yellow and blue shading within the table.

B-2. ASCII Conversion Chart

Table 25 - ASCII Conversion Chart

Character Name	Char	Decimal	Binary	Hex	8 bit	6 bit
Null	NUL	0	0	0	00000000	000000
Start of Heading	SOH	1	1	1	00000001	
Start of Text	STX	2	10	2	00000010	
End of Text	ETX	3	11	3	00000011	
End of Transmit	EOT	4	100	4	00000100	
Enquiry	ENQ	5	101	5	00000101	
Acknowledge	ACK	6	110	6	00000110	
Bell	BEL	7	111	7	00000111	
Back Space	BS	8	1000	8	00001000	
Horizontal Tab	TAB	9	1001	9	00001001	
Line Feed	LF	10	1010	0A	00001010	
Vertical Tab	VT	11	1011	0B	00001011	
Form Feed	FF	12	1100	0C	00001100	
Carriage Return	CR	13	1101	0D	00001101	
Shift Out	SO	14	1110	0E	00001110	
Shift In	SI	15	1111	0F	00001111	
Data Line Escape	DLE	16	10000	10	00010000	
Device Control 1	DC1	17	10001	11	00010001	
Device Control 2	DC2	18	10010	12	00010010	
Device Control 3	DC3	19	10011	13	00010011	
Device Control 4	DC4	20	10100	14	00010100	
Negative Acknowledge	NAK	21	10101	15	00010101	
Synchronous Idle	SYN	22	10110	16	00010110	
End of Transmit Block	ETB	23	10111	17	00010111	
Cancel	CAN	24	11000	18	00011000	

Character Name	Char	Decimal	Binary	Hex	8 bit	6 bit
End of Medium	EM	25	11001	19	00011001	
Substitute	SUB	26	11010	1A	00011010	
Escape	ESC	27	11011	1B	00011011	
File Separator	FS	28	11100	1C	00011100	
Group Separator	GS	29	11101	1D	00011101	
Record Separator	RS	30	11110	1E	00011110	
Unit Separator	US	31	11111	1F	00011111	
Space		32	100000	20	00100000	100000
Exclamation Point	!	33	100001	21	00100001	100001
Double Quote	"	34	100010	22	00100010	100010
Pound/Number Sign	#	35	100011	23	00100011	100011
Dollar Sign	$	36	100100	24	00100100	100100
Percent Sign	%	37	100101	25	00100101	100101
Ampersand	&	38	100110	26	00100110	100110
Single Quote	‘	39	100111	27	00100111	100111
Left Parenthesis	(	40	101000	28	00101000	101000
Right Parenthesis	)	41	101001	29	00101001	101001
Asterisk	*	42	101010	2A	00101010	101010
Plus Sign	+	43	101011	2B	00101011	101011
Comma	,	44	101100	2C	00101100	101100
Hyphen / Minus Sign	-	45	101101	2D	00101101	101101
Period	.	46	101110	2E	00101110	101110
Forward Slash	/	47	101111	2F	00101111	101111
Zero Digit	0	48	110000	30	00110000	110000
One Digit	1	49	110001	31	00110001	110001
Two Digit	2	50	110010	32	00110010	110010
Three Digit	3	51	110011	33	00110011	110011
Four Digit	4	52	110100	34	00110100	110100
Five Digit	5	53	110101	35	00110101	110101
Six Digit	6	54	110110	36	00110110	110110
Seven Digit	7	55	110111	37	00110111	110111
Eight Digit	8	56	111000	38	00111000	111000
Nine Digit	9	57	111001	39	00111001	111001
Colon	:	58	111010	3A	00111010	111010
Semicolon	;	59	111011	3B	00111011	111011
Less-Than Sign	<	60	111100	3C	00111100	111100
Equals Sign	=	61	111101	3D	00111101	111101
Greater-Than Sign	>	62	111110	3E	00111110	111110
Question Mark	?	63	111111	3F	00111111	111111
At Sign	@	64	1000000	40	01000000	N/A

Character Name	Char	Decimal	Binary	Hex	8 bit	6 bit
Capital A	A	65	1000001	41	01000001	000001
Capital B	B	66	1000010	42	01000010	000010
Capital C	C	67	1000011	43	01000011	000011
Capital D	D	68	1000100	44	01000100	000100
Capital E	E	69	1000101	45	01000101	000101
Capital F	F	70	1000110	46	01000110	000110
Capital G	G	71	1000111	47	01000111	000111
Capital H	H	72	1001000	48	01001000	001000
Capital I	I	73	1001001	49	01001001	001001
Capital J	J	74	1001010	4A	01001010	001010
Capital K	K	75	1001011	4B	01001011	001011
Capital L	L	76	1001100	4C	01001100	001100
Capital M	M	77	1001101	4D	01001101	001101
Capital N	N	78	1001110	4E	01001110	001110
Capital O	O	79	1001111	4F	01001111	001111
Capital P	P	80	1010000	50	01010000	010000
Capital Q	Q	81	1010001	51	01010001	010001
Capital R	R	82	1010010	52	01010010	010010
Capital S	S	83	1010011	53	01010011	010011
Capital T	T	84	1010100	54	01010100	010100
Capital U	U	85	1010101	55	01010101	010101
Capital V	V	86	1010110	56	01010110	010110
Capital W	W	87	1010111	57	01010111	010111
Capital X	X	88	1011000	58	01011000	011000
Capital Y	Y	89	1011001	59	01011001	011001
Capital Z	Z	90	1011010	5A	01011010	011010
Left Bracket	[	91	1011011	5B	01011011	011011
Backward Slash	\	92	1011100	5C	01011100	011100
Right Bracket	]	93	1011101	5D	01011101	011101
Caret	^	94	1011110	5E	01011110	011110
Underscore	_	95	1011111	5F	01011111	011111
Back Quote	`	96	1100000	60	01100000	
Lower-case A	a	97	1100001	61	01100001	
Lower-case B	b	98	1100010	62	01100010	
Lower-case C	c	99	1100011	63	01100011	
Lower-case D	d	100	1100100	64	01100100	
Lower-case E	e	101	1100101	65	01100101	
Lower-case F	f	102	1100110	66	01100110	
Lower-case G	g	103	1100111	67	01100111	
Lower-case H	h	104	1101000	68	01101000	

Character Name	Char	Decimal	Binary	Hex	8 bit	6 bit
Lower-case I	i	105	1101001	69	01101001	
Lower-case J	j	106	1101010	6A	01101010	
Lower-case K	k	107	1101011	6B	01101011	
Lower-case L	l	108	1101100	6C	01101100	
Lower-case M	m	109	1101101	6D	01101101	
Lower-case N	n	110	1101110	6E	01101110	
Lower-case O	o	111	1101111	6F	01101111	
Lower-case P	p	112	1110000	70	01110000	
Lower-case Q	q	113	1110001	71	01110001	
Lower-case R	r	114	1110010	72	01110010	
Lower-case S	s	115	1110011	73	01110011	
Lower-case T	t	116	1110100	74	01110100	
Lower-case U	u	117	1110101	75	01110101	
Lower-case V	v	118	1110110	76	01110110	
Lower-case W	w	119	1110111	77	01110111	
Lower-case X	x	120	1111000	78	01111000	
Lower-case Y	y	121	1111001	79	01111001	
Lower-case Z	z	122	1111010	7A	01111010	
Left Brace	{	123	1111011	7B	01111011	
Vertical Bar	|	124	1111100	7C	01111100	
Right Brace	}	125	1111101	7D	01111101	
Tilde	~	126	1111110	7E	01111110	
Delta	⍰	127	1111111	7F	01111111	

Appendix C. RFID Conformance

C-1. Overview

Note:	This Conformance section is still aligned with the 2016 version of the specification. It is being updated and will be released as soon as available for the 2020 version conformance testing.

This appendix specifies the conformance requirements for data on a RFID tag that is encoded according to the requirements specified in Chapter 9-5 and Appendix A. The scope of this appendix is limited to Chapter 9-5 and Appendix A.

The goal of this appendix is to provide a comprehensive validation process to ensure that the data on the RFID tag meets the requirements specified in Chapter 9-5 and Appendix A. This can be used by anyone who is creating or receiving RFID tags to ensure that the tag data conforms to the requirements and improve interoperability.

C-2. Implementation Guide

The first column of the table is the Item number of the requirement. The second column is the location of the requirement in Chapter 9-5 and Appendix A. The third column is the focus area of the requirement. The fourth column of the table states the requirement. The fifth column is the validation process. The rest of the columns are the areas of compliance.

The item number is for reference purposes only, the sequence in which the validation is conducted can be decided by the implementation. Although the requirements are listed as individual items in the table, the implementation of the validation process may reflect that the validation for any given item may be verified by the conformance of one or more other items. The business need and information related to the tag must be available to validate the conformance of the content, record sizes, and the amount of available space on the tag.

C-3. Conformance Table

Below is a list of abbreviations used in the conformance table.

Table 26 - Abbreviations Used in Conformance Table

Abbreviation	Meaning
BR	Birth Record
CDR	Current Data Record
DRT	Dual-Record Tag
LCR	Life Cycle Record
MRT	Multi-Record Tag
PHR	Part History Record
SPR	Scratch Pad Record
SRT	Single-Record Tag
UR	Utility Record

For convenience the conformance table will be in landscape mode. Note that this is the first draft of the conformance table, so during initial testing, there may be minor updates required.

C-3-1. Version Control

The version of any individual conformance table will match the version of the specification it is mean to measure, along with a version of its own. For example, 2016.1v1.0 is the first version of the conformance table related to the version 2016.1 of the specification for chapter 9-5 and 11. Note the chapters themselves have their own version control (ref Version Control)

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
1	2.2.1	Kill Command	Therefore, at the time tags are commissioned or when the birth record is written, the kill password must be permanently write-locked. A zero-valued kill password when locked will result in a tag that can never be killed.	1) Read or Change the kill password 2) If the commands failed - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
2	2.2.2	Access password	Since the tags described in this specification are meant for exchange of information between companies throughout the industry, Access passwords should not be used. If a tag does support the access password, at the time tags are commissioned or when the birth	1) Read or Change the access password 2) If the commands failed - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
3			An AIT tag used for Aerospace or Defense purposes and in accordance with this specification shall follow the Aerospace and Defense Identifier (ADI) requirements found in [tds]	1) Parse the EPC memory contents per [tds] for the ADI EPC, 2) If the parse succeed - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
4			EPC Header - Fixed 8-bit value as assigned by GS1 EPC to prevent collisions with other EPC - 0011 1011	1) Check the contents 2) If the contents match the assigned value - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
5			The table of filter values for ADI is found in [tds]	1) Check the contents against the filter values 2) If the contents have a matching filter value - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
6	2.3.1	EPC	The manager number field is always 6 characters in length (36 bits) – either a 6-character DODACC or an ASCII space character followed by a 5-character CAGE code.	1) Measure the length of manager number 2) If the length is 6 characters or an ASCII space followed by 5 characters - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
7			Manager Number - 6-bit ASCII encoding as defined in Appendix G of [tds] is always used for the individual characters	1) Decode all characters using definitions in in Appendix G of [tds] 2) All characters can be decoded - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
8			For companies who serialize uniquely within their CAGE code (commercial aviation preferred, also called UID Construct 1) or serialize within DODAAC, a zero-length string shall be used to delimit the beginning of the serial number, meaning the part number is not part of the unique identity. If an Original Part Number is encoded, it can have a maximum 32 characters so that the resulting ADI EPC value is globally unique.	If present, 1) Measure the length 2) If the length is less than 32 characters - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
9			Delimiter - 00 0000	1) Check the contents 2) If the contents match value of the delimiter - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
10			Alphanumeric Serial Number - This is also a variable-length data field and can have a length between 1 and 30 characters so that the resulting ADI EPC value is globally unique.	1) Measure the length of serial number 2) If the length is between 1 and 30 characters - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
11			This Serial Number must be encoded using the 6-bit ASCII encoding rule as defined in [tds].	1) Decode all characters using the 6-bit ASCII encoding rule as defined in [tds] 2) All characters can be decoded - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
12			This part number must be coded using the 6-bit ASCII encoding rule as defined in [tds].	1) Decode all characters using the 6-bit ASCII encoding rule as defined in [tds] 2) All characters can be decoded - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
13			The six-bit null character (0b00 0000) is used as the delimiter, which also acts as the EPC word terminator when following the Serial Number.	1) Check the contents 2) If the contents match value of the delimiter - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
14			The tagging organization shall write and permanently write-lock the properly formatted EPC identifier before the tagged item leaves the control of the tagging authority or the control of the item proprietor.	1) Attempt to change the EPC value to all zeros. 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
15	2.4	TID	TID memory contents and formatting are standardized in [*tds*]	1) Parse the TID memory per [tds] 2) If the parse succeed - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
16	2.4		the TID shall contain a unique tag serial number that is programmed into TID memory by the chip or the tag manufacturer at the time of manufacture and in accordance with [tds].	1) Parse the TID memory contents per [tds] and confirm the presence of a serial number 2) If the serial is present - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
17	2.4		TID memory shall be locked so that it cannot be modified or erased.	1) Attempt to change the TID value to all zeros, one word at a time. 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
18	2.5.3.1		All ATA business data that is stored in User Memory shall be organized into ATA records. The general form of an ATA Record is a series of entries separated by delimiters and terminated by the record termination character, as show below. <entry>< delimiter><entry><delimiter> … <entry><terminator>	1) Parse all ATA business data in user memory based on the Record descriptors for DRT and MRT. Parse the ATA business data in user memory immediately following the TOC for SRT. Check the format 2) If the data is stored as a a series of entries separated by delimiters - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
19	2.5.3.1		Each TEI must have a data value associated with it, separated from it by a single space character.	1) Check all TEIs for the presence of data value 2) All TEIs have data values associated with it - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
20	2.5.3.1		The record terminator is a single Null character. The field delimiter "*" is not allowed in this location. If the record length is such that the end of the ATA Record, not including the terminator, ends on a word boundary or with less than the space of one character remaining before the word boundary, the record terminator is optional.	If the ATA record ends with space for at least one character remaining before word boundry, 1) Check the last character of ATA record 2) If the last character is a single Null charactert and the field delimiter is not present at the location - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
21	2.5.3.1	ATA Record	In the case of the Single-Record Tag, the Null terminator must be included, unless the end of the record coincides with the end of ATA Memory.	If the ATA record ends with space for at least one character remaining before word boundry, 1) Check the last character of ATA record 2) If the last character is a single Null charactert and the field delimiter is not present at the location - Verified, otherwise - Not verified	X	X						
22	2.5.3.1		ATA records shall be encoded in their entirety, including the delimiters and terminator, using either 6-bit or 8-bit ASCII encoding as defined in Appendix A13.	1) Decode all characters of the record using definitions in Appendix A13 2) All characters can be decoded - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
23	2.5.3.1		Encoded characters shall be stored in tag memory in big endian fashion, with the msb (most significant bit) of the character positioned towards the msb of the memory word.	1) Check the sequence of characters in the memory 2) All memory contents stored in big endian fashion - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
24	2.5.3.2		Standard entries shall always be listed first in the ATA Record.	1) Check the sequence of entries in each record and compare against the standard entries allowed for the corresponding record type 2) If the standard entries occur before additional entries - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
25	2.5.3.2		When allowed by the business record type, additional entries may be made using three-letter TEIs that are defined in [csdd].	1) Check all TEIs of the additional entries against [csdd] 2) If the TEIs does not begin with a underscore character (_) and defined in [csdd] - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
26	2.5.3.2		The proprietary data identifier is used in place of the TEI and must be preceded by the underscore character (_) with no intervening space character.	1) Check the format of all proprietary data identifiers 2) If all of them preceded by the underscore character (_) with no intervening space character - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
27	2.5.3.2		Following the “_”, the data identifier may contain only characters included in the set [0 to 9, ‘A’ to ‘Z’].	1) Check all characters of the proprietary data identifiers that follow the "_" 2) If the characters are included in the set [0 to 9, ‘A’ to ‘Z’] - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
28	Appendix A11-2, 2.1.1		ToC Header ATA Tape Type Indicator: Shall be set to the Multi-Record Tag type, see Appendix A11-2, 2.1.1	1) Check the contents for the Tag Type 2) if the Tage Type is set to Multi-Record Tag, verified, otherwise, not verified.					X	X	X	X
29	3.1.1		An ATA Multi-Record Tag shall contain exactly one Birth Record.	1) Parse the 'Record Type' field of all TOC record descriptors to identify the record types 2) Only one Birth Record - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
30	3.1.1		After the Birth Record is written to the tag, the Birth Record shall be made permanent (cannot be modified or erased) using a means appropriate to the tag (examples include permalocking, block permalocking and using sections of memory that are inherently archival).	1) Attempt to change the entire Birth Record value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified					X			
31	3.1.1		Each item may be included at most one time, other than HAZ which may be used up to three times.	1) Count the occurrence of each TEI 2) All TEI except HAZ occur not more once, HAZ occurs not more three times - Verified, otherwise - Not verified					X			
32	3.1.1.1		TEI - MFR or SPL Length Min - 5 Length Max - 5	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
33	3.1.1.1		TEI - SER or SEQ or UCN Length Min - 1 Length Max - 30 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
34	3.1.1.1		TEI - PNO Length Min - 1 Length Max - 32	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance								
					SRT		DRT		MRT				
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
35	3.1.1.1		TEI - UIC Length Min - 1 Length Max - 1 Conditional Only values of 1 or 2 are allowed.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
36	3.1.1.1		TEI - PDT Length Min - 1 Length Max - 32 The Part Description (PDT) field is constrained from [csdd] definition to no more than 32 alphanumeric characters.	1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
37	3.1.1.1		TEI - DMF Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
38	3.1.1.1		TEI - WGT Length Min - 1 Length Max - 8 Conditional It shall be used in conjunction with UNT which identifies the Unit of Measure Code (such as pounds or kilogramsLB or KG).	If TEI is present, 1) Check TEI. Measure the length of data value. Check for the presence of UNT 2) TEI matches. Data value meets length requirement. UNT is present in the record - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
39	3.1.1.1		TEI - UNT Length Min - 2 Length Max - 2 Conditional Unit of Measure Code is required when WGT data is included. Valid codes are listed in the CSDD.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed per CSDD - Verified, otherwise - Not verified					X			
40	3.1.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
41	3.1.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
42	3.1.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
43	3.1.1.1	Birth Record (Multi-Record Tag)	TEI - ESD Length Min - 1 Length Max - 1 Conditional ESD, the Electrostatic Sensitive Device Indicator, is required with a value of 1if ESD handling precautions are necessary or recommended; otherwise do not use the field	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
44	3.1.1.1		TEI - EXP Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			
45	3.1.1.1		TEI - LLE Length Min - 1 Length Max - 1 Conditional A value of 1 in the value field indicates a limited life part; otherwise do not use the field.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
46	3.1.1.1		TEI - LOT/LTN Length Min - 1 Length Max - 15 Conditional This field is required for non-serialized parts that have Lot Numbers.	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement. UCN is present in record - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
47	3.1.1.1		TEI - CNT Length Min - 2 Length Max - 2 Conditional The list of two character ISO country codes are defined here: http://www.iso.org/iso/country_names_and_code_elements.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
48	3.1.1.1		TEI - ECC Length Min - 5 Length Max - 14 Conditional is an alphanumeric classification	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
49	3.1.1.1		TEI - SWI Length Min - 1 Length Max - 1 Conditional This field is required, with a value of 1 if the part has an upgradeable software component; otherwise do not use the field.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
50	3.1.1.1		TEI - TDN Length Min - 1 Length Max - 32 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
51	3.1.1.1		TEI - PML Length Min - 1 Length Max - 100 Conditional If more than one mod is included, they are all included in the value field of a single PML entry and separated by commas only (no spaces).	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. No spaces between value - Verified, otherwise - Not verified					X			
52	3.1.1.1		TEI - NSN Length Min - 13 Length Max - 13 Optional The number is stored without dashes, even though dashes are often displayed in human readable applications	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement. No dashes in value - Verified, otherwise - Not verified					X			
53	3.1.1.1		TEI - ICC Length Min - 6 Length Max - 6 Optional The valid format for the ICC value is numeric only.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified					X			
54	3.1.1.1		TEI - FAB Length Min - 5 Length Max - 5 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified					X			

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
55	3.1.1.2		The PNR (Current Part Number) shall not be used as one of the additional items, since the PNR may change and the latest is always shown in the Current Data Record.	1) Check additional TEI's 2) PNR not present - Verified, otherwise - not verified					X			
56	3.1.1.2		any number of additional entries may be added to Birth Record by following the requirements described in Section 2.5.3.2.	1) Check additional entries. Verify contents against requirements in Section 2.5.3.2 2) Contents meet the requirement of Section 2.5.3.2 - verified, otherwise - not verified					X			
57	3.1.2		All Multi-Record Tags must contain exactly one CDR.	1) Parse the 'Record Type' field of all TOC record descriptors to identify the record types 2) Only one CDR Record - Verified, otherwise - Not verified						X		
58	3.1.2		The CDR must be capable of holding all mandatory data items and all conditional items that are required by the conditions.	1) Calculate the size of CDR 2) Size meets business requirement - Verified, otherwise - Not verified						X		
59	3.1.2		All new data written to the tag must first be written to the Birth Record or to a Part History Record.	1) Match contents of CDR with Birth Record or Part History Record 2) All the contents of CDR present in Birth Record or Part History Record - Verified, otherwise - Not verified						X		

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance: SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
60	3.1.2		the CDR shall be updated whenever a Part History Record makes a change to a data element that needs to be stored in the CDR. The data contents of the CDR are listed in Table 9-5.7. If any of the items listed in the table appear in the Birth Record or in a Part History Record, the most recent version of that item must be included in the CDR.	1) Match items listed in the table with Birth Record or Part History Record 2) Most recent version of the matching items listed in CDR - Verified, otherwise - Not verified						X		
61	3.1.2		Only those items listed in the data table are allowed and each item may be used up to one time, other than HAZ which may be used up to three times. No Additional Records such as those defined in section 2.5.3.2 shall be used in the CDR.	1) Compare TEI's in CDR against the list in Table 9-5.7. Count the occurrence of each TEI 2) All TEI's present in Table 9-5.7. All TEI except HAZ occur not more once, HAZ occurs not more three times - Verified, otherwise - Not verified						X		
62	3.1.2		The CDR shall never be locked or permalocked.	1) Attempt to change one of the CDR TEIs value to all zeros, one word at a time 2) change successful - Verified, otherwise - Not verified						X		

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
63	3.1.2.1		TEI - PNR Length Min - 1 Length Max - 15 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the most recent Part History Record or the PNO in the Birth Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
64	3.1.2.1		TEI - PML Length Min - 1 Length Max - 100 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
65	3.1.2.1		TEI - OPN Length Min - 16 Length Max - 32 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
66	3.1.2.1	Current Data Record (Multi-Record Tag)	TEI - CND Length Min - 3 Length Max - 3 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		

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Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
67	3.1.2.1		TEI - EXP Length Min - 8 Length Max - 8 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
68	3.1.2.1		TEI - TDN Length Min - 1 Length Max - 32 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
69	3.1.2.1		TEI - HAZ Length Min - 6 Length Max - 6 Up to three HAZ shall be included in the CDR when multiple HAZ entries are used elsewhere on the tag in either the Birth Record or in Part History Records. If more than three HAZ occur in the tag, the three most recent shall be reflected in the CDR. shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Count the number of occurances. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Maximum of three occurances. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
70	3.1.2.1		TEI - ONR Length Min - 2 Length Max - 5 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
71	3.1.2.1		TEI - LAC Length Min - 1 Length Max - 13 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
72	3.1.2.1		TEI - ASN Length Min - 1 Length Max - 11 shall be included in the CDR if they are included in the Birth Record or a Part History Record (including Correction Records and Data-Digest Records), and only the most recent value shall be used. Format and length of data values shall be same as the source entry in the Birth Record or Part History Record.	If TEI is present in Birth Record or Part History Record, 1) Check TEI. Measure the length of data value. Compare the value of the TEI against corresponding values in the Birth Record or Part History Record 2) TEI matches. Data value has the same content, format and length as the most recent value from Birth Record or Part History Record - Verified, otherwise - Not verified						X		
73	3.1.3		A Multi-Record Tag shall include one User Scratchpad Record.	1) Parse the 'Record Type' field of all TOC record descriptors to identify the record types 2) Only one Scratchpad Record - Verified, otherwise - Not verified								X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
74	3.1.3		Each record entry shall use the format ACO__*ACD ___*REM ___* (or ACO_*ACD_*xxx_ in the case an alternate TEI is used) as shown in Table 9-5.8. As additional Scratchpad entries are added each will include the appropriate ACD__*ACD__*... data.	1) Check format of all record entries 2) All record entries meet format requirement - Verified, otherwise - Not verified								X
75	3.1.3		The Scratchpad Record shall always be encoded using 8-bit ASCII encoding as defined in Appendix A13	1) Decode all characters of the record using definitions in Appendix A13 2) All characters can be decoded - Verified, otherwise - Not verified								X
76	3.1.3		If space must be allocated for the new entry, then previous entries are deleted starting with the oldest.	1) Check the sequence of the entries 2) If entries have a linear timeline - Verified, otherwise - Not verified								X
77	3.1.3		The User Scratchpad Record shall be a rewritable record and shall never be locked, even if an unlock capability is provided.	1) Attempt to change the entire record value to a different value, e.g. the date the conformance certification was performaned, 2) change successful - Verified, otherwise - Not verified								X
78	3.1.3.1	User	TEI - ACO Length Min - 5 Length Max - 5	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified								X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
79	3.1.3.1	User Scratchpad Record (Multi-Record Tag)	TEI - ACD Length Min - 8 Length Max - 8	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified								X
80	3.1.3.1		TEI - REM Length Min - 1 Length Max - 344 REM is required if no other TEIs beyond ACO and ACD are included in the entry. If other TEIs are included, REM is optional.	Not required if TEIs is present beyond ACO and ACD. 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified								X
81				1) Check the sequence of entries in each record and compare against the standard entries allowed for the corresponding record type 2) If the standard entries occur before additional entries - Verified, otherwise - Not verified								X
82	3.1.3.2		Beyond adding the free text allowed in the Remarks field, users may have use cases that are facilitated by further	1) Check all TEIs of the additional entries against [csdd] 2) If the TEIs does not begin with a underscore character (_) and defined in [csdd] - Verified, otherwise - Not verified								X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
83			tagged data with other TEI's. To do so, follow procedures described in Section 2.5.3.2.	1) Check the format of all proprietary data identifiers 2) If all of them preceded by the underscore character (_) with no intervening space character - Verified, otherwise - Not verified								X
84				1) Check all characters of the proprietary data identifiers that follow the "_" 2) If the characters are included in the set [0 to 9, 'A' to 'Z'] - Verified, otherwise - Not verified								X
85	3.1.4		Multi-Record Tags are required to have space to accommodate at least one Part History Record	1) Determine if tag contains one or more Part History records. Calculate the appropriate minimum size of Part History record 2) Tag contains one or more Part History records or minimum size meets business requirement - Verified, otherwise - Not verified							X	
86	3.1.4		After writing a Part History Record, it shall be made permanent (cannot be modified or erased) using a means appropriate to the tag.	1) Attempt to change the entire record value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified							X	
87	3.1.4.1		The first entry in a Part History Record is always ACT with action code.	1) Check first entry of Part History Record 2) Entry is ACT with action code - Verified, otherwise - Not verified							X	

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
88	3.1.4.1		Only the action codes defined in the following two sections are allowed as values for ACT.	1) Check all values of ACT 2) All values are listed in either 3.1.4.1 a or 3.1.4.1 b - Verified, otherwise - Not verified							X	
89	3.1.4.2		Following the action code entry are three required entries that make up the traceability data for the part history record, as described in Table 9-5.9.	1) Check TEIs after each action code entry 2) ACO, ACD, and CND present after each action code entry - Verified, otherwise - Not verified							X	
90	3.1.4.2		TEI - ACT Length Min - 3 Length Max - 3	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
91	3.1.4.2		TEI - ACO Length Min - 5 Length Max - 5	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
92	3.1.4.2		TEI - ACD Length Min - 8 Length Max - 8	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
93	3.1.4.2		TEI - CND Length Min - 3 Length Max - 3 Value is one of: SRV - serviceable UNS - unserviceable UNK - unknown	1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified							X	
94	3.1.4.3		Action code - INS TEI - NHA Length Min - 1 Length Max - 15 Optional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
95	3.1.4.3		Action code - INS TEI - AIN Length Min - 1 Length Max - 10	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
96	3.1.4.3		Action code - INS TEI - FHL Length Min - 1 Length Max -6 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
97	3.1.4.3		Action code - INS TEI - FCL Length Min - 1 Length Max - 6 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
98	3.1.4.3		Action code - INS TEI - LAC Length Min - 1 Length Max - 13 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
99	3.1.4.3		Action code - RMV TEI - NHA Length Min - 1 Length Max - 15 Optional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
100	3.1.4.3		Action code - RMV TEI - AIN Length Min - 1 Length Max - 10	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
101	3.1.4.3		Action code - RMV TEI - FHL Length Min - 1 Length Max - 6 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
102	3.1.4.3		Action code - RMV TEI - FCL Length Min - 1 Length Max - 6 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
103	3.1.4.3		Action code - RMV TEI - LAC Length Min - 1 Length Max - 13 Optional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
104	3.1.4.3		Action code - RMV TEI - RMT Length Min - 1 Length Max - 30	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
105	3.1.4.3	Part History Records (Multi-Record Tag)	Action code - RMV TEI - RTI Length Min - 1 Length Max - 50 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
106	3.1.4.3		Action code - RPR TEI - RMD Length Min - 1 Length Max - 50 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
107	3.1.4.3		Action code - RPR TEI - RAP Length Min - 1 Length Max - 20 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
108	3.1.4.3		Action code - OVH TEI - EXP Length Min - 8 Length Max - 8 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
109	3.1.4.3		Action code - OVH TEI - OHM Length Min - 6 Length Max - 20 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
110	3.1.4.3		Action code - MOD TEI - PNR Length Min - 1 Length Max - 15 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
111	3.1.4.3		Action code - MOD TEI - STN Length Min - 1 Length Max - 25 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
112	3.1.4.3		Action code - MOD TEI - PML Length Min - 1 Length Max - 12 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
113	3.1.4.3		Action code - MOD TEI - SFT Length Min - 1 Length Max - 32 Optional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
114	3.1.4.3		Action code - EXC TEI - MFR Length Min - 5 Length Max - 5	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
115	3.1.4.3		Action code - EXC TEI - SER Length Min - 1 Length Max - 15	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
116	3.1.4.3		Action code - EXC TEI - PNR Length Min - 1 Length Max - 15	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
117	3.1.4.3		Action code - SRV TEI - MNC Length Min - 3 Length Max - 5 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
118	3.1.4.3		Action code - SHP TEI - SHT Length Min - 1 Length Max - 5 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
119	3.1.4.3		Action code - RCD TEI - MFR/SPL Length Min - 5 Length Max - 5 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
120	3.1.4.3		Action code - INP TEI - IFC Length Min - 1 Length Max - 3 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
121	3.1.4.3		Action code - INP TEI - IMD Length Min - 1 Length Max - 25 Conditional	If Action code is present and if TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
122	3.1.4.3		Action code - OTH TEI - ACR Length Min - 1 Length Max - 25	If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
123	3.1.4.3		Action code - OTH TEI - REM Length Min - 1 Length Max - 50 Conditional For the REM entry under the OTH action code, the entry is optional if there are any additional TEIs in the record (see Additional Information in Section 3.1.4.4), otherwise the entry is required.	Not required if TEIs is present beyond ACO and ACD. If Action code is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified							X	
124	3.1.4.4		To accommodate additional data in unique or atypical circumstances, any number of additional entries may be added to Part History Records by following the requirements described in Section 2.5.3.2.	1) Check additional entries. Verify contents against requirements in Section 2.5.3.2 2) Contents meet the requirement of Section 2.5.3.2 - verified, otherwise - not verified							X	

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
125	3.1.5		Timestamps shall be included by making use of timestamp features at the next higher data layer. For the ToC format, the timestamp bit shall be set in the ToC Header, and timestamps included in all Data Record Headers.	1) Check for timestamp present in ToC Header and Data Record Headers. 2) If timestamp present - Verified, otherwise - Not verified							X	
126	Appendix A11-2, 2.1.1		ToC Header ATA Tape Type Indicator: Shall be set to the Dual-Record Tag type, see Appendix A11-2, 2.1.1	1) Check the contents for the Tag Type 2) if the Tage Type is set to Dual-Record Tag, verified, otherwise, not verified.			X	X				
127	3.2.1		Items listed in the table shall be included in the Birth Record at most one time, except for HAZ which may be included up to three times.	1) Count the occurrence of each TEI 2) All TEI except HAZ occur not more once, HAZ occurs not more three times - Verified, otherwise - Not verified			X					
128	3.2.1		Items listed in Table 9-5.12 shall be the first entries in the Birth Record.	1) Check the entries in the record against the items listed in Table 9-5.12. 2) If all entries from table occur before other entries - Verified, otherwise - Not verified			X					

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
129	3.2.1		After the Birth Record is written to the tag, the Birth Record shall be made permanent (cannot be modified or erased) using a means appropriate to the tag (examples include block-permalocking and using sections of memory that are inherently archival) while leaving rewriteable the area dedicated to the Lifecycle Record.	1) Attempt to change the entire record value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified			X					
130	3.2.1		The proper format, limits, and allowed values for each data element are controlled by their definitions in [csdd]. If the maximum field length listed in Table 9-5.12 is less than what is specified in [csdd], the maximum described in the table must be obeyed.	1) Compare the data elements in the record against the definitions in [csdd]. 2) If all the data elements meet the definition - Verified, otherwise - Not verified			X					
131	3.2.1.1		TEI - MFR/SPL Length Min - 5 Length Max - 5 Only one of MFR or SPL is permitted on a tag, not both.	1) Check TEI. Measure the length of data value 2) Only MFR or SPL is present. TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
132	3.2.1.1		TEI - SER/SEQ/UCN Length Min - 1 Length Max - 15 Conditional UCN shall be used (in conjunction with SPL in the CAGE code field). Only one of SER or SEQ or UCN is permitted on a tag, never more than one.	If TEI is present, 1) Check TEI. Measure the length of data value 2) Only SER or SEQ or UCN is present. UCN is only present when SPL is the TEI for Spec 2000 Unique Serial Number. TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
133	3.2.1.1		TEI - PNO Length Min - 1 Length Max - 15	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
134	3.2.1.1		TEI - UIC Length Min - 1 Length Max - 1 Conditional only values of 1 or 2 are allowed. A value of 1 indicates the part is serialized using either SER or UCN. A value of 2 indicates the part is serialized using a sequence number only (SEQ) and requires PNO to make a globally unique identity. For non-serialized parts, UIC shall be omitted.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed. The TEI for Spec 2000 Unique Serial Number is SER or UCN if the data value of 1. The TEI for Spec 2000 Unique Serial Number is SEQ if the data value of 2 - Verified, otherwise - Not verified			X					

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
135	3.2.1.1		TEI - DMF Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
136	3.2.1.1		TEI - WGT Length Min - 1 Length Max - 6 Conditional It shall be used in conjunction with UNT which identifies the Unit of Measure Code (such as pounds or kilograms).	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement. UNT is present in the record - Verified, otherwise - Not verified			X					
137	3.2.1.1		TEI - UNT Length Min - 2 Length Max - 2 Conditional Mandatory when WGT data is included. The only valid codes are either LB or KG.	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement. Data value is allowed. WGT is present in the record - Verified, otherwise - Not verified			X					
138	3.2.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
139	3.2.1.1	Birth Record (Dual-Record Tag)	TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
140	3.2.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
141	3.2.1.1		TEI - ESD Length Min - 1 Length Max - 1 Conditional is required, with a value of 1if ESD handling precautions are necessary or recommended; otherwise do not use the field.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
142	3.2.1.1		TEI - EXP Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
143	3.2.1.1		TEI - LLE Length Min - 1 Length Max - 1 Conditional A value of 1 in the value field indicates a limited life part; otherwise do not use the field.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
144	3.2.1.1		TEI - PDT Length Min - 1 Length Max - 32 Optional The valid format for the ICC value is numeric only. The Part Description (PDT) field is constrained from the CSDD definition to no more than 32 alphanumeric characters.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
145	3.2.1.1		TEI - ICC Length Min - 6 Length Max - 6 Optional The valid format for the ICC value is numeric only.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
146	3.2.1.1		TEI - LOT/LTN Length Min - 1 Length Max - 15 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
147	3.2.1.1		TEI - CNT Length Min - 2 Length Max - 2 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
148	3.2.1.1		TEI - ECC Length Min - 5 Length Max - 14 Optional is an alphanumeric classification	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
149	3.2.1.1		TEI - SWI Length Min - 1 Length Max - 1 Optional A value of 1 is used if the part has an upgradeable software component; otherwise do not use the field	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
150	3.2.1.1		TEI - TDN Length Min - 1 Length Max - 32 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
151	3.2.1.1		TEI - NSN Length Min - 13 Length Max - 13 Optional NSN, NATO Stock Number is a fixed-length, 13 numeric digits The data must be stored on the AIT tag without dashes.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified			X					
152	3.2.1.1		TEI - FSB Length Min - 5 Length Max - 5 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified			X					
153	3.2.1.2		Beyond the standard TEIs associated with the Birth Record, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Section 2.5.3.2.	1) Check additional entries. Verify contents against requirements in Section 2.5.3.2 2) Contents meet the requirement of Section 2.5.3.2 - verified, otherwise - not verified			X					
154	3.2.1.2		Note that the PNR (Current Part Number) will not be used as one of the additional items, since the PNR may change and the latest is always shown in the Lifecycle Record.	1) Check to see if PNR is part of the additional items. 2) PNR not present- Verified, otherwise - Not verified			X					
155	3.2.2		The Lifecycle Record shall never be locked or permalocked.	1) Attempt to change the entire record value to a different value, 2) change successful - Verified, otherwise - Not verified				X				

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
156	3.2.2		The Lifecycle Record shall be encoded using either 6-bit or 8-bit ASCII encoding as defined in Appendix A13.2.	1) Decode all characters of the record using definitions in Appendix A13.2 2) All characters can be decoded - Verified, otherwise - Not verified				X				
157	3.2.2.1		TEI - PNR Length Min - 1 Length Max - 15	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
158	3.2.2.1		TEI - PML Length Min - 1 Length Max - 12 Conditional If more than one mod is included, they are all included in the value field of a single PML entry and separated by commas only (no spaces).	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified				X				
159	3.2.2.1		TEI - OPN Length Min - 16 Length Max - 32 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
160	3.2.2.1		TEI - EXP Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
161	3.2.2.1	Lifecycle Record (Dual-Record Tag)	TEI - DOH Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
162	3.2.2.1		TEI - TDN Length Min - 1 Length Max - 32 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
163	3.2.2.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
164	3.2.2.1		TEI - LAC Length Min - 1 Length Max - 13 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
165	3.2.2.1		TEI - MNC Length Min - 3 Length Max - 5 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
166	3.2.2.1		TEI - DOW Length Min - 8 Length Max - 8 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified				X				
167	3.2.2.2		Beyond the standard TEIs associated with the Lifecycle Record, it is possible to add additional information of interest. The additional data shall be added following the requirements described in Section 2.5.3.2	1) Check the sequence of entries in each record and compare against the standard entries allowed for the corresponding record type 2) If the standard entries occur before additional entries - Verified, otherwise - Not verified				X				
168				1) Check all TEIs of the additional entries against [csdd] 2) If the TEIs does not begin with a underscore character (_) and defined in [csdd] - Verified, otherwise - Not verified				X				
169				1) Check the format of all proprietary data identifiers 2) If all of them preceded by the underscore character (_) with no intervening space character - Verified, otherwise - Not verified				X				

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
170				1) Check all characters of the proprietary data identifiers that follow the "_" 2) If the characters are included in the set [0 to 9, ‘A’ to ‘Z’] - Verified, otherwise - Not verified				X				
171	Appendix A11-2, 3.1		ToC Header ATA Tape Type: Shall be set to the Single Record Birth Tag type, see Appendix A11-2, 3.1	1) Check the contents for the Tag Type 2) if the Tage Type is set to Single-Record Birth Tag, verified, otherwise, not verified.	X							
172	3.3.1		The data on the tag shall be encoded using 6-bit ASCII encoding, as defined in Appendix A13-2.	1) Decode all characters of the record using definitions in Appendix A13.2 2) All characters can be decoded - Verified, otherwise - Not verified	X							
173	3.3.1		Items listed in the table shall be included in the Birth Record at most one time, except for HAZ which may be included up to three times.	1) Count the occurrence of each TEI 2) All TEI except HAZ occur not more once, HAZ occurs not more three times - Verified, otherwise - Not verified	X							
174	3.3.1		Items listed in Table 9-5.15 shall be the first entries in the Birth Record.	1) Check the entries in the record against the items listed in Table 9-5.15. 2) If all entries from table occur before other entries - Verified, otherwise - Not verified	X							

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
175	3.3.1		After the Birth Record is written to the tag, the Record shall be made permanent before the tagged item leaves the control of the tagging authority or the control of the item proprietor.	1) Verify this record is locked by changing it, one word at a time 2) If the record can't be changed - Verified, otherwise - Not verified	X							
176	3.3.1		If adequate space remains on the tag after the Birth Record is written, then the Birth Record must be protected at the next data layer by a CRC value.	If space of 16 bit or more is available after the Birth record 1) Check CRC. Computer CRC for the Birth record. 2) CRC present matches the computed CRC of the Birth Record - Verified, otherwise - Not verified	X							
177	3.3.1.1		TEI - MFR/SPL Length Min - 5 Length Max - 5	1) Check TEI. Measure the length of data value 2) Only MFR or SPL is present. TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							
178	3.3.1.1		TEI - SER/SEQ/UCN Length Min - 1 Length Max - 30 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) Only SER or SEQ or UCN is present. UCN is only present when SPL is the TEI for Spec 2000 Unique Serial Number. TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
179	3.3.1.1	Single Record Birth Tag	TEI - PNO Length Min - 1 Length Max - 32	1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							
180	3.3.1.1		TEI - UIC Length Min - 1 Length Max - 1 Conditional only values of 0, 1, 2 are allowed. This field is required for serialized parts. A value of 1 indicates the part is serialized using either SER or UCN. A value of 2 indicates the part is serialized using a sequence number only (SEQ) and requires PNO to make a globally unique identity.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed. The TEI for Spec 2000 Unique Serial Number is SER or UCN if the data value of 1. The TEI for Spec 2000 Unique Serial Number is SEQ if the data value of 2 - Verified, otherwise - Not verified	X							
181	3.3.1.1		TEI - DMF Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							
182	3.3.1.1		TEI - HAZ Length Min - 6 Length Max - 6 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
183	3.3.1.1		TEI - EXP Length Min - 8 Length Max - 8 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							
184	3.3.1.1		TEI - LLE Length Min - 1 Length Max - 1 Conditional A value of 1 in the value field indicates a limited life part; zero otherwise.	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified	X							
185	3.3.1.1		TEI - PNR Length Min - 1 Length Max - 32 Conditional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified	X							
186	3.3.1.1		TEI - PML Length Min - 1 Length Max - 12 Conditional The field length is restricted from what is defined in [csdd]. If more than one mod is included, they are all included in the value field of a single PML entry and separated by commas only (no spaces).	If TEI is present, 1) Check TEI. Measure the length of data value. Check data value 2) TEI matches. Data value meets length requirement. Data value is allowed - Verified, otherwise - Not verified	X							

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
187	Appendix A11-2, 3.1		ToC Header ATA Tape Type: Shall be set to the Single Record Utility Tag type, see Appendix A11-2, 3.1	1) Check the contents for the Tag Type 2) if the Tage Type is set to Single-Record Utility Tag, verified, otherwise, not verified.		X						
188	3.3.2		The Single Record Utility Tag shall be encoded using 6-bit ASCII encoding, as defined in Appendix A13-2.	1) Decode all characters of the record using definitions in Appendix A13-2 2) All characters can be decoded - Verified, otherwise - Not verified		X						
189	3.3.2		… the Single-Record Utility Tag shall not contain a Birth Record as a Single Record Birth Tag does	1) Check the ATA Record for containing a combination of the following TEIs: MFR, PNO or PNR. 2) If the record does not contain MFR along with PNO and/or PNR, verified, otherwise, not verified.		X						
190	3.3.2		TEI - SPL Length Min - 5 Length Max - 5 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
191	3.3.2		TEI - UCN Length Min - 1 Length Max - 15 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
192	3.3.2	Single Record Utility Tag	TEI - PNO Length Min - 1 Length Max - 15 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
193	3.3.2		TEI - PNR Length Min - 1 Length Max - 15 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
194	3.3.2		TEI - UIC Length Min - 1 Length Max - 1 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
195	3.3.2		TEI - DMF Length Min - 8 Length Max - 8 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
196	3.3.2		TEI - PML Length Min - 1 Length Max - 12 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
197	3.3.2		TEI - LAC Length Min - 1 Length Max - 13 Optional	If TEI is present, 1) Check TEI. Measure the length of data value 2) TEI matches. Data value meets length requirement - Verified, otherwise - Not verified		X						
198	3.4.1	Record Pre-allocation (Multi-Record Tag)	All Multi-Record Tags shall be initialized with a Current Data Record, and a Scratchpad Record, with enough space remaining for the Birth Record and at least one Part History Record.	1) Check allocation record types and available space 2) If Current Data Record, Scratchpad Record, Birth Record, and a Part History Record are present. - Verified. If Current Data Record, Scratchpad Record, and Birth record are only present, check available space is enough to add one Part History Record based on business need.- Verified. otherwise - Not verified					X	X	X	X
199	3.4.1		Scratchpad Record: The minimum space allocated for the payload region (the ATA Record) of Scratchpad record shall be 496 bits	1) Calculate the size of the payload region 2) If size is equal or greater than 496 bits - Verified, otherwise - Not verified					X	X	X	X
200	3.4.1		Scratchpad Record: At the time the Scratchpad Record is pre-allocated, the payload must be filled with NULLs only.	1) Check all the characters in the unused area of Scratchpad Record 2) If all characters are Null - Verified, otherwise - Not verified					X	X	X	X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
201	3.4.1		Note that these three records, i.e. Current Data Record, Scratchpad Record and Birth Record, shall be created in the exact order as shown in the figure. The three Record Descriptors for their corresponding records shall be created in the exact order as shown in the figure	1) Check the order of Current Data Record, Scratchpad Record and Birth Record 2) If the order matches exact order as shown in the figure - Verified, otherwise - Not verified 3) Check the order of Record Descriptor for the Current Data Record, the Record Descriptor for the Scratchpad Record, and the Record Descriptor for the Birth Record 4) If the order matches exact order as shown in the figure - Verified, otherwise - Not verified					X	X	X	X
202	3.4.2		All Dual-Record tags shall be initialized with a Lifecycle Record, with enough space remaining to store the Birth Record.	1) Check allocation record types and available space 2) If Lifecycle Record Present. Available space is enough to store birth record based on business needs - Verified, otherwise - Not verified			X	X				

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
203	3.4.2	Record Pre-allocation (Dual-Record Tag)	The Lifecycle Record shall be the first record written, and the Birth Record shall be the second written. The resulting tag structure is shown in Figure 9-5.6 below. The two Record Descriptors for their corresponding records shall be created in the exact order as shown in Figure 9-5.6.	1) Check the order of Lifecycle Record and Birth Record, 2) If the order matches exact order as shown in the figure - verified, otherwise, not verified. 3) Check the order of Record Descriptors for the Lifecycle Record and Birth Record. 4) If the order matches exact order as shown in the figure, verified, otherwise, not verified.			X	X				
204	3.4.2		The Lifecycle Record may include data in the payload when it is first written, or it may be pre-allocated as an empty record. If empty when pre-allocated, the payload area must be filled with zeros only.	If Lifecycle record is empty, 1) Check all the characters 2) If all characters are zeros - Verified, otherwise - Not verified			X	X				
205	3.4.2		The size allocated for the record shall be at least large enough for the ATA Record portion (the record payload) to store all of the standard (Mandatory and Conditional) elements defined for the Lifecycle Record using the maximum field width for each.	1) Check allocated space for record 2) Available space meets business requirement - Verified, otherwise - Not verified			X	X				

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
206	Appendix A11-2, 1	Container - General	In the Full ToC format, each record descriptor describes and points a data record. As data records are added to the tag, RDs are added at the end of the array, growing toward high memory. The data records start at high memory and grow toward the record descriptors (low memory).	1) Check the memory locations of record descriptors and data records 2) Record descriptors start at low memory and grow towards high memory. Data records start at high memory and grow towards low memory - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
207	Appendix A11-2, 1		In all Figures in this Appendix, the most significant bit is on the left and is transmitted first over the air interface.	1) Check memory structure and location of fields 2) Most significant bit is on the left - Verified, otherwise - Not verified	X	X	X	X	X	X	X	X
208	Appendix A11-2, 2.1		The ToC Header must be stored at the very beginning of the User Memory bank; hence the DSFID (Data Structure Format Identifier) field must be stored at word address zero in User Memory.	1) Read the first word in user memory and compare it to 0x1E00 2) If the value matches - Verified, otherwise - Not verified			X	X	X	X	X	X
209	Appendix A11-2, 2.1		Once the ToC Header is written, it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.	1) Attempt to change the entire ToC Header value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified			X	X	X	X	X	X
210	Appendix A11-2, 2.1		Locations of all other fields in the ToC shall be as shown in Figure A11-2.	1) Check the location of all fields against Figure A11-2. 2) If the location matches Figure A11-2 - Verified, otherwise - Not verified			X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
211	Appendix A11-2, 2.1		Record Descriptors shall immediately follow the ToC header in User Memory.	1) Validate the content of the first record descriptor (in item 230-234) with the data stored immediately following the TOC header 2) If the record descriptor is valid - Verified, otherwise - Not verified			X	X	X	X	X	X
212	Appendix A11-2, 2.1.1		DSFID - Shall be set to 0x1E00	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified			X	X	X	X	X	X
213	Appendix A11-2, 2.1.1		ToC Minor Verson Number	1) Check the content for the encoded version number 2) The major version number is 4. The minor version number is 1. The combination of the Major & Minor Version numbers need to match with the			X	X	X	X	X	X
214	Appendix A11-2, 2.1.1		ToC Major Version Number				X	X	X	X	X	X
215	Appendix A11-2, 2.1.1		ATA Tag Type: 0000 – Multi-Record Tag 0001 – Dual-Record Tag 0010 – Single Record Birth Tag 1010 – Single Record Utility Tag	1) Check the contents for the Tag Type 2) The encoded Tag Type needs to match with the data structure, format and contents for the intended Tag Type as defined in Section 3 of Chapter 9-5. If matched, verified. If not matched, not verified.			X	X	X	X	X	X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
216	Appendix A11-2, 2.1.1	ToC Format - ToC Header	ATA Classification: Currently this field is not used and shall be set to 00001b (binary), 0x01 (hex), since this was the value shown for flyable parts in the previous version of this standard.	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified			X	X	X	X	X	X
217	Appendix A11-2, 2.1.1		Flags Bit Position 0 : Replacement Tag 0 = tag is a new tag (original), 1 = tag is a replacement tag and contains data sourced from an earlier tag on the same asset	1) Check the contents 2) If the tag is intended as a new tag and has a value of 0 - Verified. If the tag is intended as a replacement tag and has a value of 1 - Verified. otherwise - Not verified			X	X	X	X	X	X
218	Appendix A11-2, 2.1.1		Flags Bit Position 1: Timestamp Included 0 = timestamp is not included, 1 = timestamp is included in record header	1) If the value of the flag is 1 then check if timestamp is present and the value of year in the timestamp is greater than 2010. 2) Flag is unset OR Timestamp is present with the value of year greater than 2010 when flag is set - Verified, otherwise - Not verified			X	X	X	X	X	X
219	Appendix A11-2, 2.1.1		Flags Bit Position 2: 16/32-bit pointer 0 = 16 bit pointers used in the record descriptors; Size of ATA Memory field encoded in 16 bits 1 = 32 bit pointers used in the record descriptors; Size of ATA Memory field encoded in 32 bits	1) Check the contents and the type of pointers used in record descriptors 2) Content is 1 if 32 bit pointers are used in record descriptors, 0 otherwise - Verified, otherwise - Not verified			X	X	X	X	X	X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
220	Appendix A11-2, 2.1.1		Flags Bit Position 3: CRC Indicator 0 = there is no CRC written to the tag, 1 = there is a CRC written to the tag	1) Check the contents and presence of CRC 2) Contents is 1 if CRC is present, 0 otherwise - Verified, otherwise - Not verified			X	X	X	X	X	X
221	Appendix A11-2, 2.1.1		Flags Bit Position 4: Corrected Tag 0 = Original record or correction done by company which created the original record 1 = Record corrected by company other than the one who created the original record.	1) Check content 2) If the content is 0 and the record was done by the compnay that created the original record - Verified. If the content is 1 and the record was done by the compnay that did not create the original record - Verified.otherwise - Not verified			X	X	X	X	X	X
222	Appendix A11-2, 2.1.1		Size of ToC Header (in words): If two words are used to indicate the Size of ATA Memory (flag for 16/32-bit pointers is set to one), this field shall be set to 0x05, otherwise it is set to 0x04.	1) Check the contents and flag for 16/32-bit pointers 2) If the contents match requirement - Verified, otherwise - Not verified			X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
223	Appendix A11-2, 2.1.1		Size of RDs : Size of record descriptors in words (16 bits). 0x00 = the tag uses the Short ToC and has no record descriptor, i.e. Single-Record Tag type. 0x02 = the tag uses the full ToC format with 16-bit record addresses (see figure A11-2.4) 0x03 = the tag uses the full ToC format with 32-bit record addresses (see figure A11-2.5)]	1) Check the contents and 16/32-bit pointers flag 2) If the content is 0x02 or 0x03 and matches the 16/32-bit pointers flag - Verified, otherwise - Not verified			X	X	X	X	X	X
224	Appendix A11-2, 2.1.1		Size of ATA Memory: The number of 16-bit words in ATA memory.	1) Check the content and number of words in ATA memory based on location of TOC trailer 2) If the content matches words in ATA memory - Verified, otherwise - Not verified			X	X	X	X	X	X
225	Appendix A11-2, 2.1.1		Size of ATA Memory: The second word is only included if the number of words cannot be expressed using 16 bits. In this case, the 16/32-bit pointers flag is set to one and the size is expressed as a 32-bit value.	1) Check the contents, number of words in ATA memory, and the 16/32-bit pointers flag 2) Content only present if the number of words cannot be expressed using 16 bits. 16/32-bit pointers flag is set to one - Verified, otherwise - Not verified			X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
226	Appendix A11-2, 2.1.1	ToC Format - ToC Trailer	The ToC Trailer shall be stored at the end of ATA memory as defined by the Size of ATA Memory field in the ToC Header such that the CRC word is stored in the last word of ATA memory and the Number of Records stored is in the penultimate memory word.	1) Check the location of CRC and Number of records. 2) If TOC trailer is after the last ATA record of the intended tag type and a CRC word is present in the last word of ATA memory and the Number of Records stored is present the penultimate memory word. - Verified, otherwise - Not verified			X	X	X	X	X	X
227	Appendix A11-2, 2.1.1		the ToC Trailer must never be locked or made permanent.	1) Attempt to change the entire ToC Trailer value to all zeros 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified			X	X	X	X	X	X
228	Appendix A11-2, 2.1.1		ToC Trailer field 1: The number of records stored: Indicates how many data records have been stored.	1) Check the content and number of the data records 2) If the contents matches the number of data records - Verified, otherwise - Not verified			X	X	X	X	X	X
229	Appendix A11-2, 2.1.1		ToC Trailer field 2: CRC on the ToC A Cyclic Redundancy Check calculated over the ToC Header, the Record Descriptors and the Toc Trailer not including the CRC word, using the method described in A11-3.1.	1) Check the contents. Calculate CRC over the ToC Header, the Record Descriptors and the Toc Trailer not including the CRC word, using the method described in A11-3.1. 2) If the contents match calculated CRC - Verified, otherwise - Not verified			X	X	X	X	X	X

Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
230	Appendix A11-2, 2.2	ToC Format - ToC Record Descriptors	When a new Record Descriptor is written, it must be made permanent using a means appropriate to the tag.	1) Attempt to change the entire Record Descriptor value to all zeros 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified			X	X	X	X	X	X
231	Appendix A11-2, 2.2		Locations of all fields in a Record Descriptor shall be as shown below in Figures A11-4 and A11-5.	1) Verify the location of all fields against Figure A11-4 and A11-5. 2) If the location matches Figure A11-4 and A11-5 - Verified, otherwise - Not verified			X	X	X	X	X	X
232	Appendix A11-2, 2.2.1		The absolute address in the user bank where the record starts (number of words away from zero).	1) Check the contents and the absolute address where the record starts 2) If the contents match the absolute address where the record starts - Verified, otherwise - Not verified			X	X	X	X	X	X
233	Appendix A11-2, 2.2.1		Indicates the type of record using the following values; - Birth Record: 0x00 - Current Data Record: 0x01 - User Scratchpad Record: 0x02 - Part History Record: 0x03 - Lifecycle Record: 0x04	1) Check the contents and the type of record 2) If the contents match record type - Verified, otherwise - Not verified			X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
234	Appendix A11-2, 2.2.1		Indicates the encoding type used in the record pointed to by this Record Descriptor 0 = 6-bit ASCII encoding is used in the payload of this record 1 = 8-bit ASCII encoding is used in the payload of this record	1) Check the contents and decode the contents of the record using the specified ASCII encoding type 2) 2) All characters can be decoded - Verified, otherwise - Not verified			X	X	X	X	X	X
235	Appendix A11-2, 2.3		The Record Payload contains the data contents plus padding to reach the end of the record as defined by the Record Size field. If the data content includes a termination character, then padding can be any value; if no terminator is present then padding must be all zeros.	If no terminator is present, 1) Check the characters used for padding 2) If all the characters are zero - Verified, otherwise - Not verified			X	X	X	X	X	X
236	Appendix A11-2, 2.3		Data is stored immediately following the Record Header and written left to right then top (near the header) to bottom (near the trailer).	1) Check the location of the data record and the format 2) Data is stored immediately following the Record Header and written left to right then top (near the header) to bottom (near the trailer) - Verified, otherwise - Not verified			X	X	X	X	X	X
237	Appendix A11-2, 2.3		Payloads can be encoded using either 6-bit or 8-bit ASCII encoding as indicated by the 6/8-bit encoding flag in the corresponding Record Descriptor. Encoding shall be as defined in Appendix 13.	1) Decode all characters of the ToC using definitions in Appendix A13 2) All characters can be decoded - Verified, otherwise - Not verified			X	X	X	X	X	X

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
238	Appendix A11-2, 2.3	ToC Format (Data Record Format)	If the timestamp flag is set in the corresponding Record Descriptor, then the timestamp field shall be included as part of the Header.	1) If the timestamp flag is set then check if timestamp is present and the value of year in the timestamp is greater than 2010. 2) Flag is unset OR Timestamp is present with the value of year greater than 2010 when flag is set - Verified, otherwise - Not verified			X	X	X	X	X	X
239	Appendix A11-2, 2.3		Locations of all fields in a Data Record shall be as shown below in Figures A11-6 and A11-7.	1) Verify the location of all fields against Figure A11-6 and A11-7. 2) If the location matches Figure A11-6 and A11-7 - Verified, otherwise - Not verified			X	X	X	X	X	X
240	Appendix A11-2, 2.3.1		The size of the record in words (16 bits), including the Header, Trailer and all Payload Area words.	1) Check the contents. Calculate size of record (16 bits), including the Header, Trailer and all Payload Area words 2) If the contents match size of record in words - Verified, otherwise - Not verified			X	X	X	X	X	X
241	Appendix A11-2, 2.3.1		Indication of record type, using the same values as used for Record Descriptors.	1) Check the contents and record type used in record descriptor 2) If the contents matches record type used in record descriptor - Verified, otherwise - Not verified			X	X	X	X	X	X

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
242	Appendix A11-2, 2.3.1		CRC value calculated using the method described in A11-3.1. The calculation is performed over the entire record excluding the CRC word, so any padding present in the payload is always included.	1) Check the contents. Calculate CRC over the entire record excluding the CRC word and any padding present in the payload 2) If the contents match calculated CRC - Verified, otherwise - Not verified			X	X	X	X	X	X
243	Appendix A11-2, 3		The Short ToC storage format is shown in Figure A11-8.	1) Verify the location of all fields against Figure A11-8. 2) If the location matches Figure A11-8 - Verified, otherwise - Not verified	X	X						
244	Appendix A11-2, 3		Once the ToC Header is written, if the tag type is a Single-Record Birth Tag (see ATA Tag Type in Appendix A11.2 Section 3.1 below), it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.	1) Attempt to change the entire ToC Header value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified	X							
245	Appendix A11-2, 3		The Size of ToC Header field shall indicate the number of words in the ToC header and may change along with the ToC Major and Minor Version numbers.	1) Check the contents and number of words in ToC Header 2) If the contents match words in ToC Header - Verified, otherwise - Not verified	X	X						
246	Appendix A11-2, 3		In this format, there are no record descriptors; the record payload (no header or trailer) starts immediately after the ToC header and is written down towards higher memory addresses.	1) Check the location of record payload and ToC header 2) If the record payload follows ToC header and is written down towards high memory address - Verified, otherwise - Not verified	X	X						

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
247	Appendix A11-2, 3		The record payload can extend up to the boundary of the ATA memory if the CRC indicator is set to 0. If CRC indicator is set to 1, CRC will occupy the last word in the ATA memory and the payload can extend up to the CRC word.	If CRC indicator is set to 1, 1) Check the last word in ATA memory 2) If the last word is CRC - Verified, otherwise - Not verified	X	X						
248	Appendix A11-2, 3		If a CRC is encoded and if the tag type is a Single-Record Birth Tag, it must be made permanent (unable to be modified or deleted) using a means appropriate to the tag.	1) Attempt to change the CRC value to all zeros, one word at a time 2) Tag replies with a memory locked error code as specified in [gen2] - Verified, otherwise - Not verified	X							
249	Appendix A11-2, 3		The payload contents must include its own terminator if it does not end at the CRC word boundary. If the CRC word is omitted and the payload ends at the boundary of ATA Memory, then the payload terminator may be omitted.	If payload contents do not end at CRC word boundary or if payload does not end at the boundary of ATA memory, 1) Check to see if the payload content include its own terminator 2) If terminator present - Verified, otherwise - Not verified	X	X						
250	Appendix A11-2, 3.1		DSFID - Shall be set to 0x1E00	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified	X	X						
251	Appendix A11-2, 3.1		ToC Minor Version Number	1) Check the content for the encoded version number 2) The major version number is 4. The minor version number is 1. The combination of the Major & Minor Version numbers need to match with the	X	X						
252	Appendix A11-2, 3.1		ToC Major Version Number		X	X						

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
253	Appendix A11-2, 3.1	Short ToC Format	ATA Tag Type: 0000 – Multi-Record Tag 0001 – Dual-Record Tag 0010 – Single Record Birth Tag 1010 – Single Record Utility Tag	1) Check the contents for the Tag Type 2) The encoded Tag Type needs to match with the data structure, format and contents for the intended Tag Type as defined in Section 3 of Chapter 9-5. If matched, verified. If not matched, not verified.	X	X						
254	Appendix A11-2, 3.1		ATA Classification: Currently this field is not used and shall be set to 00001b (binary), 0x01 (hex), since this was the value shown for flyable parts in the previous version of this standard.	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified	X	X						
255	Appendix A11-2, 3.1		Flags Bit Position 0 : Replacement Tag 0 = tag is a new tag (original), 1 = tag is a replacement tag and contains data sourced from an earlier tag on the same asset	1) Check the contents 2) If the tag is intended as a new tag and has a value of 0 - Verified. If the tag is intended as a replacement tag and has a value of 1 - Verified. otherwise - Not verified	X	X						
256	Appendix A11-2, 3.1		Flags Bit Position 1: Not applicable and shall be set to 0	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified	X	X						
257	Appendix A11-2, 3.1		Flags Bit Position 2: not applicable and shall be set to 0	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified	X	X						

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
258	Appendix A11-2, 3.1		Flags Bit Position 3: CRC Indicator 0 = there is no CRC written to the tag, 1 = there is a CRC written to the tag	1) Check the contents and presence of CRC 2) Contents is 1 if CRC is present, 0 otherwise - Verified, otherwise - Not verified	X	X						
259	Appendix A11-2, 3.1		Flags Bit Position 4: Corrected Tag 0 = Original record or correction done by company which created the original record 1 = Record corrected by company other than the one who created the original record.	1) Check the contents and presence of CRC 2) Contents is 1 if CRC is present, 0 otherwise - Verified, otherwise - Not verified	X	X						
260	Appendix A11-2, 3.1		Flags Bit 5 to 7: Reserved Shall all be set 0	1) Check the contents 2) If the contents match requirement - Verified, otherwise - Not verified	X	X						
261	Appendix A11-2, 3.1		Size of ToC Header: Size of ToC Header (in words). Set to 0x04.	1) Check the contents 2) If the contents is set to 0x04 - Verified, otherwise - Not verified	X	X						
262	Appendix A11-2, 3.1		Size of RDs: Size of record descriptors. Set to 0x00 to indicate the Short ToC format.	1) Check the contents 2) If the contents is set to 0x00 - Verified, otherwise - Not verified	X	X						
263	Appendix A11-2, 3.1		Size of ATA memory – The number of words in ATA memory. This indicates the portion of User Memory that is dedicated to the ToC container and its contents which include the optional CRC if it exists.	1) Check the contents and calculate size of ATA memory 2) If the contents match number of words in ATA memory - Verified, otherwise - Not verified	X	X						

Appendix 14 - RFID Conformance
Table A14-2

Item	Subclause	Focus Area	Requirement	Validation process	Area of compliance							
					SRT		DRT		MRT			
					BR	UR	BR	LCR	BR	CDR	PHR	SPR
264	Appendix A11-2, 3.1		CRC on the TOC … using the method described in Annex A.	1) Calculate CRC using the method described in Annex A. 2) If CRC matches the value in the field - verified, otherwise - Not verified	X	X						

Name	Action Code	Mod	2005

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Describes the action taken relative to a given part, component or lot.	2000,
Specific	Used for traceability purposes to specifically record each action that is performed on a part, component or lot.	2000,

Name	Action Code	Mod	2005

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ACT	Data Element	Fixed Record Character Length: 03 **Data Type:** A **Min Length:** 3 **Max Length:** 3 **Cobol Picture:** X(03) **Permitted Value List:** ACT_Codes **Usages:** **Chapter** 9

PERMITTED VALUES List Name: *ACT_Codes*		
Permitted Value	**Default Value**	**Description**
BUY		Bought from
CDO		Current design activity is
DES		How destroyed
DIG		Data Digest Record (on RFID Tag)
DMP		Tag data from prior RFID tag replacement
EXC		Exchanged for/with
INP		Inspected what, tested what, adjusted what
INS		Installed on
MFG		Manufactured by
MOD		Modified
MRK		Marked by
ODO		Original design activity is
OTH		Other - freelance note
OVH		How overhauled/remanufactured and/or new life limits if applicable
PHC		Part History Correction Pointer (RFID tag)
RCD		Received by/from
RMV		Removed from
RPR		Repaired by
SCP		Scrapped
SHP		Shipped to
SLD		Sold to
SRV		Serviced
TST		Tested
UPG		Upgraded, new part number is
WHR		Warehoused at

Name	Action Company	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The five character CAGE/NCAGE Code of the company taking an action relative to a part.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ACO	Data Element	Fixed Record Character Length: 05 **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Cobol Picture:** X(05) **Decimals:** 0 **Usages:** **Chapter** 9

Name	Action Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The date on which a particular action was taken	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ACD	Data Element	For off tag format, use YYYY-MM-DD. If hours and minutes are needed, the 24 hour clock employing local time shall be used. Format YYYY-MM-DDThh:mm For RFID, use YYYYMMDD **Data Type:** Date **Min Length:** 8 **Max Length:** 16 **Usages:** **Chapter** 9
2500	XSD	ActionDate	Element	**Data Type:** xs:date **Usages:** **Schema** ATA_RepairDamageStatus

Name	Action Description	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A textual description of an action taken to a component, part, aircraft or engine.	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ACR	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 25 **Usages:** **Chapter** 9
2500	XSD	ActionDescription	Element	**Data Type:** xs:string **Max Length:** 500 **Usages:** **Schema** ATA_RepairDamageStatus

Name	Aircraft Identification Number	Mod	2019

ALSO KNOWN AS: AIN

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The manufacturer's permanently-applied serial number for the airframe.	2000,

Name	Aircraft Identification Number	Mod	2019

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	AIN	Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 6 **Cobol Picture:** X(01) to X(06) **Decimals:** 0 **<u>Usages:</u>** **Chapter** 1, 5 **Record Type** 22, 26, 28
2000	XSD	AIN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 10 **<u>Usages:</u>** **Chapter** 11, 14, 15 **Schema** AircraftEvent, AircraftHoursAndLandings, AircraftOutOfService, AircraftStatusChange, ATA_WarrantyClaim, DeliveredAircraftTransferPartList, EngineRemoval, Flight, Logbook, LRU_Removal, QuantityPerAircraft, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	TEI	AIN	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 10 **<u>Usages:</u>** **Chapter** 9

Name	Airline Part Number	Mod	2020

ALSO KNOWN AS: Airline Stock Number

DEFINITIONS

Class	Definition	Source
Concept	A number assigned by the airline to identify and control the part in their inventory and control system.	2200, 2400, 2500,
Specific	Internal identification that has been applied to a part or unit in an airline's inventory. The Airline Stock Number is used in addition to other identification by the manufacturer or distributor of the part.	2000, 2500,

Name	Airline Part Number	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	ASN	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 11 **Cobol Picture:** X(11) **Decimals:** 0 **Usages:** **Chapter** 12, 2, 5, 9 **Command** A1ADDPRT, A1CHANGE, A1STOCKS, A1UPDATE, P1PDINQY **Record Type** 21
2200	ML	alprtnbr	Element	**Usages:** **DTD** aipc, eipc, wm
2000	XSD	ASN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 11, 16 **Schema** AircraftEvent, ATA_PartCertificationForm, LRU_Removal, PieceParts, QuantityPerAircraft, ScheduledMaintenance, ServiceBulletin, ShopFindings
2500	XSD	AirlinePartNumber	Element	**Data Type:** xs:string **Max Length:** 32 **Usages:** **Schema** ATA_InstalledComponentStatus

Name	Battery Manufacture Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Date of expiration of a battery.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	BAT	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD YYYYMMDD format **Usages:** **Chapter** 9

Name	Beacon Identifier	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A unique identifier of emergency beacons.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	BID	Element	Provided by beacon manufacturers, and registered with national authorities **Data Type:** string **Min Length:** 15 **Max Length:** 15 15 character hexidecimal field. **Usages:** **Chapter** 9

Name	Certificate Tracking Number	Mod	2020

ALSO KNOWN AS: Authorized Release Certificate number

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A tracking number established by the organization or individual issuing airworthiness or conformance data that uniquely identifies the information set.	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	TDN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 16 **Schema** ATA_PartCertificationForm
2000	XSD	PartCertficateTrackingNum	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 17, Gen2 **Schema** ATA_DSE_Logbook, ShipmentNotificatior
2000	TEI	TDN	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 9
2500	XSD	AuthorizedReleaseCertificateNumber	Element	**Data Type:** xs:string **Max Length:** 32 **Usages:** **Schema** ATA_InstalledComponentStatus

Name	Commercial And Government Entity Code	Mod	2020

ALSO KNOWN AS: CAGE Code

DEFINITIONS

Class	Definition	Source
Concept	A unique identifier for a company defined by the Defense Logistics Information Service, which is part of the U.S. Government's Defense Logistics Agency.	2000, 2200, 2500,
Specific	A unique identifier to provide a standardized method of identifying a given company facility at a specific location. CAGE Codes are used internationally as part of the NATO Codification System (NCS), where they are sometimes called NCAGE Codes.	2400,
Specific	When used for part identification the CAGE Code or NATO Supply Code is a unique 5 character identification for an enterprise or an identifiable portion of an enterprise.	2000,
Specific	The five character CAGE/NCAGE Code of the company (i.e., trading partner) when providing part traceability.	2000,

Name	Commercial And Government Entity Code	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	TEI	CAG	Data Element	Alpha characters should all be upper case. When providing traceability for a serialized part, this data element represents the other company (second trading partner) in the transaction. For example, if your company is selling the part, CAG woud represent the company buying the part. If your company is buying the part, CAG represents the company selling the part. Use the codes specified in Cataloging Handbook H4/H8 Sections A & B (CAGE) codes (United States and Canada only) and sections C & D NATO Supply Codes for Manufacturers (excluding United States and Canada) CAG is used for the enterprise assigning a unique Part Serial Number (SER) when different from the Part Number owner (MFR). The owner of this CAGE/NCAGE code assigns the SER which is globally unique within their CAGE/NCAGE. **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Decimals:** 0 **Usages:** **Chapter** 9
2000	XSD	CAGE_Code	Element	**Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 **Usages:** **Chapter** 17, 18, Gen2 **Schema** ATA_Logbook, ATA_WorkPackage, PurchaseOrderStatus, QuoteResponse
2400	XSD	cageCode	Attribute	**Usages:** **Schema** AllowableConfigurationInParts

Name	Commercial And Government Entity Code	Mod	2020

2500	XSD	CAGE_Code	Element	**Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 **Usages:** **Schema** ATA_AD_Status, ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name	Condition Code	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Specifies the condition of part for sale.	2000,
Specific	Indicates the condition of a part relative to its traceability as it moves through its lifecycle process.	2000,

Name	Condition Code	Mod	2013

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	CND	Data Element	**Data Type:** A **Min Length:** 2 **Max Length:** 2 **Cobol Picture:** A(02) **Permitted Value List:** Condition Codes **Usages:** **Chapter** 12, 2 **Command** A1ADDPRT, A1CHANGE, A1QTYDEC, A1QTYINC, A1QUOTES, A1STOCKS, A1UPDATE, P1PDINQY, S1QUOTES
2000	XSD	CND	Element	**Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 **Permitted Value List:** Condition Codes **Usages:** **Schema** ATA_SparesQuoteFinal, ATA_SparesQuoteRequest
2000	TEI	CND	Data Element	**Data Type:** Alpha **Min Length:** 3 **Max Length:** 3 **Permitted Value List:** CND_Codes **Usages:** **Chapter** 9

Name	Condition Code	Mod	2013

PERMITTED VALUES List Name: *CND_Codes*		
Permitted Value	**Default Value**	**Description**
SCP		Part has been declared scrap
SRV		Part is serviceable
UNK		Condition of the part is unknown
UNS		Part is unserviceable

PERMITTED VALUES List Name: *Condition Codes*		
Permitted Value	**Default Value**	**Description**
AR		As Removed
CR		Condition provided on request
EX		Exchange/Lease
NU		New
OH		Overhauled
ST		Stolen/Missing
US		Used/Serviceable
XX		Scrap

Name **Country Code** **Mod** 2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A numeric or alpha code use to identify a country of origin for an information set.	2400,
Specific	A code used to identify the country of an Aviation Authority	2000,
Specific	A numeric or alpha code used to identify a country of origin for an aircraft, component, or engine.	2000, 2200,

Name	Country Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2200	ML	country	Element	A country code specified in the "Manufacturers reference and/or Specification" column of the consumable material list in SRM 51-35-00.
2000	XSD	CNT	Element	Use ISO 3166 2-character country codes **Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 **Usages:** **Chapter** 16 **Schema** ATA_PartCertificationForm
2000	TEI	CNT	Data Element	Use ISO 3166 2-character country codes **Data Type:** String **Min Length:** 2 **Max Length:** 2 **Usages:** **Chapter** 9
2400	XSD	countryIsoCode	Attribute	**Usages:** **Schema** AllowableConfigurationInParts
2000	XSD	Country	Element	**Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 Use ISO 3166 Country Codes **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification
2500	XSD	Country	Element	**Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 Use ISO 3166 2-character country codes **Usages:** **Schema** ATA_AircraftTransferRecordsCrate

Name	**Country Code**	**Mod**	2020

Name	Customer Identification Code	Mod	2012

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the airline customer plus the office and/or individual receiving or transmitting data sets.	2000,

Name	Customer Identification Code	Mod	2012

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	CIC	Data Element	Use of Internal Routing Code is optional. Refer to Customer Code (CUS)for definition and other applications in Provisioning, Order Administration, Invoicing, Repair Administration, Information/Data Exchange, and Surplus Procedure. Refer to Inquirer Identification Code for P1PDINQY, R1CDBINQ, and R1CDBRSP Command Code applications. Non-airline companies which do not qualify for ATA/IATA Codes but wish to function as customers should use their Supplier Code (POS 01-05). **Data Type:** AN **Min Length:** 3 **Max Length:** 5 **Decimals:** 0 <FF1>POS 01-02 IATA Airline Designator X(02) POS 03 Office Code X(01) POS 04-05 Internal Routing Code X(02)</FF1> (As agreed to by trading partners) The first two characters identify the customer as specified by the International Air Transport Association (IATA) Airline Coding Directory. **Usages:** **Chapter** 2, 3, 6, 7, 9 **Command** A1CNTACT, P1ADVISE, P1CNTACT, R1ADVISE, R1CNTACT, R1CPOACK, R1CPOINQ, R1CPORSP, R1CPOXMT, R1INXACK, R1INXXMT, R1PNRINQ, R1PNRRSP, R1QTNINT, R1QTNREQ, R1QTNXMT, S1BOOKED, S1CNTACT, S1PNSTAT, S1POSTAT, S1QUOTES, S1REJECT, S1STOCKS **External** UN/EDIFACT, X12

Name	**Customer Identification Code**	Mod	2012

2000	XSD	CIC	Element	Non-airlines use 5 character CAGE code **Data Type:** xs:string **Min Length:** 3 **Max Length:** 5 POS 01-02 IATA Airline Designator POS 03 Office Code POS 04-05 Internal Routing Code (optional) (As agreed to by trading partners) The first two characters identify the customer as specified by the International Air Transport Association (IATA) Airline Coding Directory. **Usages:** **Chapter** 11, 13, 14, 16, 2, 3, 4 **Schema** ATA_InvoiceMessageAck, ATA_MetricsPartsDetail, ATA_MetricsPartSummary, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesMessageAck, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusInquiry, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteInterim, ATA_SparesQuoteRequest, ATA_SparesStockInquiry, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, ATA_WarrantyAcknowledgement, ATA_WarrantyClaim, ShopFindings

Name	Customer Order Number	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The customer's identity number assigned to a specific order for a given part or a specific order for repair/overhaul services for a given part.	2000,

Name	Customer Order Number	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	CPO	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 11 **Cobol Picture:** X(01) to X(11) **Decimals:** 0 **Usages:** **Chapter** 3, 4, 7, 9 **Command** R1CPOINQ, R1CPORSP, R1CPOXMT, R1CUSSHP, R1DSPACK, R1DSPXMT, R1EXCXMT, R1INVACK, R1INVXMT, R1INXACK, R1INXXMT, R1MATRCP, R1PNRRSP, R1SPLSHP, R1TDNXMT, S1BOOKED, S1INVEXC, S1NVOICE, S1ORDEXC, S1PNSTAT, S1POSTAT, S1SHIPPD **External** UN/EDIFACT, X12
2000	XSD	CPO	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 11 **Usages:** **Chapter** 11, 13, 14, 16, 3, 4 **Schema** ATA_InvoiceMessageAck, ATA_MetricsPartsDetail, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesMessageAck, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusInquiry, ATA_SparesOrderStatusResponse, ATA_SparesSupplierShipNotice, ATA_WarrantyClaim, ShopFindings
2000	XSD	CustomerOrderNumber	Element	**Data Type:** xs:string **Max Length:** 32 **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, ShipmentNotification

Name	Customer Order Number	Mod	2020

Name	Date of Next Hydrostatic Test	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the date by which the next hydrostatic test of a component is required.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	DNH	Element	**Data Type:** date **Date Format:** YYYYMMDD Date format: YYYYMMDD for RFID encoding **Usages:** **Chapter** 9

Name	**Electrostatic Sensitive Device Indicator**	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Denotes subject part as an electronic component subject to catastrophic failure, major electrical characteristic change or performance degradation from electrostatic discharge.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	ESD	Data Element	**Data Type:** N **Min Length:** 1 **Max Length:** 1 **Decimals:** 0 Provisioning S/T File Format - Explanation Code 34 (EC34) Text <FF1>POS. 01-26 Filler (Spaces) * X(26) </FF1> * Actual indication is specified by the Code "34" in the Explanation Code field. Provisioning V File Format - TEI: ESD 1 Indicates part as an electrostatic sensitive device. **Usages:** **Chapter** 1 **Record Type** 03, 12
2000	TEI	ESD	Data Element	Note - if this field is optional, only provide it when an item is Electrostatic Sensitive (with a value of 1) **Data Type:** Boolean **Min Length:** 1 **Max Length:** 1 1 - Electrostatic Sensitive 0 - Not Electrostatic Sensitive **Usages:** **Chapter** 9

Name	Embedded Category Group	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Designates a particular category of subcomponent that has required data defined for inclusion in an Embedded Life Part data structure.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ECG	Element	**Data Type:** String **Usages:** **Chapter** 9

Name	Embedded Life Part Designator	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Used to identify group of data elements on a parent part's RFID tag which belong to an embedded child part. .	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ELP	Element	See Spec 2000 Chapter 9 for allowable tags which are contained in this data group **Data Type:** String **Usages:** **Chapter** 9

Name	Enterprise Lot Number	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Enterprise Lot Number is the manufacturer's unique identity for a group of units of the same item which are processed, manufactured, or assembled by one producer under uniform conditions and which are expected to function in a uniform manner. Enterprise Lot Number when linked with the Enterprise Identifier provides the permanent identification for a given group of like items. The Enterprise Lot Number is unique within the Enterprise Identifier.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	LTN	Data Element	Alpha characters shall be upper case. The dash (-) is the only special character permitted in the Lot Number field. However, the dash (-) is not allowed as the first or last position of a Lot Number. When used as part identification for non-serialized items, lot number (LTN) shall be used in lieu of the Part Serial Number (SER). Under certain circumstances, it may be desirable to sub-divide a LTN into smaller units (batches). In that case, use Batch Item Identifier (BII) as the appropriate data identifier. **Data Type:** String **Min Length:** 1 **Max Length:** 15 **Decimals:** 0 **<u>Usages:</u>** **Chapter** 9

Name	Expiration Date	Mod	2020

ALSO KNOWN AS: Expiry Date

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The date on which a document or certificate is no longer effective	2500,
Specific	The date on which a part's service life expires	2000,
Specific	The date that a maintenance release expires.	2000,
Specific	The date that a maintenance deferral expires.	2000,
Specific	For Shelf Life Limited items, identifies the date that the shelf life expires.	2000,
Specific	Specifies the date on which provisioning price information transmitted in the Procurement Data Segment (PDS) is no longer considered firm.	2000,

Name	**Expiration Date**	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	EXP	Data Element	Expiration Date may be invalidated or extended by bilateral agreement. **Data Type:** N **Min Length:** 6 **Max Length:** 6 **Decimals:** 0 99 99 99 Day Month Year For RFID use YYYYMMDD **Usages:** **Chapter** 1, 9 **Record Type** 12
2000	XSD	EXP	Element	**Data Type:** xs:date **Date Format:** YYYY-MM-DD **Usages:** **Chapter** 11, 15, 16 **Schema** ATA_PartCertificationForm, DeliveredAircraftTransferPartList, LRU_Removal
2000	XSD	ExpirationDate	Element	Date and time conform to the ISO 8601 extended format: yyyy-mm-ddThh:mm:ss or for UTC: yyyy-mm-ddThh:mm:ssZ **Data Type:** xs:dateTime **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook
2000	TEI	EXP	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date format YYYYMMDD for RFID encoding **Usages:** **Chapter** 9

Name	Expiration Date	Mod	2020

2500	XSD	ExpiryDate	Element	**Data Type:** xs:date **Usages:** **Schema** ATA_AircraftTransferRecordsCrate

Name	Expiration Date	Mod	2020

ALSO KNOWN AS: Expiry Date

DEFINITIONS

Class	Definition	Source
Specific	The date on which a document or certificate is no longer effective	2500,
Specific	The date on which a part's service life expires	2000,
Specific	The date that a maintenance release expires.	2000,
Specific	The date that a maintenance deferral expires.	2000,
Specific	For Shelf Life Limited items, identifies the date that the shelf life expires.	2000,
Specific	Specifies the date on which provisioning price information transmitted in the Procurement Data Segment (PDS) is no longer considered firm.	2000,

Name	Expiration Date	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	EXP	Data Element	Expiration Date may be invalidated or extended by bilateral agreement. **Data Type:** N **Min Length:** 6 **Max Length:** 6 **Decimals:** 0 99 99 99 Day Month Year For RFID use YYYYMMDD **Usages:** **Chapter** 1, 9 **Record Type** 12
2000	XSD	EXP	Element	**Data Type:** xs:date **Date Format:** YYYY-MM-DD **Usages:** **Chapter** 11, 15, 16 **Schema** ATA_PartCertificationForm, DeliveredAircraftTransferPartList, LRU_Removal
2000	XSD	ExpirationDate	Element	Date and time conform to the ISO 8601 extended format: yyyy-mm-ddThh:mm:ss or for UTC: yyyy-mm-ddThh:mm:ssZ **Data Type:** xs:dateTime **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook
2000	TEI	EXP	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date format YYYYMMDD for RFID encoding **Usages:** **Chapter** 9

Name	**Expiration Date**	Mod	2020

2500	XSD	ExpiryDate	Element	**Data Type:** xs:date **Usages:** **Schema** ATA_AircraftTransferRecordsCrate

Name	Export Control Classification Number	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A classification used in the Commerce Control List to identify items for export control purposes.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ECC	Data Element	Numbers available at: http://www.access.gpo.gov/bis/ear/pdf/indexnum.pdf Normally, the OEM is responsible for determining and reporting the correct ECC Number. **Data Type:** String **Min Length:** 5 **Max Length:** 14 **Decimals:** 0 **Usages:** **Chapter** 9
2000	XSD	ECCN	Element	**Data Type:** xs:string **Max Length:** 32 **Usages:** **Chapter** Gen2 **Schema** ShipmentNotification

Name	Export Controlled Item	Mod	2012

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Items subject to export control and or restrictions as identified in the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	ECI	Element	Full details of encoding is found in the Wassenaar Agreement at http://www.wassenaar.org/controllists/index.html **Data Type:** AN **Min Length:** 3 **Max Length:** 9 First 2 Characters: Country Code (from ISO 3166) which has imposed the export control or restriction. Third through ninth character: Wassenaar Code, which consists of either a single category code, or the Military List Code (ML followed by 1 or 2 digits) that identifies the nature of the material. This can be followed by an optional SL or VSL to indicate sensitive or very sensitive items. **Usages:** **Chapter** 9

Name	Fabricator	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the CAGE or NCAGE of the production organization responsible for the manufacture of the part, but does not hold the design authority responsible for the part number.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	FAB	Data Element	Refer to Commercial and Government Entity Code (CAGE code) for format and structure. **Data Type:** String **Min Length:** 5 **Max Length:** 5 **<u>Usages:</u>** **Chapter** 9

Name	Flight Cycles - Last Count	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the total number of flight cycles achieved by the Model of Applicability (MOA) within the customer's fleet for the reporting period.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	FCL	Data Element	**Data Type:** N **Min Length:** 3 **Max Length:** 5 **Cobol Picture:** 9(03) to 9(05) **Decimals:** 0 **Usages:** **Chapter** 5 **Record Type** 20
2000	TEI	FCL	Data Element	**Data Type:** Numeric **Min Length:** 1 **Max Length:** 6 **Usages:** **Chapter** 9

Name	**Flight Hours - Last Count**	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The total number of aircraft flying hours achieved by the Model of Applicability Code (MOA) within the customer's fleet during the reporting period.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	FHL	Data Element	**Data Type:** N **Min Length:** 4 **Max Length:** 9 **Cobol Picture:** 9(04) to 9(09) **Decimals:** 0 **Usages:** **Chapter** 5 **Record Type** 20
2000	TEI	FHL	Data Element	**Data Type:** Numeric **Min Length:** 1 **Max Length:** 6 **Usages:** **Chapter** 9

Name	Hazardous Material Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies those articles and substances which are capable of posing a significant risk to health, safety or property when transported.	2000,

Name	Hazardous Material Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	HAZ	Data Element	**Data Type:** AN **Min Length:** 6 **Max Length:** 6 **Cobol Picture:** X(06) **Decimals:** 0 Provisioning S/T File Format - Explanation Code 32 (EC32) Text <FF1>POS 01-02 Literal 'UN' (United Nations) or 'NA' (North America) A(02) POS 03-06 Hazard Code 9(04) POS 07-26 Filler (Spaces) X(20)</FF1> Prov. V File, Bar Code and Procurement Planning Format - TEI: HAZ <FF1>POS 01-02 Literal 'UN' (United Nations) or 'NA' (North America) A(02) POS 03-06 Hazard Code 9(04) </FF1> For codes, literals and definitions refer to Technical Instruction for Safe Transport of Dangerous Goods by Air, International Civil Aviation Organization (ICAO), Document9284-AN/905. **Usages:** **Chapter** 1, 2 **Record Type** 03, 07, 12, 32
2000	MSG	HAZ	Data Element	For codes, literals and definitions refer to Technical Instruction for Safe Transport of Dangerous Goods by Air, International Civil Aviation Organization (ICAO), Document 9284-AN/905. **Data Type:** AN **Min Length:** 6 **Max Length:** 6 **Cobol Picture:** X(06) **Decimals:** 0 pos 01-02 Literal 'UN' (United Nations) or 'NA' (North America) pos 03-06 Hazard Code **Usages:** **Chapter** 2, 9 **Command** P1PDINQY, P1UPDATE

Name **Hazardous Material Code** **Mod** 2020

2000	TEI	HAZ	Data Element	**Data Type:** String **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** 9	
2000	XSD	HAZ	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** Gen2 **Schema** ShipmentNotification	

Name	Hazardous Material Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies those articles and substances which are capable of posing a significant risk to health, safety or property when transported.	2000,

Name	Hazardous Material Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	HAZ	Data Element	**Data Type:** AN **Min Length:** 6 **Max Length:** 6 **Cobol Picture:** X(06) **Decimals:** 0 Provisioning S/T File Format - Explanation Code 32 (EC32) Text <FF1>POS 01-02 Literal 'UN' (United Nations) or 'NA' (North America) A(02) POS 03-06 Hazard Code 9(04) POS 07-26 Filler (Spaces) X(20)</FF1> Prov. V File, Bar Code and Procurement Planning Format - TEI: HAZ <FF1>POS 01-02 Literal 'UN' (United Nations) or 'NA' (North America) A(02) POS 03-06 Hazard Code 9(04) </FF1> For codes, literals and definitions refer to Technical Instruction for Safe Transport of Dangerous Goods by Air, International Civil Aviation Organization (ICAO), Document9284-AN/905. **Usages:** **Chapter** 1, 2 **Record Type** 03, 07, 12, 32
2000	MSG	HAZ	Data Element	For codes, literals and definitions refer to Technical Instruction for Safe Transport of Dangerous Goods by Air, International Civil Aviation Organization (ICAO), Document 9284-AN/905. **Data Type:** AN **Min Length:** 6 **Max Length:** 6 **Cobol Picture:** X(06) **Decimals:** 0 pos 01-02 Literal 'UN' (United Nations) or 'NA' (North America) pos 03-06 Hazard Code **Usages:** **Chapter** 2, 9 **Command** P1PDINQY, P1UPDATE

Name	Hazardous Material Code	Mod	2020

2000	TEI	HAZ	Data Element	**Data Type:** String **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** 9
2000	XSD	HAZ	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** Gen2 **Schema** ShipmentNotification

Name	Hydrostatic Test Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the date when a hydrostatic test was performed on a component.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	DOH	Element	**Data Type:** xs:date ISO 8601 Date YYYY-MM-DD For RFID formats: YYYYMMDD **Usages:** **Chapter** 15, 9 **Schema** DeliveredAircraftTransferPartList
2000	TEI	TEI	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date stucture: YYYYMMDD **Usages:** **Chapter** 9

Name	Hydrostatic Test Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the date when a hydrostatic test was performed on a component.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	DOH	Element	**Data Type:** xs:date ISO 8601 Date YYYY-MM-DD For RFID formats: YYYYMMDD **Usages:** **Chapter** 15, 9 **Schema** DeliveredAircraftTransferPartList
2000	TEI	TEI	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date stucture: YYYYMMDD **Usages:** **Chapter** 9

Name	Inspection Method Description	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Provides a text description of the inspection method	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	IMD	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 100 **Usages:** **Chapter** 11 **Schema** ScheduledMaintenance
2000	TEI	IMD	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 25 **Usages:** **Chapter** 9

Name	International Commodity Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies, for custom purposes, the classification and description of the subject part or material item per harmonized agreements on tariff commodity codes. The six position code provides a common, basic classification for all using nations.	2000,

Name	International Commodity Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	ICC	Data Element	For additional positions to provide for individual national regulations concerning import and export, see Harmonized Tariff Code. The first six positions only of the code specified in international Harmonized Commodity Description and Coding Manuals. **Data Type:** N **Min Length:** 6 **Max Length:** 6 **Cobol Picture:** 9(06) **Decimals:** 0 **Usages:** **Chapter** 1, 2, 3, 7 **Command** P1PDINQY, P1UPDATE, R1CUSSHP, R1SPLSHP, S1SHIPPD **External** UN/EDIFACT, X12 **Record Type** 07, 12, 32
2000	XSD	ICC	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** 16, 3 **Schema** ATA_PartCertificationForm, ATA_SparesSupplierShipNotice
2000	TEI	ICC	Data Element	**Data Type:** String **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** 9
2000	XSD	InternationalCommodityCode	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 6 **Usages:** **Chapter** Gen2 **Schema** ShipmentNotification

Name	International Commodity Code	Mod	2020

Name	Last Overhaul Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the date of the last overhaul of a component.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	OVD	Element	**Data Type:** String **Date Format:** YYYYMMDD Date Format for RFID: YYYYMMDD **Usages:** **Chapter** 9

Name	Life Limited Equipment Indicator	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Flags a part as Life Limited Equipment/Item (See Life Limited Item)	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	LLE	Element	**Min Length:** 1 **Max Length:** 1 **Permitted Value List:** YND **Usages:** **Chapter** 15, 9 **Schema** DeliveredAircraftTransferPartList
2500	XSD	LifeLimitedPartIndicator	Element	**Data Type:** xs:string **Permitted Value List:** YND **Usages:** **Schema** ATA_InstalledComponentStatus

PERMITTED VALUES List Name: *YND*		
Permitted Value	**Default Value**	**Description**
D		Does Not Apply
N		No
Y		Yes

Name	Location on Aircraft	Mod	2020

ALSO KNOWN AS: Part Location
Structural Damage Location
Location Description

DEFINITIONS

Class	Definition	Source
Specific	A textual description of the location or position of a part / component/structure/damage on an aircraft.	2000, 2500,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	TEI	LAC	Data Element	Note: This field could be a code used internal by an operator, or be based on manufacturer's location terminology, but is typically optimized to facilitate individual use cases such as search for emergency equipement, etc. **Data Type:** String **Min Length:** 1 **Max Length:** 13 **Usages:** **Chapter** 9
2500	XSD	LocationDescription	Element	**Data Type:** xs:string **Max Length:** 100 **Usages:** **Schema** ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus
2500	XSD	PartLocation	Element	**Data Type:** xs:string **Max Length:** 100 **Usages:** **Schema** ATA_AD_Status, ATA_SB_MOD_STC_Status

Name	Lot Number	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	A manufacturer's unique identity for a group of units of the same item which are processed, manufactured, or assembled by one producer under uniform conditions and which are expected to function in a uniform manner. Lot Number when linked with the Enterprise Identifier and Original Part Number provides the permanent identification for a given group of like items. The Lot Number (LOT) is unique within the Original Part Number (PNO).	2000,

Name	Lot Number	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	LOT	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 **Usages:** **Chapter** 2 **Command** S1QUOTES, S1REJECT
2000	XSD	LOT	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 11, 16, 3 **Schema** ATA_PartCertificationForm, ATA_SparesQuoteFinal, LRU_Removal
2000	XSD	BatchNum	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook
2000	TEI	LOT	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 9
2000	XSD	LotNumber	Element	**Data Type:** xs:string **Max Length:** 30 **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification

Name	Lot Number	Mod	2020

Name	Maintenance Action Station Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the station location where a specified maintenance action was performed.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	MNC	Element	Refer to IATA or ICAO Station Codes **Data Type:** xs:string **Min Length:** 3 **Max Length:** 5 **Usages:** **Chapter** 11 **Schema** EngineRemoval, Logbook, LRU_Removal, ScheduledMaintenance
2000	XSD	StationCode	Element	**Data Type:** xs:string **Min Length:** 3 **Max Length:** 5 **Usages:** **Chapter** 17, Gen2 **Schema** ATA_DSE_Logbook, PurchaseOrderSubmittal
2000	TEI	MNC	Data Element	**Data Type:** String **Min Length:** 3 **Max Length:** 5 **Usages:** **Chapter** 9

Name	Manufacture Date	Mod	2020

ALSO KNOWN AS: Date of Manufacture

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The date on which the subject part, assembly or material item is first certified by the manufacturer as a serviceable item. Where the customer stipulates fitment of its own serviceable unit, the Manufacture Date will be the date of the release note, supplied with the equipment, by the customer.	2000, 2500,

Name	Manufacture Date	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG & File	DMF	Data Element	Format applied in S and T files (ref. Chapter 1): DDMMYY (2 digit Day, 2 digit Month, 2 digit Year). Format applied in quotation process (ref. Chapter 2): MMYYYY (2 digit Month, 4 digit Year). **Data Type:** N **Min Length:** 6 **Max Length:** 6 **Decimals:** 0 **Usages:** **Chapter** 2 **Command** S1QUOTES **Record Type** 27
2000	XSD	DMF	Element	**Data Type:** xs:date **Date Format:** YYYY-MM-DD **Usages:** **Chapter** 15, 16, 3 **Schema** ATA_PartCertificationForm, ATA_SparesQuoteFinal, DeliveredAircraftTransferPartList
2000	TEI	DMF	Data Element	Format for bar coding (ref. Chapter 9), MMYYYY (2 digit Month, 4 digit Year). Format for RFID (ref. Chapter 9), YYYYMMDD (4 digit Year, 2 digit Month, 2 digit Day). See XSD for off tag formats. **Data Type:** Date **Min Length:** 6 **Max Length:** 8 **Usages:** **Chapter** 9
2500	XSD	ManufactureDate	Element	**Data Type:** xs:date **Usages:** **Schema** ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus

Name	**Manufacture Date**	**Mod**	2020

Name	Manufacturer Code	Mod	2020

DEFINITIONS

Class	Definition	Source
Specific	A five digit code assigned to identify the manufacturer of the product, normally the Commercial And Government Entity (CAGE) code.	2300, 2500,
Specific	A five digit code assigned to identify the manufacturer of the part, normally the Commercial And Government Entity (CAGE) code. Can be a local code.	2200,
Specific	Identifies the manufacturer, government agency or other organization controlling the design, production and part number assignment of the subject part.	2000, 2500,

Name	Manufacturer Code	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG & File	MFR	Data Element	Reference Information for CAGE/NCAGE: Use the five position alphanumeric code specified in Cataloging Handbook H4/H8: Sections A and B, Commercial and Government Entity (CAGE) Codes (United States and Canada only) and Sections C and D, NATO Supply Codes for Manufacturer(NCAGE) (excluding United States and Canada). **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Cobol Picture:** X(05) **Decimals:** 0 For standard parts (Standard/Attaching Part Codes 3, 4, and 6) the following part number types will be identified by the referenced Manufacturer Code (CAGE Code/NCAGE Code). <FF1> TYPE / CAGE CODE AC / 88041 AF / 99238 AMS (Legacy) / 81343 (superseded by 0U583) AMS / 0U583 (supersedes 81343) AN / 88044 AND / 99237 JAN / 81350 MIL / 81349 MS / 96906 NAS / 80205 NAF / 80020 NASA / 88006 SAE (legacy) / 81343 (superseded by 0U583) SAE / 0U583 (supersedes 81343) USA / 81351 USN / 88827 TYPE / NCAGE (NATO/NSCM) A / K7766 AFNOR / F0110 AGS (Legacy) / U1653 (Superseded by U14C6) AGS / U14C6 (Supersedes U1653) AS (Legacy) / U1653 (Superseded by U14C6) AS / U14C6 (Supersedes U1653) BNA / F0112 BNAE / F0111 CCTU / F0115 DIN / D8286 EN / I9005

				AECMA / I9005 LN / D8442</FF1> **Usages:** **Chapter** 1, 12, 2, 3, 5, 7, 8, 9 **Command** A1ADDPRT, A1CHANGE, A1QTYDEC, A1QTYINC, A1QUOTES, A1STOCKS, A1UPDATE, P1PDINQY, P1UPDATE, R1CDBACK, R1CDBINQ, R1CDBRSP, R1CDBUPD, R1CPOXMT, R1CUSSHP, R1DSPXMT, R1QTNINT, R1QTNREQ, R1QTNXMT, R1SPLSHP, R1TDNXMT, S1BOOKED, S1ORDEXC, S1PNSTAT, S1POSTAT, S1QUOTES, S1SHIPPD, S1STOCKS **External** UN/EDIFACT, X12 **Record Type** 02, 03, 04, 05, 07, 12, 17, 21, 24, 27, 29, 32
2200	ML	mfr	Element	**Usages:** **DTD** aipc, amm, cmm, cpm, eipc, srm, teman, wm
2200	ML	amfr	Attribute	An attribute which identifies if the part is built by the airframe manufacturer **Usages:** **DTD** aipc
2200	ML	manufact	Attribute	**Usages:** **DTD** msg3

Name	Manufacturer Code	Mod	2020

2000	XSD	MFR	Element	**Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 **Usages:** **Chapter** 11, 13, 14, 15, 16, 3 **Schema** AircraftEvent, AircraftHoursAndLandings, AircraftOutOfService, AircraftStatusChange, ATA_MetricsPartsDetail, ATA_PartCertificationForm, ATA_SparesOrderExc, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteInterim, ATA_SparesQuoteRequest, ATA_SparesStockInquiry, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, ATA_WarrantyClaim, DeliveredAircraftTransferPartList, EngineRemoval, Flight, Logbook, LRU_Removal, PieceParts, QuantityPerAircraft, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	XSD	PartManufacturerCode	Element	**Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook
2500	XSD	Manufacturer Code	Element	**Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 Contains CAGE codes **Usages:** **Schema** ATA_AD_Status, ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name	Master Carton Number	Mod	2020

DEFINITIONS

Class	Definition	Source
Specific	The cover identification number of the outermost (external) container in a shipment leaving the supplier's dock.	2000,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG	BOX	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 10 **Cobol Picture:** X(01) to X(10) **Decimals:** 0 **Usages:** **Chapter** 3, 7, 9 **Command** R1CUSSHP, R1MATRCP, R1SPLSHP, S1SHIPPD **External** UN/EDIFACT, X12
2000	XSD	BOX	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 10 **Usages:** **Chapter** 11, 16, 3 **Schema** ATA_PartCertificationForm, ATA_SparesSupplierShipNotice, ShopFindings
2000	XSD	BillOfLadingBoxNumber	Element	**Data Type:** xs:string **Max Length:** 10 **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, ShipmentNotification

Name	Modification/STC Number	Mod	2014

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the numeric identifier of a service bulletin. This identifier is structured and must include information regarding the aircraft or engine type, the model, the ATA number, and the sequence number necessary to uniquely identify the service bulletin.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	STN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 50 **Usages:** **Chapter** 11 **Schema** ServiceBulletin
2000	TEI	STN	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 25 **Usages:** **Chapter** 9

Name	NATO Stock Number	Mod	2013

ALSO KNOWN AS: National Stock Number

DEFINITIONS		
Class	**Definition**	**Source**
Concept	A supply item codification system applied by NATO, and Ministries or Departments of Defence to materiel items such as parts, equipment or supplies.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	NSN	Data Element	Note: Sometimes coded as NNNN-NN-NNN-NNNN, but should be stored and encoded within a barcode or RFID without the dashes. **Data Type:** N **Min Length:** 13 **Max Length:** 13 **Decimals:** 0 **Usages:** **Chapter** 9

Name	Next Higher Assembly Part Number	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The part number of the assembly on which the particular item under discussion is attached or is a part of either directly or through intermediate attaching parts.	2000, 2200,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2200	ML	pnrnha	Element	**Usages:** **DTD** wm
2000	TEI	NHA	Element	**Data Type:** string **Max Length:** 32 **Usages:** **Chapter** 9

Name	Original Equipment Manufacturer Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the CAGE code of the creator/manufacturer of the Part Number when it is differnet than the CAGE code of the Serial Numer in AIDC applications.	2000,
Specific	Specifies the OEM Manufacturer Code for the OEM Part Number specified in the Original Equipment Manufacturer Part Number (OMP) data element.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	OMM	Data Element	Refer to data set group, Original Equipment Manufacturer Data Text (OMD) for application. Refer to Manufacturer Code (MFR) for definition and edit structure. **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Decimals:** 0 **Usages:** **Chapter** 2, 9 **Command** P1PDINQY, P1UPDATE **Record Type** 07

Name	Original Part Number	Mod	2018

DEFINITIONS

Class	Definition	Source
Specific	The design activity or industry standard identity for the subject part, assembly, kit or material item. It is used to identify a given configuration. The Original Part Number is unique within a business entity.	2000,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	TEI	PNO	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 32 **Decimals:** 0 1. The format of this data element will match those of Part Number (PNR) 2. A given part number will only be used for parts with the same configuration. 3. Original Part Numbers are controlled by the cognizant design activity. Normally this is Engineering. 4. This data element shall only be used: - in conjunction with the Sequential Part Serial Number (SEQ) - when there is a need to maintain the Original Part Number on the part for the life cycle of the part. **Usages:** **Chapter** 9

Name	Overhaul Manual Reference Number	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The section of the OEM's repair manual that defines the required work scope for a part or component.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	OHM	Data Element	**Data Type:** AN **Min Length:** 6 **Max Length:** 20 **Cobol Picture:** X(06) to X(20) **Decimals:** 0 **Usages:** **Chapter** 8 **Command** R1CDBRSP, R1CDBUPD **Record Type** 17
2000	TEI	OHM	Data Element	**Data Type:** String **Min Length:** 6 **Max Length:** 20 **Usages:** **Chapter** 9

Name	Overlength Part Number	Mod	2014

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies a complete part identity exceeding fifteen positions in length.	2000,

Name	Overlength Part Number	Mod	2014

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	OPN	Data Element	The Part Number field for the subject overlength number contains a unique reference number(15 positions maximum) which is used as the part number for SPEC2000 processing. Refer to Part Number for definition and structure. **Data Type:** AN **Min Length:** 26 **Max Length:** 26 **Cobol Picture:** X(26) **Decimals:** 0 Provisioning S/T File Format - Explanation Code 11 (EC11) Text <FF1> Explanation Text Counter 01 POS. 01-26 Overlength Part Number (P/N POS 01-26) X(26) Explanation Text Counter 02 (when required) POS. 01-26 Overlength Part Number (P/N POS 27-32) X(06) POS. 07-26 Filler (Spaces) X(20)</FF1> **Usages:** **Chapter** 1 **Record Type** 03
2000	MSG & File	OPN	Data Element	The Part Number field for the subject overlength number contains a unique reference number (15 positions maximum) which is used as the part number for SPEC2000 processing. Refer to Part Number for definition and structure. **Data Type:** AN **Min Length:** 16 **Max Length:** 32 **Cobol Picture:** X(16) to X(32) **Decimals:** 0 Online Command Provisioning V File, Delivery Configuration, Data & Procurement Planning format: Overlength Part Number (Complete) X(16) to X(32) **Usages:** **Chapter** 1, 2, 5, 7 **Command** P1PDINQY, P1UPDATE, R1TDNXMT **Record Type** 07, 12, 21, 27, 29, 32

Name	Overlength Part Number	Mod	2014

2000	XSD	OPN	Element	The Part Number field for the subject overlength number contains a unique reference number(15 positions maximum) which is used as the part number for Spec 2000 processing. **Data Type:** xs:string **Min Length:** 16 **Max Length:** 32 **Usages:** **Chapter** 11, 15, 16 **Schema** AircraftEvent, ATA_PartCertificationForm, DeliveredAircraftTransferPartList, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	TEI	OPN	Data Element	**Data Type:** String **Min Length:** 16 **Max Length:** 32 **Usages:** **Chapter** 9

Name	Packing Sheet Number	Mod	2020

DEFINITIONS

Class	Definition	Source
Specific	The serialized identity for the supplier's packing sheet or shipping document.	2000,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG	PSN	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 **Usages:** **Chapter** 3, 4, 7, 9 **Command** R1CUSSHP, R1INVXMT, R1MATRCP, R1SPLSHP, S1NVOICE, S1SHIPPD **External** UN/EDIFACT, X12
2000	XSD	PSN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 11, 16, 3, 4 **Schema** ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesSupplierShipNotice, ShopFindings
2000	XSD	PackingSheet Number	Element	**Data Type:** xs:string **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal

Name	Part Description	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the full descriptive name of a part or component.	2000,
Specific	The textual description or functional name given to an equipment item.	2200,

Name	Part Description	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2200	ML	partdesc	Element	**Usages:** **DTD** wm
2000	XSD	PDT	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 100 **Usages:** **Chapter** 11, 14, 15, 16 **Schema** AircraftEvent, ATA_PartCertificationForm, ATA_WarrantyClaim, DeliveredAircraftTransferPartList, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	XSD	PartDescription	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 100 **Usages:** **Chapter** 17, Gen2 **Schema** ATA_DSE_Logbook, InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification
2000	TEI	PDT	Data Element	Shorter maximum size for RFID applications **Data Type:** string **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 9

Name	**Part Description**	Mod	2020

2500	XSD	PartDescription	Element	**Data Type:** xs:string **Max Length:** 100 **Usages:** **Schema** ATA_AD_Status, ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name	Part History Pointer	Mod	2016

DEFINITIONS		
Class	**Definition**	**Source**
Specific	An integer that indicates which RFID history record is being corrected.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	PHP	Element	The numbering method used to determine this value is to number the first record written to User Memory as 0 (zero), then count up 1 (one) for each subsequent record in the order they appear in memory. **Data Type:** Integer **Usages:** **Chapter** 9

Name	**Part Modification Level**	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Indicates the modification status of a component or engine in terms of what modifications or service bulletins have been installed.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	PML	Element	This is normally an alpha or numeric shorthand representation of the SBs or Mods installed, not a list of the complete SB and modification nubmers. **Data Type:** xs:string **Min Length:** 1 **Max Length:** 1000 **Decimals:** 0 **Usages:** **Chapter** 11, 15 **Schema** AircraftEvent, DeliveredAircraftTransferPartList, LRU_Removal, ScheduledMaintenance, ServiceBulletin, ShopFindings
2000	TEI	PML	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 12 **Usages:** **Chapter** 9
2500	XSD	PartModificationLevel	Element	This is normally an alpha or numeric shorthand representation of the SBs or Mods installed, not a list of the complete SB and modification nubmers. **Data Type:** xs:String **Usages:** **Schema** ATA_InstalledComponentStatus

Name **Part Number** **Mod** 2020

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The manufacturer's, supplier's or industry standard identity for the subject part, assembly, kit or material item. Part Number, when linked with its Manufacturer Code unambiguously identifies a given item.	2000, 2200, 2400, 2500,
Specific	Identification of a part or assembly that can be installed in one or more locations on an aircraft.	2000, 2400, 2500,

Name	Part Number	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2200	ML	pnr	Element	**Usages:** **DTD** aipc, cmm, cpm, eipc, em, mpd, sb, srm, teman, wm
2000	MSG & File	PNR	Data Element	1. Slash "/" and asterisk "*" are not allowed in part numbers. For compatibility purposes with many years of previous requirements, it is recommended that the following rules of part number construction are followed: 1. Do not use alpha "O" - use zero "0". 2. Use only upper case Alpha and numbers along with dash. 3. Use dash "-"only between 2 numeric characters 4. Limit length to 15 characters or less. 5. Do not start or end a part number with a dash 6. Do not embed spaces. **Data Type:** AN **Min Length:** 1 **Max Length:** 32 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 Note 15 character limit for chapter 1 applications. **Usages:** **Chapter** 1, 12, 2, 3, 4, 5, 7, 8, 9 **Command** A1ADDPRT, A1CHANGE, A1QTYDEC, A1QTYINC, A1QUOTES, A1STOCKS, A1UPDATE, P1PDINQY, P1UPDATE, R1CDBACK, R1CDBINQ, R1CDBRSP, R1CDBUPD, R1CPORSP, R1CPOXMT, R1CUSSHP, R1DSPXMT, R1EXCXMT, R1INVACK, R1INVXMT, R1INXACK, R1INXXMT, R1MATRCP, R1PNRINQ, R1PNRRSP, R1QTNINT, R1QTNREQ, R1QTNXMT, R1SPLSHP, R1TDNXMT, S1BOOKED, S1INVEXC, S1NVOICE, S1ORDEXC, S1PNSTAT, S1POSTAT, S1QUOTES, S1SHIPPD, S1STOCKS **External** UN/EDIFACT, X12 **Record Type** 02, 03, 04, 05, 07, 12, 17, 21, 24, 27, 29, 32

Name	Part Number	Mod	2020

2000	XSD	PNR	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 32 1. Slash "/" and asterisk "*" are not allowed in part numbers. For compatibility purposes with many years of previous requirements and for human factors reasons, it is recommended that the following rules of part number construction are followed: 1. Do not use alpha "O" - use zero "0". 2. Use only upper case Alpha and numbers along with dash. 3. Use dash "-"only between 2 numeric characters 4. Limit length to 15 characters or less. 5. Do not start or end a part number with a dash 6. Do not embed spaces. **Usages:** **Chapter** 11, 13, 14, 15, 16, 3 **Schema** AircraftEvent, ATA_InvoiceMessageAck, ATA_MetricsPartsDetail, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusResponse, ATA_SparesQuoteInterim, ATA_SparesQuoteRequest, ATA_SparesStockInquiry, ATA_SparesSupplierShipNotice, ATA_WarrantyClaim, DeliveredAircraftTransferPartList, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	XSD	PartNum	Element	Contains the part number referred to in the Logbook writeup, as categorized by "Part Type". See also ASN and MPN. **Data Type:** xs:string **Max Length:** 32 **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook
2400	XSD	partNumber	Attribute	**Usages:** **Schema** AllowableConfigurationInParts

Name	Part Number	Mod	2020

2000	XSD	PartNumber	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 32 1. Slash "/" and asterisk "*" are not allowed in part numbers. For compatibility purposes with many years of previous requirements and for human factors reasons, it is recommended that the following rules of part number construction are followed: 1. Do not use alpha "O" - use zero "0". 2. Use only upper case Alpha and numbers along with dash. 3. Use dash "-"only between 2 numeric characters 4. Limit length to 15 characters or less. 5. Do not start or end a part number with a dash 6. Do not embed spaces. **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification
2500	XSD	PartNumber	Element	**Data Type:** xs:string **Max Length:** 32 **Usages:** **Schema** ATA_AD_Status, ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name	Part Serial Number	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The manufacturer's serialized identity for an individual part, component or component end item. The Part Serial Number, linked with its Manufacturer Code, provides a globally unique identity for the given item.	2000, 2500,

Name	Part Serial Number	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	SER	Data Element	The dash (-) is the only special character permitted in the Part Serial Number field, however, the dash (-) is not allowed as the last position of a Part Serial Number. **Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 **Usages:** **Chapter** 1, 12, 2, 5, 7, 9 **Command** A1ADDPRT, A1STOCKS, A1UPDATE, P1PDINQY, R1CPOINQ, R1CPORSP, R1CPOXMT, R1DSPXMT, R1EXCXMT, R1PNRINQ, R1PNRRSP, R1SPLSHP, R1TDNXMT **Record Type** 22, 27, 28
2000	XSD	SER	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 30 **Usages:** **Chapter** 11, 14, 15, 16, 3 **Schema** AircraftEvent, ATA_PartCertificationForm, ATA_SparesQuoteFinal, ATA_WarrantyClaim, DeliveredAircraftTransferPartList, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings
2000	XSD	PartSerialNum	Element	As recorded in a Logbook, can be SER, UCN, USN, or UST as described in Part Serial Number Type. **Data Type:** xs:string **Max Length:** 50 **Usages:** **Chapter** 17 **Schema** ATA_DSE_Logbook

Name	**Part Serial Number**	Mod	2020

2000	XSD	SerialNumber	Element	**Data Type:** **Max Length:** **<u>Usages:</u>** **Chapter** **Schema**	xs:string 30 Gen2 InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification
2500	XSD	SerialNumber	Element	**Data Type:** **Max Length:** **<u>Usages:</u>** **Schema**	xs:string 30 ATA_AD_Status, ATA_AircraftTransferRecordsCrate, ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name	Point of Use Location Name	Mod	2009

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies specific stocking/binning location for inventory in a user's facility.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	POU	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 **Usages:** **Chapter** 3, 9 **Command** S1BOOKED **External** UN/EDIFACT, X12
2000	XSD	POU	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 3 **Schema** ATA_SparesOrder

Name	**Previous Inspection Date**	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the recorded date of a previous inspection of the component or aircraft.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	PRV	Element	Note Format for RFID encoding is YYYYMMDD **Data Type:** xs:date **Date Format:** YYYY-MM-DD **Usages:** **Chapter** 11, 9 **Schema** ScheduledMaintenance
2000	TEI	PRV	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date Format: YYYYMMDD **Usages:** **Chapter** 9

Name	Previous Inspection Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the recorded date of a previous inspection of the component or aircraft.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	PRV	Element	Note Format for RFID encoding is YYYYMMDD **Data Type:** xs:date **Date Format:** YYYY-MM-DD **Usages:** **Chapter** 11, 9 **Schema** ScheduledMaintenance
2000	TEI	PRV	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Date Format: YYYYMMDD **Usages:** **Chapter** 9

Name	Remarks Text	Mod	2020

ALSO KNOWN AS: Comments

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Provides general comments to supplement other textual descriptions.	2000, 2500,
Specific	Provides miscellaneous information not otherwise provided for by dedicated Text Element Identifiers (TEI's) in variable record systems.	2000,

Name	Remarks Text	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG & File	REM	Data Element	Remarks Text may occur multiple times in certain applications. Please refer to the applicable chapter in Spec 2000. Whether single or multiple occurrence, Remark Text TEI's are always transmitted last in a given record or on-line message. Each occurrence in an on-line message is transmitted as a separate line starting with the TEI "REM" and ending with "/(CRLF)" or, if the last line, "(CRLF)" only. **Data Type:** AN **Min Length:** 1 **Max Length:** 64 **Cobol Picture:** X(01) to X(64) **Decimals:** 0 **Usages:** **Chapter** 12, 2, 3, 4, 6, 7, 8 **Command** A1ADDPRT, A1CNTACT, A1QUOTES, A1SEARCH, A1STOCKS, A1UPDATE, P1CNTACT, P1DISINQ, P1PDINQY, P1SEARCH, P1UPDATE, R1CDBACK, R1CDBRSP, R1CDBUPD, R1CNTACT, R1CPOACK, R1CPORSP, R1CPOXMT, R1CUSSHP, R1DSPXMT, R1EXCXMT, R1INVXMT, R1INXXMT, R1MATRCP, R1PNRRSP, R1QTNINT, R1QTNREQ, R1QTNXMT, R1SPLSHP, S1BOOKED, S1CNTACT, S1INVEXC, S1NVOICE, S1ORDEXC, S1PNSTAT, S1POSTAT, S1QUOTES, S1SHIPPD, S1STOCKS **External** UN/EDIFACT, X12 **Record Type** 07, 16, 17, 32

Name	**Remarks Text**	Mod	2020

2000	XSD	REM	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 1000 **Usages:** **Chapter** 11, 15, 16, 3 **Schema** AircraftEvent, AircraftOutOfService, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteInterim, ATA_SparesQuoteRequest, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, DeliveredAircraftTransferPartList, Logbook, ScheduledMaintenance, ServiceBulletin, ShopFindings, SummaryData
2000	XSD	Comments	Element	**Data Type:** xs:string **Max Length:** 1000 **Usages:** **Chapter** 17, Gen2 **Schema** ATA_DSE_Logbook, InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse
2000	TEI	REM	Data Element	For length restrictions, refer to context within Spec 2000. **Data Type:** String **Usages:** **Chapter** 9
2500	XSD	Remarks	Element	**Data Type:** xs:string **Max Length:** 1000 **Usages:** **Schema** ATA_AD_Status, ATA_InstalledComponentStatus, ATA_SB_MOD_STC_Status

Name	Removal Reason Text	Mod	2019

ALSO KNOWN AS: Reason for Removal

DEFINITIONS		
Class	**Definition**	**Source**
Specific	This field contains the text explaining the reason a component was removed from an aircraft. It should indicate the observed failure in the operational environment (e.g., PIREP).	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	RMT	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 5000 **Usages:** **Chapter** 11 **Schema** EngineRemoval, LRU_Removal, ScheduledMaintenance, ShopFindings
2000	TEI	RMT	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 30 **Usages:** **Chapter** 9

Name	**Removal Tracking Identifier**	Mod	2019

DEFINITIONS

Class	Definition	Source
Specific	A unique identifier that is applied to a 'Line Replaceable Unit (LRU) Removal Record' so that the LRU can be tracked through the entire removal process. This identifier can be used to link the original LRU Removal Record to Shop Findings Records and Piece Part Records.	2000,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	XSD	RTI	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 50 **Usages:** **Chapter** 11 **Schema** EngineRemoval, LRU_Removal, ScheduledMaintenance, ShopFindings
2000	TEI	RTI	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 50 **Usages:** **Chapter** 9

Name	Repair Approval Reference Text	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies a description of approval for a specific repair task.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	RAP	Element	Example: Repair according to SRM **Data Type:** xs:string **Min Length:** 1 **Max Length:** 100 **Usages:** **Chapter** 11 **Schema** ScheduledMaintenance
2000	TEI	RAP	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 20 **Usages:** **Chapter** 9

Name	Repair Purchase Order Number	Mod	2002

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The customer's identity number assigned to a specific order for the repair/overhaul services for a given part.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	RPO	Data Element	This TEI is used in "Bar Coding" to enable differentiation between a Repair Agency's own purchase order and that of a customer. **Data Type:** AN **Min Length:** 1 **Max Length:** 11 **Cobol Picture:** X(01) to X(11) **Decimals:** 0 **Usages:** **Chapter** 9

Name	Repair/Modification Description	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the specific repairs or modifications made to a part.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	RMD	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 256 **Usages:** **Chapter** 11, 16 **Schema** ATA_PartCertificationForm, ScheduledMaintenance
2000	TEI	RMD	Data Element	For RFID use, should be a brief summary of full repair/modification description **Data Type:** String **Min Length:** 1 **Max Length:** 50 **Usages:** **Chapter** 9

Name	Sequential Part Serial Number	Mod	2014

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The identity for an individual part, assembly, kit or materiel item. Sequential Part Serial Number shall be unique within the Original Part Number.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	SEQ	Data Element	**Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Decimals:** 0 1. Alpha characters shall be upper case. 2. The dash (-) is the only special character permitted. However, the dash (-) is not allowed as the first or last character. 3. This data element may be used in conjunction with the Original Part Number (PNO), the Lot Number (LOT), the Enterprise Lot Number (LTN) or the Batch Item Identifier (BII). **Usages:** **Chapter** 9

Name	Shelf Life Code	Mod	2009

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The Shelf Life identifies the period of time which an item can be stored prior to the possibility that it is liable to deteriorate or perish when stored.	2000,
Specific	In the V-file and Bar-Coded shipping labels, specifies the number of months for the shelf life of a subject item.	2000,
Specific	In S & T-files, specifies a code which identifies a range of months for the shelf life of a subject item. Available codes are identified in â€œShelf Life Codesâ€ below.	2000,

Name	**Shelf Life Code**	Mod	2009

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	SLC	Data Element	For V file and Bar Coded Shipping Labels the shelf life in months (1 to 2 digits) applies. **Data Type:** AN **Min Length:** 1 **Max Length:** 2 **Decimals:** 0 **Usages:** **Chapter** 1, 9 **Record Type** 12
2000	File	SLC	Data Element	For S&T-file applications the one digit code as listed in permitted values applies. **Data Type:** AN **Min Length:** 1 **Max Length:** 1 **Decimals:** 0 **Permitted Value List:** Shelf Life Codes **Usages:** **Chapter** 1 **Record Type** 02

Name	**Shelf Life Code**	Mod	2009

PERMITTED VALUES List Name: *Shelf Life Codes*		
Permitted Value	**Default Value**	**Description**
0		No specified shelf life
1		3 months or less
2		4-6 months
3		7-9 month
4		10-12 months
5		13-24 months
6		24 months
A		26 months
B		28 months
C		30 months
D		32 months
E		34 months.
F		36 months.
G		38 months.
H		40 months.
I		42 months.
J		44 months.
K		46 months.
L		48 months.
M		50 months.
N		52 months.
O		54 months.
P		56 months.
Q		58 months.
R		60 months.
S		62 months.
T		64 months.
U		66 months.
V		68 months.
W		70 months.
X		72 months.
Y		74 months.
Z		76 months or higher.

Name	Shipment Quantity	Mod	2009

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The actual amount shipped on the Shippped Date for the Part Number or Response Part Number and Customer Order Number.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	SHQ	Data Element	**Data Type:** N **Min Length:** 1 **Max Length:** 5 **Cobol Picture:** 9(01) to 9(05) **Decimals:** 0 **Usages:** **Chapter** 3, 7, 9 **Command** R1CUSSHP, R1SPLSHP, S1PNSTAT, S1POSTAT, S1SHIPPD **External** UN/EDIFACT, X12
2000	XSD	SHQ	Element	**Data Type:** xs:decimal **Min Length:** 1 **Max Length:** 5 **Decimals:** 0 **Usages:** **Schema** ATA_SparesOrderStatusResponse, ATA_SparesSupplierShipNotice

Name	Ship-To Code	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Identifies the shipment destination address including required marks and information which must be displayed on shipping containers. May also convey applicability or exclusion of specific taxes or charges relating to the shipment destination.	2000,

Name	**Ship-To Code**	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG	SHT	Data Element	Assigned per mutual agreement between customer and supplier. **Data Type:** AN **Min Length:** 1 **Max Length:** 5 **Cobol Picture:** X(01) to X(05) **Decimals:** 0 **Usages:** **Chapter** 3, 4, 7 **Command** R1CPOXMT, R1INVXMT, R1SPLSHP, S1BOOKED, S1NVOICE, S1PNSTAT, S1POSTAT, S1SHIPPD **External** UN/EDIFACT, X12
2000	XSD	SHT	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 5 **Usages:** **Chapter** 3 **Schema** ATA_SparesInvoice, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderStatusResponse, ATA_SparesSupplierShipNotice
2000	TEI	SHT	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 5 **Usages:** **Chapter** 9
2000	XSD	ShipToCode	xs:string	**Max Length:** 12 **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderSubmittal, ShipmentNotification

Name	Ship-To Code	Mod	2020

Name	Software Indicator	Mod	2013

DEFINITIONS

Class	Definition	Source
Specific	Indicates that a part or component has field upgradeable software.	2000,

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	TEI	SWI	Data Element	Value = 1 if a unit is software upgradeable **Data Type:** String **Min Length:** 1 **Max Length:** 1 **Permitted Value List:** Software Indicator **Usages:** **Chapter** 9

PERMITTED VALUES **List Name:** *Software Indicator*

Permitted Value	Default Value	Description
0		No
1		Yes

Name	Software Part Number	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The manufacturer's, supplier's or industry standard identity of an embedded software program in a programmed memory device.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	SFT	Data Element	**Data Type:** String **Min Length:** 1 **Max Length:** 32 **Usages:** **Chapter** 9

Name **Supplier Code** **Mod** 2020

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Identification of the aircraft vendor associated with the transmitted data. A five digit alphanumeric code identifying the originator of the transmitted data.	2000, 2200,
Specific	Supplier Code identifies: a) The originator of Procurement Data and a source of supply for the subject part in Procurement Planning, Provisioning V File and Delivery configuration Data applications. b) The actual supply source for the subject part in Order Administration, Invoicing and Information/Data Exchange transactions. c) The repair agency for the subject part in Repair Administration transactions. d) The lister of the AIRS material (generated from AIRS owner code) in P1PDINQY. e) The organization assigning a Unique Component Identification Number (UCN), where the organization is not the manufacturer, government agency, or other organization controlling the design of the serialized component. f) The organization reporting LRU Removal Record, Shop Finding Record, Piece Part Record, or Aircraft Hours and Landings Record in Reliability applications. g) The organization issuing electronic part certification or conformance data. h) The organization providing the industry metrics data.	2000,

Name	Supplier Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	File	SPL	Data Element	Refer to Manufacturer Code for structure. (Ref. CAGE/NCAGE) **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Cobol Picture:** X(05) **Decimals:** 0 **Usages:** **Chapter** 1, 2, 5, 8, 9 **Record Type** 06, 07, 12, 16, 17, 21, 23, 31, 32, 99
2000	MSG	SPL	Data Element	Refer to Manufacturer Code for structure. (Ref. CAGE/NCAGE) **Data Type:** AN **Min Length:** 5 **Max Length:** 5 **Cobol Picture:** X(05) **Decimals:** 0 **Usages:** **Chapter** 2, 3, 4, 6, 7, 8 **Command** A1CNTACT, P1ADVISE, P1CNTACT, P1DISUPD, P1PDINQY, P1UPDATE, R1ADVISE, R1CDBACK, R1CDBINQ, R1CDBRSP, R1CDBUPD, R1CNTACT, R1CPOACK, R1CPOINQ, R1CPORSP, R1CPOXMT, R1CUSSHP, R1DSPACK, R1DSPXMT, R1EXCACK, R1EXCXMT, R1INVACK, R1INVXMT, R1INXACK, R1INXXMT, R1MATRCP, R1PNRINQ, R1PNRRSP, R1QTNINT, R1QTNREQ, R1QTNXMT, R1SPLSHP, R1TDNXMT, S1BOOKED, S1CNTACT, S1INVEXC, S1NVOICE, S1ORDEXC, S1REJECT, S1SHIPPD **External** UN/EDIFACT, X12

Name	Supplier Code	Mod	2020

2000	XSD	SPL	Element	For Reliability applications only, use "ZZZZZ" if the reporting organization has no CAGE/NCAGE identification. In that case, transmission of the Reporting Organization Name ('RON') is required. **Data Type:** xs:string **Min Length:** 5 **Max Length:** 5 **Usages:** **Chapter** 11, 13, 16, 3, 4 **Schema** AircraftEvent, ATA_InvoiceMessageAck, ATA_MetricsPartsDetail, ATA_MetricsPartSummary, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesMessageAck, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusInquiry, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteInterim, ATA_SparesQuoteRequest, ATA_SparesStockInquiry, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings
2200	ML	spl	Element	**Usages:** **DTD** aipc, cmm, eipc
2200	ML	spl	Attribute	**Usages:** **DTD** aipc, amm, cmm, cpm, eipc, em, frmfim, lea, mpd, msg3, sb, sbi, sds, srm, teman, wm

Name	Tag Identification Number	Mod	2020

ALSO KNOWN AS: TID
RFID Tag ID

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Contains an RFID tag's TID (Tag Identification) according to GS1 TDS specification.	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	TIN	Element	**Data Type:** xs:string **Max Length:** 124 **Usages:** **Chapter** 9
2500	XSD	RFID_TagID	Element	**Data Type:** xs:string **Usages:** **Schema** ATA_InstalledComponentStatus

Name	UID Construct Number	Mod	2013

DEFINITIONS		
Class	**Definition**	**Source**
Specific	UID (Unique Identification) Construct Number identifies the method that an item can be uniquely identified, whether it is serialized within CAGE code, or whether it is serialized uniquely within Original Part Number, within CAGE code.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	UIC	Data Element	**Data Type:** Numeric **Min Length:** 1 **Max Length:** 1 **Permitted Value List:** UID Construct Values **Usages:** **Chapter** 9

PERMITTED VALUES	List Name: *UID Construct Values*	
Permitted Value	**Default Value**	**Description**
1		Serial Number globally unique within CAGE/NCAGE Code (MFR)
2		Serial Number unique within original part number, within CAGE/NCAGE

Name	**Unique Component Identification Number**	Mod	2020

ALSO KNOWN AS: Airline Serial Number

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The permanent tracking identity assigned to an in-service part in lieu of the manufacturer's serial number.	2000,

Name	Unique Component Identification Number	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG	UCN	Data Element	The dash (-) is the only special character permitted in the Unique Component Identification number field, however the dash (-) is not allowed as the last position of the UCN. **Data Type:** AN **Min Length:** 1 **Max Length:** 15 **Cobol Picture:** X(01) to X(15) **Decimals:** 0 **Usages:** **Chapter** 12, 2, 9 **Command** A1ADDPRT, A1STOCKS, A1UPDATE, P1PDINQY
2000	XSD	UCN	Element	**Data Type:** xs:string **Min Length:** 1 **Max Length:** 15 **Usages:** **Chapter** 11, 16 **Schema** AircraftEvent, ATA_PartCertificationForm, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings
2500	XSD	AirlineSerialNumber	Element	**Data Type:** xs:string **Max Length:** 30 **Usages:** **Schema** ATA_AD_Status, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus, ATA_SB_MOD_STC_Status

Name **Unit of Measure Code** **Mod** 2020

ALSO KNOWN AS: Unit of Measure

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Specifies a type of count, measurement, container or form.	2300,
Concept	Used to define units of measure (ft = feet, cm = centimeters, lb = pounds, etc.).	2200,
Specific	The unit of measure related to torque values.	2200,
Specific	The specific unit of measure directly related to the Threshold, Interval or Limit for the scheduled maintenance task presented.	2200,
Specific	Specifies the type of count, measurement, container or form of the subject part or material.	300, 2000, 2500,

Name	Unit of Measure Code	Mod	2020

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG & File	UNT	Data Element	Refer to Unit of Measure Clarification Text for a nondefinitive Unit of Measure. If not available, AIRS data base default is "EA". Used in data set group Material Used Text (RMU) in Warranty Claims (Chapter 14). Applies to S and T files. "* " denotes nondefinitive units. **Data Type:** A **Min Length:** 2 **Max Length:** 2 **Cobol Picture:** A(02) **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 1, 12, 2, 3, 4, 5, 7, 9 **Command** A1ADDPRT, A1CHANGE, A1QUOTES, A1STOCKS, A1UPDATE, P1PDINQY, P1UPDATE, R1CPOXMT, R1CUSSHP, R1EXCXMT, R1INVXMT, R1QTNREQ, R1QTNXMT, R1SPLSHP, R1TDNXMT, S1BOOKED, S1NVOICE, S1ORDEXC, S1PNSTAT, S1POSTAT, S1QUOTES, S1SHIPPD, S1STOCKS **External** UN/EDIFACT, X12 **Record Type** 02, 07, 12, 21, 29, 32
2200	ML	unit	Attribute	**Permitted Value List:** unit **Usages:** **DTD** aipc, amm, cpm, srm, teman, v4sheet, wm
2200	ML	unitcode	Attribute	**Usages:** **DTD** mpd, msg3

Name	**Unit of Measure Code**	Mod	2020

2000	XSD	UNT	Attribute	**Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 11, 13, 15, 16, 17, 3, 4 **Schema** AircraftStatusChange, ATA_DSE_Logbook, ATA_MetricsPartsDetail, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteRequest, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, DeliveredAircraftTransferPartList
2000	TEI	UNT	Data Element	**Data Type:** String **Min Length:** 2 **Max Length:** 2 **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 9
2300	XSD	unit	Attribute	See Spec 2300 Appendix A-1 for permitted values. **Data Type:** xs:string **Usages:** **Schema** Annunciation, CdlItem, DispatchItem, DispatchLocator, DispatchProcedure, DmStatus, ExchangePackageStatusList, FailureConsequences, FrontMatter, GlossaryRepository, NonNormalProcedure, NormalProcedure, PmStatus, QualifierRepository, SubSetHeader, SystemDescription, SystemFault
2000	XSD	unitOfMeasureCode	Attribute	**Data Type:** xs:string **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification

Name	**Unit of Measure Code**	Mod	2020

2500	XSD	UnitOfMeasureCode	Attribute	**Data Type:** xs:string **Permitted Value List:** Unit Of Measure Codes **Usages:** **Schema** ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus

Name	Unit of Measure Code	Mod	2020

PERMITTED VALUES **List Name:** *unit*

Permitted Value	Default Value	Description
cm		Centimeters
ft		Feet
in		Inches
lb-ft		Pound Foot
lb-in		Pound Inch
m		Meters
m.daN		Meter deca Newton
m.N		Meter Newton
mm		Millimeters

PERMITTED VALUES **List Name:** *Unit Of Measure Codes*

Permitted Value	Default Value	Description
3F		Kilograms per Liter
AA		Two Hundred, Fifty -- 250 each of an item of supply.
AM		Ampoule* -- A small glass or plastic tube sealed by fusion after filling.
AT		Assortment -- A collection of various items falling into a common category or class and packaged as a small unit constituting a single item of supply.
AX		Twenty -- 20 each of an item of supply.
AY		Assembly -- A collection of parts assembled to form a complete unit constituting a single item of supply.
BA		Bale* -- A shaped unit of compressed material bound with cord or metal ties and usually wrapped, e.g., paper and cloth rags.
BB		Bobbin* -- A cylindrical shaped reel or spool containing thread, yarn, wire.
BC		Block* -- A piece of material such as wood, stone or metal usually with one or more planed faces.
BF		Board Foot -- A unit of measure for lumber equal to the volume of a board 12" X 12" X 1" (144 cubic inches, or 2.360 cubic decimeters).
BG		Bag* -- A flexible container of various sizes and shapes fabricated from materials as paper, plastic or textiles. Includes "sack" and "pouch".
BK		Book* -- A booklike package, as labels or tickets, fastened together along one edge, usually between protective covers.
BL		Barrel* -- A cylindrical container, metal or wood, usually with sides that bulge outward and flat ends or heads of equal diameter. Drum* -- A cylindrical container designed as an exterior pack for storing and shipping bulk materials, e.g., fuels, chemicals, powders. Keg* -- A small barrel shaped container.
BO		Bolt* -- A flat fold of fabric having a stiff paper board core.
BR		Bar* -- A solid piece or block of material having its length greater than its other dimensions, e.g., solder. Not applicable to items as soap, beeswax, buffing compound.
BU		Bushel -- A unit of dry measure equal to eight (8) gallons.
BX		Box* -- A rigid three dimensional container of varying size and material. Includes "tray" and "crate".
CA		Can* -- A rigid receptacle made of fiber, metal, plastic. May be cylindrical or any numbwe of shapes. Includes "cannister". Pail -- A cylindrical container with a handle, as a bucket. Tin* -- A box-like metal container with a flap or lid cover.

Name	Unit of Measure Code	Mod	2020

CB		Carboy* -- A large, heavy duty, bottle-type container used for transportation and storage of liquids. Usually encased in a rigid protective outer container for shipment.
CC		Cubic Centimeter -- A metric unit of cubic measure equal to 0.000001 cubic meter, 1.0 milliliter or 0.061 cubic inch.
CE		Degrees Celsius
CF		Cubic Foot -- A unit of cubic measure equal to 0.037 cubic yard or 0.028 cubic meters.
CG		Centigram -- A unit of metric weight equal to 0.01 gram or 0.000035 ounce.
CI		Cubic Inch -- A unit of cubic measure equal to 0.00058 cubic feet or 16.387 cubic centimeters.
CK		Cake* -- A block of compacted or congealed matter. Applicable to such items as soap, buffing compound.
CL		Cylinder* -- A rigid, cylindrical, metal container designed for transportation and storage of compressed gasses.
CM		Centimeters -- A unit of metric length equal to 0.01 meter or 0.39 inch.
CN		Carton* -- A container, usually of fibreboard or pasteboard, with fixed or collapsible joints and self-locking or tuck-in flaps.
CO		Container* -- A general term for a receptacle or covering for shipment of goods.
CP		Capsule* -- A compact metallic or plastic container for liquids or solids.
CR		Card* -- A flat piece of thick paper or pasteboard to which various items can be attached or displayed.
CS		Case* -- A container designed to hold one or more specific items in a fixed position by virtue of conforming dimensions or attachments.
CT		Hundred Feet -- A unit of linear measurement equal to 33.333 yards or 30.48 meters.
CW		Hundred Pounds -- A unit of avoirdupois weight equal to 45.359 kilograms.
CY		Cubic Yard -- Unit of cubic measure equal to 27 cubic feet or 0.765 cubic meter.
DC		Cubic Decimeter -- A metric unit of cubic measure equal to 1.0 liter or 61.02 cubic inches.
DL		Deciliter -- A unit of metric capacity equal to 0.1 liter, 100 cubic centimeters or 6.1 cubic inches.
DM		Decimeter -- A unit of metric length equal to 0.1 meter or 3.94 inches.
DR		Dram -- A unit of avoirdupois weight equal to 1/16 (.0625) ounce or 1.771 grams.
DZ		Dozen -- Twelve each of an item of supply.
EA		Each -- One unit of an item of supply.
FA		Degrees Fahrenheit
FM		Fathom -- A unit of length equal to 6.0 feet or 1.829 meters.
FO		Fluidounce (U.S.) -- A liquid unit of measure equal to 1/16 (.0625) pint (U.S.), 29.573 milliliters or 29.573 cubic centimeters.
FT		Foot/Foot Run -- A unit of linear measurement equal to 12 inches or (Linear Foot) 30.480 centimeters.
FY		Fifty -- Fifty (50) each of an item of supply.
FZ		Fluidounce (Imperial) -- A liquid unit of measure equal to 1/20 (.05) pint (Imperial), 28.416 cubic centimeters or 28.416 milliliters.
GC		Gill (Imperial) -- A unit of liquid or dry measure equal to 5 fluidounces, 8.669 cubic inches or 142.066 cubic centimeters.
GE		Pounds per Gallon
GI		Gallon (Imperial) -- A unit of liquid or dry measure equal to 277.420 cubic inches, 4.545 liters or 1.201 gallons (U.S.).
GL		Gallon (U.S.) -- A unit of liquid or dry measure equal to 231 cubic inches, 3.785 liters or 0.833 gallon (Imperial).

GM		Gram -- A small unit of metric mass and weight equal to 0.000001 metric ton or 0.0353 ounce.
GN		Grain -- A small unit of weight equal to 1/480 (.002083) troy ounce, or 0.0648 gram.
GP		Group -- A collection of related items issued as a single unit of supply, e.g., test set group.
GR		Gross -- 144 each of a unit of supply.
HC		Hundred Cubic Meters -- A unit of metric volume equal to 131.0 cubic yards.
HG		Hectogram -- A unit of metric mass and weight equal to 100 grams or 3.527 ounces.
HK		Hundred Kilogram (Quintal) -- A unit of metric mass and weight equal to 0.1 metric ton or 220.46 pounds.
HL		Hundred Liters (Hectoliter) -- A unit of metric capacity equal to 3.53 cubic feet.
HM		Hundred Meters (Hectometer) -- A unit of metric length equal to 109.36 yards or 0.062 mile.
HP		Half Pint (U.S.) -- A unit of liquid measure equal to 14.4375 cubic inches or 0.2365 milliliter.
HS		Hundred Square Feet -- A unit of area measurement equal to 11.1 square yards or 9.3 square meters.
HU		Hundred -- 100 each of an item of supply.
HW		Hundred Weight -- A unit of avoirdupois weight equal to 100 pounds or 45.359 kilograms (short hundred weight); or 112 pounds or 50.802 kilograms (long hundred weight).
HY		Hundred Yards -- A unit of linear measurement equal to 91.4 meters.
IN		Inch -- A unit of linear measurement equal to 2.540 centimeters.
IU		Unit* -- A standard or basic quantity into which an item of supply is dispensed or distributed.
JR		Jar* -- A rigid container having a wide mouth and often no neck, typically made of earthen ware or glass. Bottle* -- A glass, plastic or earthenware container of varying size, shape and finish with a closure for retention of contents. excludes jars, ampoules, vials and carboys.
KC		Kilograms per Cubic Meter
KG		Kilogram -- A metric unit of weight equal to 1000 grams or 2.2046 pounds.
KM		Kilometer -- A metric unit of length equal to 1000 meters or 0.62 mile.
KP		Cop* -- A cylindrical or conical mass of thread, yarn, cable wound on a quill or tube.
KT		Kit -- A collection of related items issued as a single unit of supply, such as tools, instruments, repair parts, instruction sheets and often supplies typically carried in a box or bag. Also includes selected collections of equipment components, tools and/or materials for the repair, overhaul or modification of equipment.
LB		Pound -- A unit a avoirdupois weight equal to 16 ounces or 0.453 kilogram.
LG		Length* -- A unit of fixed or specific linear measurement.
LI		Liter -- A unit of metric capacity equal to 1.0 cubic decimeter, 61.02 cubic inches, 1.06 quarts (U.S.) or 0.88 quart (Imperial).
LM		Linear Meter -- A term used for measuring preformed piping, insulation.
LT		Lot* -- A number of units of an item of supply offered as a single item.
MC		Cubic Meter -- A metric unit of cubic measure equal to 1.0 kiloliter or 1.31 cubic yards.
ME		Meter -- A metric unit of linear measurement equal to 39.37 inches.
MF		Thousand Board Feet -- A unit of measure for lumber equal to the volume of 1000 board foot units (12" X 12" X 1").
MG		Milligram -- A metric unit of mass and weight equal to .001 gram.
ML		Milliliter -- A metric unit of capacity equal to .001 liter, 0.061 cubic inch or 1 cubic centimeter.

MM		Millimeter -- A metric unit of length equal to .001 meter or 0.04 inch.
MN		Square Millimeter -- A metric unit of area measurement equal to 0.000001 square meter or 0.0016 square inch.
MT		Thousand Feet -- A unit of linear measurement equal to 333.33 yards or 304.8 meters.
MX		Thousand Cubic Feet -- A unit of volume equal to 37.04 cubic yards or 765 cubic meters.
OT		Outfit -- A collection of related items issued as a single item of supply.
OZ		Ounce -- A unit a avoirdupois weight equal to 1/16 (.0625) pound or 28.349 grams.
PB		Pint (Imperial) -- A measure of liquid capacity equal to 1/8 (.125) gallon (Imperial), 34.678 cubic inches, 0.568 liter or 1.201 pints (U.S.).
PC		Piece* -- A portion or quantity of an item, often a specific length.
PD		Pad* -- Multiple sheets of paper that are stacked together and fastened at one end by sealing.
PE		Peck -- A unit of dry measure equal to 2 gallons.
PK		Bundle* -- A quantity of an item tied together without compression. Pack* -- A parcel or quantity of an item supplied as a wrapped or tied unit. Package* -- A quantity of an item supplied in a protective wrapping.
PM		Plate -- A flat piece of square or rectangular shaped metal of uniform thickness usually 1/4 inch or more.
PR		Pair -- Two like, corresponding items as gloves, shoes, bearings; or single items fabricated of two corresponding parts as shears, goggles, trousers.
PT		Pint (U.S.) -- A measure of liquid capacity equal to 1/8 (.125) gallon (U.S.), 28.875 cubic inches, 0.473 liter or 0.833 pint (Imperial).
PZ		Packet* -- A container used for subsistence items.
QI		Quart (Imperial) -- A unit of liquid capacity equal to 1/4 (.25) gallon (Imperial), 69.355 cubic inches, 1.136 liters or 1.201 quart (U.S.).
QK		Quarter Kilogram -- A unit of metric weight equal to 250 grams.
QR		Quire -- A measure of 24 sheets of paper.
QT		Quart (U.S.) -- A unit of liquid capacity equal to 1/4 (.25) gallon (U.S.), 57.75 cubic inches, 0.946 liter or 0.833 quart (Imperial).
RA		Ration* -- Amount of food or supplies allotted to an individual, usually for one day.
RL		Roll* -- A cylindrical configuration of flexible material which has been rolled on itself as textiles, tape, paper, film and may utilize a core with or without flanges. Spool* -- A cylindrical form with a flange or rim at each end and an axial hole for a pin or spindle on which material as thread or wire is wound. Coil* -- An arrangement of material as wire, rope and tubing wound in a circular shape. Cone* -- A cone-shaped mass of material wound on itself as twine or thread wound on a conical core.
RM		Ream -- A quantity of paper varying from 480 to 516 sheets, depending upon grade.
SC		Square Centimeter -- A metric unit of area measurement equal to 0.0001 square meter or 0.155 square inch.
SD		Square Decimeter -- A metric unit of area measurement equal to 0.01 square meter or 15.5 square inches.
SF		Square Foot/Super Foot -- A unit of area measurement equal to 144 square inches or 0.093 square meter.
SH		Sheet -- A flat piece of rectangular shaped material of uniform thickness that is very thin in relation to its length and width, such as paper, metal and plywood.
SI		Square Inch -- A unit of area measurement equal to 0.00694 square feet or 6.4516 square centimeters.
SK		Stick* -- Material in a relatively long, slendor and often cylindrical form for ease of application, e.g., abrasives.

Name	Unit of Measure Code	Mod	2020

SM		Square Meter -- A metric unit of area measurement equal to 10.76 square feet.
SN		Skein -- A loop of yarn, 120 yards in length, usually wound on a circular core.
SO		Shot -- A unit of linear measure equal to 15 fathoms or 90 feet, usually applied to anchor chain.
SP		Strip* -- A relatively narrow, flat length of material, uniform in width, such as paper, wood and metal.
ST		Set -- A collection of matched or related items issued as a single item of supply, i.e., tool set, matched set.
SY		Square Yard -- A unit of area measurement equal to 1296 square inches, 9 square feet or 0.836 square meter.
TE		Ten -- 10 each of an item of supply.
TH		Thousand -- 1000 each of an item of supply.
TK		Ton, Metric (Thousand Kilograms) -- A metric unit of weight equal to 2204.6 pounds.
TL		Thousand Liter (Kiloliter) -- A metric unit of capacity equal to 1 cubic meter or 1.31 cubic yards.
TN		Ton, Short -- A unit of avoirdupois weight equal to 2000 pounds or 0.907 metric ton.
TO		Troy Ounce -- A unit of troy weight, usually applied to precious metals, equal to 1/12 (.0833) troy pound or 0.373 kilogram.
TT		Tablet* -- A compressed or molded block of solid material; a collection of sheet paper glued together at one edge.
TU		Tube* -- A squeeze-type container used in packaging commodities as adhesives,toothpaste, pharmaceuticals.
TX		Ton, Long -- A unit of avoirdupois weight equal to 2240 pounds or 1.016 metric tons.
VC		Five Hundred -- Five hundred (500) each of an item of supply.
VI		Vial* -- A small glass container, tubular in shape (generally less than one inch in diameter) having a flat bottom and variety of neck shapes.
YD		Yard -- A unit of length equal to 3 feet or 0.914 meter.
ZV		Syphon* -- An aerated container from which liquid is forced by gas pressure.

Name	**Unit of Measure Code**	Mod	2020

ALSO KNOWN AS: Unit of Measure

DEFINITIONS		
Class	**Definition**	**Source**
Concept	Specifies a type of count, measurement, container or form.	2300,
Concept	Used to define units of measure (ft = feet, cm = centimeters, lb = pounds, etc.).	2200,
Specific	The unit of measure related to torque values.	2200,
Specific	The specific unit of measure directly related to the Threshold, Interval or Limit for the scheduled maintenance task presented.	2200,
Specific	Specifies the type of count, measurement, container or form of the subject part or material.	300, 2000, 2500,

Name	Unit of Measure Code	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	UNT	Data Element	Refer to Unit of Measure Clarification Text for a nondefinitive Unit of Measure. If not available, AIRS data base default is "EA". Used in data set group Material Used Text (RMU) in Warranty Claims (Chapter 14). Applies to S and T files. "* " denotes nondefinitive units. **Data Type:** A **Min Length:** 2 **Max Length:** 2 **Cobol Picture:** A(02) **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 1, 12, 2, 3, 4, 5, 7, 9 **Command** A1ADDPRT, A1CHANGE, A1QUOTES, A1STOCKS, A1UPDATE, P1PDINQY, P1UPDATE, R1CPOXMT, R1CUSSHP, R1EXCXMT, R1INVXMT, R1QTNREQ, R1QTNXMT, R1SPLSHP, R1TDNXMT, S1BOOKED, S1NVOICE, S1ORDEXC, S1PNSTAT, S1POSTAT, S1QUOTES, S1SHIPPD, S1STOCKS **External** UN/EDIFACT, X12 **Record Type** 02, 07, 12, 21, 29, 32
2200	ML	unit	Attribute	**Permitted Value List:** unit **Usages:** **DTD** aipc, amm, cpm, srm, teman, v4sheet, wm
2200	ML	unitcode	Attribute	**Usages:** **DTD** mpd, msg3

Name **Unit of Measure Code** **Mod** 2020

2000	XSD	UNT	Attribute	**Data Type:** xs:string **Min Length:** 2 **Max Length:** 2 **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 11, 13, 15, 16, 17, 3, 4 **Schema** AircraftStatusChange, ATA_DSE_Logbook, ATA_MetricsPartsDetail, ATA_PartCertificationForm, ATA_SparesInvoice, ATA_SparesOrder, ATA_SparesOrderBookback, ATA_SparesOrderExc, ATA_SparesOrderStatusResponse, ATA_SparesQuoteFinal, ATA_SparesQuoteRequest, ATA_SparesStockResponse, ATA_SparesSupplierShipNotice, DeliveredAircraftTransferPartList
2000	TEI	UNT	Data Element	**Data Type:** String **Min Length:** 2 **Max Length:** 2 **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** 9
2300	XSD	unit	Attribute	See Spec 2300 Appendix A-1 for permitted values. **Data Type:** xs:string **Usages:** **Schema** Annunciation, CdlItem, DispatchItem, DispatchLocator, DispatchProcedure, DmStatus, ExchangePackageStatusList, FailureConsequences, FrontMatter, GlossaryRepository, NonNormalProcedure, NormalProcedure, PmStatus, QualifierRepository, SubSetHeader, SystemDescription, SystemFault
2000	XSD	unitOfMeasureCode	Attribute	**Data Type:** xs:string **Permitted Value List:** Unit Of Measure Codes **Usages:** **Chapter** Gen2 **Schema** InvoiceSubmittal, PurchaseOrderStatus, PurchaseOrderSubmittal, QuoteRequestSubmittal, QuoteResponse, ShipmentNotification

Name	**Unit of Measure Code**	Mod	2020

2500	XSD	UnitOfMeasureCode	Attribute	**Data Type:** xs:string **Permitted Value List:** Unit Of Measure Codes **<u>Usages:</u>** **Schema** ATA_AssetStatus, ATA_InstalledComponentStatus, ATA_LastDoneNextDueMaintenanceStatus, ATA_RepairDamageStatus

Name	Unit of Measure Code	Mod	2020

PERMITTED VALUES	List Name: *unit*	
Permitted Value	**Default Value**	**Description**
cm		Centimeters
ft		Feet
in		Inches
lb-ft		Pound Foot
lb-in		Pound Inch
m		Meters
m.daN		Meter deca Newton
m.N		Meter Newton
mm		Millimeters

PERMITTED VALUES	List Name: *Unit Of Measure Codes*	
Permitted Value	**Default Value**	**Description**
3F		Kilograms per Liter
AA		Two Hundred, Fifty -- 250 each of an item of supply.
AM		Ampoule* -- A small glass or plastic tube sealed by fusion after filling.
AT		Assortment -- A collection of various items falling into a common category or class and packaged as a small unit constituting a single item of supply.
AX		Twenty -- 20 each of an item of supply.
AY		Assembly -- A collection of parts assembled to form a complete unit constituting a single item of supply.
BA		Bale* -- A shaped unit of compressed material bound with cord or metal ties and usually wrapped, e.g., paper and cloth rags.
BB		Bobbin* -- A cylindrical shaped reel or spool containing thread, yarn, wire.
BC		Block* -- A piece of material such as wood, stone or metal usually with one or more planed faces.
BF		Board Foot -- A unit of measure for lumber equal to the volume of a board 12" X 12" X 1" (144 cubic inches, or 2.360 cubic decimeters).
BG		Bag* -- A flexible container of various sizes and shapes fabricated from materials as paper, plastic or textiles. Includes "sack" and "pouch".
BK		Book* -- A booklike package, as labels or tickets, fastened together along one edge, usually between protective covers.
BL		Barrel* -- A cylindrical container, metal or wood, usually with sides that bulge outward and flat ends or heads of equal diameter. Drum* -- A cylindrical container designed as an exterior pack for storing and shipping bulk materials, e.g., fuels, chemicals, powders. Keg* -- A small barrel shaped container.
BO		Bolt* -- A flat fold of fabric having a stiff paper board core.
BR		Bar* -- A solid piece or block of material having its length greater than its other dimensions, e.g., solder. Not applicable to items as soap, beeswax, buffing compound.
BU		Bushel -- A unit of dry measure equal to eight (8) gallons.
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SH		Sheet -- A flat piece of rectangular shaped material of uniform thickness that is very thin in relation to its length and width, such as paper, metal and plywood.
SI		Square Inch -- A unit of area measurement equal to 0.00694 square feet or 6.4516 square centimeters.
SK		Stick* -- Material in a relatively long, slendor and often cylindrical form for ease of application, e.g., abrasives.

Name	Unit of Measure Code	Mod	2020

SM		Square Meter -- A metric unit of area measurement equal to 10.76 square feet.
SN		Skein -- A loop of yarn, 120 yards in length, usually wound on a circular core.
SO		Shot -- A unit of linear measure equal to 15 fathoms or 90 feet, usually applied to anchor chain.
SP		Strip* -- A relatively narrow, flat length of material, uniform in width, such as paper, wood and metal.
ST		Set -- A collection of matched or related items issued as a single item of supply, i.e., tool set, matched set.
SY		Square Yard -- A unit of area measurement equal to 1296 square inches, 9 square feet or 0.836 square meter.
TE		Ten -- 10 each of an item of supply.
TH		Thousand -- 1000 each of an item of supply.
TK		Ton, Metric (Thousand Kilograms) -- A metric unit of weight equal to 2204.6 pounds.
TL		Thousand Liter (Kiloliter) -- A metric unit of capacity equal to 1 cubic meter or 1.31 cubic yards.
TN		Ton, Short -- A unit of avoirdupois weight equal to 2000 pounds or 0.907 metric ton.
TO		Troy Ounce -- A unit of troy weight, usually applied to precious metals, equal to 1/12 (.0833) troy pound or 0.373 kilogram.
TT		Tablet* -- A compressed or molded block of solid material; a collection of sheet paper glued together at one edge.
TU		Tube* -- A squeeze-type container used in packaging commodities as adhesives,toothpaste, pharmaceuticals.
TX		Ton, Long -- A unit of avoirdupois weight equal to 2240 pounds or 1.016 metric tons.
VC		Five Hundred -- Five hundred (500) each of an item of supply.
VI		Vial* -- A small glass container, tubular in shape (generally less than one inch in diameter) having a flat bottom and variety of neck shapes.
YD		Yard -- A unit of length equal to 3 feet or 0.914 meter.
ZV		Syphon* -- An aerated container from which liquid is forced by gas pressure.

Name	Universal Serial Number	Mod	2017

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Consists of the combination of CAGE Code or NCAGE Code (five characters, fixed length) of the Manufacturer (MFR) of a new part, plus the Part Serial Number (SER) that will be a unique number within that CAGE Code or NCAGE.	2000,

Name	Universal Serial Number	Mod	2017

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	MSG & File	USN	Data Element	**Data Type:** AN **Min Length:** 6 **Max Length:** 35 **Cobol Picture:** X(06) to X(20) **Decimals:** 0 Structure of Universal Serial Number (USN): Use the five character, alphanumeric code as specified in the Cataloging Handbook H4/H8: Sections A and B, Commercial and Government Entity (CAGE) Codes (United States and Canada only) and Sections C and D, NATO Supply Codes for Manufacturer (NCAGE) (excluding the United States and Canada), followed by the Part Serial Number. No blanks or data separators are allowed. **Usages:** **Chapter** 7, 9 **Command** R1CPOXMT, R1TDNXMT
2000	XSD	USN	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 35 **Usages:** **Chapter** 11, 16 **Schema** AircraftEvent, ATA_PartCertificationForm, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings

Name	Universal Serial Tracking Number	Mod	2009

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Consists of the combination of the CAGE Code or NCAGE Code of the Supplier of data (SPL) for an in-service part, plus the Unique Component Identification Number (UCN) that will be a unique number within that CAGE or NCAGE Code. Whether the supplier of data is an airline, a repair agency or the original equipment manufacturer, the Universal Serial Tracking Number should only be used to identify a NON-new, in-service part, implying that the part was 'born' with another Part Serial Number (SER). A corresponding database record will enable cross-referencing the two numbers.	2000,

Name	Universal Serial Tracking Number	Mod	2009

APPLICATION IN SPECIFICATIONS

Source	Context	Key (e.g., Tag or TEI)	Type	Properties
2000	MSG & File	UST	Data Element	**Data Type:** AN **Min Length:** 6 **Max Length:** 20 **Cobol Picture:** X(06) to X(20) **Decimals:** 0 Structure of Universal Serial Tracking Number: Use the five character, alphanumeric codes as specified in the Cataloging Handbook H4/H8: Sections A and B, Commercial and Government Entity (CAGE) Codes (United States and Canada only) and Sections C and D, NATO Supply Codes for Manufacturer (NSCM) (excluding the United States and Canada), followed by the Unique Component Number. No blanks or data separators are allowed. **Usages:** **Chapter** 2, 7, 9 **Command** R1CPOXMT, R1TDNXMT, S1QUOTES, S1REJECT
2000	XSD	UST	Element	**Data Type:** xs:string **Min Length:** 6 **Max Length:** 20 **Usages:** **Chapter** 11, 16, 3 **Schema** AircraftEvent, ATA_PartCertificationForm, ATA_SparesQuoteFinal, LRU_Removal, PieceParts, ScheduledMaintenance, ServiceBulletin, ShopFindings

Name	Warranty Date	Mod	2006

DEFINITIONS		
Class	**Definition**	**Source**
Specific	The date on which a warranty will expire on a particular part.	2000,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	TEI	WDT	Data Element	If the particular day is not desired to be expressed, the last two characters can be 00 to leave the warranty date at a more general level of year and month. **Data Type:** D **Min Length:** 8 **Max Length:** 8 **Cobol Picture:** X(08) **Date Format:** YYYYMMDD **Usages:** **Chapter** 9

Name	Weighing Date	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Specific	Specifies the date when a component or aircraft was weighed.	2000, 2500,

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2000	XSD	DOW	Element	**Data Type:** xs:date ISO 8601 Date YYYY-MM-DD **Usages:** **Chapter** 15 **Schema** DeliveredAircraftTransferPartList
2000	TEI	DOW	Data Element	**Data Type:** Date **Min Length:** 8 **Max Length:** 8 **Date Format:** YYYYMMDD Format YYYYMMDD **Usages:** **Chapter** 9
2500	XSD	DateOfWeighing	Element	**Data Type:** xs:date **Usages:** **Schema** ATA_AssetStatus

Name	Weight	Mod	2020

DEFINITIONS		
Class	**Definition**	**Source**
Concept	The measurement of the heaviness of an object.	2000, 2500,
Specific	The numerical value of the weight of a box, carton, or other shipping container.	2000,
Specific	Identifies the change in weight of the airframe resulting from a specific action or actions.	2200,

Name	**Weight**	Mod	2020

APPLICATION IN SPECIFICATIONS				
Source	**Context**	**Key (e.g., Tag or TEI)**	**Type**	**Properties**
2200	ML	weight	Element	**Usages:** **DTD** cpm, sb, teman
2000	XSD	WGT	Element	**Data Type:** xs:decimal **Decimals:** 0 **Usages:** **Chapter** 3 **Schema** ATA_SparesSupplierShipNotice
2000	TEI	WGT	Data Element	Used with Unit of Measure Code **Data Type:** Integer **Min Length:** 1 **Max Length:** 6 **Usages:** **Chapter** 9
2000	XSD	Weight	Element	In shipments of multiple containers, used for the weigth of individual container - see also Total Shipment Weight **Data Type:** xs:decimal **Usages:** **Chapter** Gen2 **Schema** ShipmentNotification
2500	XSD	Weight	Element	**Data Type:** xs:decimal Must use with unit of Measure Code **Usages:** **Schema** ATA_AssetStatus