**Annex E: Data Validation Checks**

* + 1. **References**

IHO S-58 ENC VALIDATION CHECKS Edition 6.0.0 – 2016

* + 1. **Abbreviations**

PS – Product Specification

DCEG – Data Classification and Encoding Guide

* + 1. **Production validation checks for S-129 Under Keel Clearance Management**

The following checks are intended for production systems designed to produce S-129 UKCM datasets. The checks can be administered at any time during the production phase. All checks should be considered as warnings, even though more severe classifications are available. Given the status of the development and lack of experience with system use of S-129 datasets, it is considered premature to classify any checks as error or critical error at this time. All operators and spatial expressions are defined in Annex F.

* + 1. **Check Classification**

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| C | Critical Error | An error which would make an ENC unusable in ECDIS through not loading or causing an ECDIS to crash or presenting data which is unsafe for navigation. |
| E | Error | An error which may degrade the quality of the ENC through appearance or usability but which will not pose a significant danger when used to support navigation. |
| W | Warning | An error which may be duplication or an inconsistency which will not noticeably degrade the usability of an ENC in ECDIS. |

* + 1. **Check application**

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| B | Base | Apply check to new dataset, new edition, and post-update dataset (after updates have been applied to the base). |
| U | Update | Apply check to update datasets in isolation. |
| S | Post-update | Apply check only to a post-update dataset (i.e. subsequent to application of all available updates). |

Checks do not apply to dataset terminations or cancellations, except where the check description explicitly states it applies in case of a termination or cancellation.

* + 1. **Checks relating to UKCM Product Specification**

**Check = S-100 Generic test**

**Check = S-100 Format Specific test**

**Check = S-102 Product Specification specific test**

| **No** | **Check description** | **Check message** | **Check solution** | **Conformity to:** | **Apply to** |
| --- | --- | --- | --- | --- | --- |
| 1 | If any mandatory attributes are not Present. | Mandatory attributes are not encoded. | Populate mandatory attributes. | DCEG and PS 7.2 Application Schema | B |
| 2 | If any mandatory attributes are present but the attribute value is unknown. | Mandatory attributes are encoded, but attribute value is unknown. | The reason for omission must be given by populating a GML nilReason attribute. | PS 7.2 Application Schema | B |
| 3 | For each feature object with an attribute of type Float or Integer where the value contains zeroes before the first numerical digit or after the last numerical digit. | Values have been padded with non-significant zeroes. E.g. For a signal period of 2.5 sec, the value of SIGPER must be 2.5 and not 02.500. | Remove non-significant zeroes. | PS 7.2 Application Schema | B |
| 4 | For each association between features instances, features instances and information instances, and between information instances that is not defined in the feature catalogue. | Wrong association used. | Use correct association type. | Logical consistency | B |
| 5 | For each role name on associations that is not defined in the feature catalogue. | Wrong role used. | Use correct role name. | Logical consistency | B |
| 6 | For each association that is not defined in the feature catalogue. | Unknown association is used. | Use association that is defined in the feature catalogue. | Logical consistency | B |
| 7 | For each role name that is not defined in the feature catalogue. | Unknown role name is used. | Use role name that is defined in the feature catalogue. | Logical consistency | B |
| 8 | For each association ensure associated classes are only those permitted by the feature catalogue. | Class is associated in an illegal association. | Ensure correct association is used between classes. | Logical consistency | B |
| 9 | For each role name ensure it is only used with permitted associations. | Role name is used on an illegal association. | Ensure correct role names are used on the association. | Logical consistency | B |
| 10 | Ensure dataset conformance to the GML schema. | Dataset does not conform to the GML schema. | Ensure conformance to the GML schema. | Annex B. Schema documentation | B |
| 11 | If the file names in an exchange set are not in accordance with the Product Specification. | File names are not in accordance with the Product Specification. | Amend file names. | Logical consistency | B |
| 12 | For each feature instance, which does not have a valid feature class label/code as defined by the feature catalogue. | Object has invalid feature class code. | Amend object class code. | Logical consistency | B |
| 13 | For each attribute, which does not have a valid attribute label/code as defined by the feature catalogue. | Attribute has invalid attribute label/code. | Amend attribute label/code. | Logical consistency | B |
| 14 | For each feature object, which contains attributes outside the list of permissible attributes for the feature class (as defined in the feature catalogue). | Attribute not permitted on feature class. | Remove attribute. | Logical consistency | B |
| 15 | If the order of the data in a dataset is not correct. | Incorrect data order. | Amend data order. | Logical consistency | B |
| 16 | For each attribute instance where the total number of instances exceed the permitted number of instances. | Too many instances of attribute. | Ensure correct attribute encoding. | Logical consistency | B |
| 17 | For each instance of a file referenced in the data, and if not present in the exchange set. | File referenced in the dataset is not present in the exchange set. | Add file to exchange set or remove reference to file. | Logical consistency | B |
| 18 | For each dataset discovery metadata file that does not correspond to the dataset discovery metadata content table. | Dataset discovery metadata file that does not correspond to the dataset discovery metadata content table. | Ensure correct encoding of the discovery metadata file. | Logical consistency | B |
| 19 | For each cancellation (termination) of a dataset that does not exist on the system or has already been cancelled. | Terminated dataset is not present. | Ignore the update. | Logical consistency | B, U |
| 20 | For each cancellation (termination) of a dataset where the update exchange set contains a corresponding dataset file. | Cancellations cannot contain data objects. | Remove the dataset file from the exchange set or correct the metadata. | Logical consistency | B, U |
| 21 | If any optional attributes are present but the attribute value is unknown or missing. | Optional attributes are encoded, but attribute value is unknown or missing. | Remove optional attributes when value is unknown or missing. | Logical consistency | B |
| 22 | For datasets not named according to dataset file naming convention. | Dataset file name is not according to file naming convention. | Rename according to naming convention. | Logical consistency | B |
| 23 | For each feature instance of type FixedTimeRange where timeStart is encoded later than timeEnd. | Feature has timeStart encoded later than timeEnd. | Ensure values of FixedTimeRange subattributes timeEnd and timeStart are logical. | PS 7.2 Application Schema | B |
| 24 | For each feature instance where FixedTimeRange subattribute timeStart is notNull AND timeEnd is Null OR not Present. | Feature has timeStart without a value of timeEnd. | Populate timeEnd or remove timeStart. | PS 7.2 Application Schema | B |
| 25 | For each feature instance where FixedTimeRange subattribute timeEND is notNull AND timeStart is Null OR not Present. | Object has timeEnd without a value of timeStart. | Populate timeStart or remove timeEnd. | PS 7.2 Application Schema | B |
| 26 | For the Date Time attributes generationTime, expectedPassingTime, Timestart and TimeEnd where encoding is not according to format. | Attributes are not encoded according to attribute type format. | Encode according to attribute type format. | PS 7.2 Application Schema | B |  |
| 27 | For each UnderKeelClearancePlan without any UnderKeelClearanceControlPoint associated with it. | An UnderKeelClearancePlan must consist of minimum 1 UnderKeelClearanceControlPoint association. | Associate UnderKeelClearancePlan with UnderKeelClearanceControlPoint association. | PS 7.2 Application Schema | B |  |