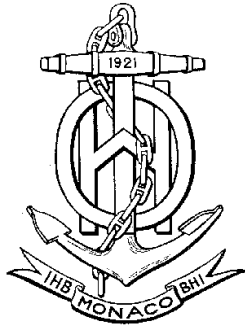


INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO TRANSFER STANDARD for DIGITAL HYDROGRAPHIC DATA

Special Publication No. 57

**S-57 MAINTENANCE DOCUMENT
(Cumulative)**

Number 8 – March 2002

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Introduction
Clarifications
Corrections
Extensions

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Introduction

As data producers and users implement this Standard, errors and deficiencies may be found. These items will be managed using the Maintenance Document (MD). Each time the TSMAD WG meets, a new edition of the MD, which is cumulative, will be produced if necessary. This will cancel the previous edition. When the next major edition of the Standard is produced, all the items contained in the current MD will be included. The latest edition of the MD can be found on the IHO Web-site (www.iho.shom.fr).

Because Edition 3.1 is a minor new edition, the only information that has been transferred to it from the previous MD are the new attribute values referred to in the Explanatory Booklet which was issued with Edition 3.1. Clarifications contained in the MD remain of relevance to Edition 3.1, but are not included in it. Clarifications in the latest edition of the MD must therefore be taken into account before making use of Edition 3.1.

The Maintenance Document contains three sections: Clarifications, Corrections and Extensions. Each of these is explained in its respective Introduction section. Within a MD, each item is assigned a unique Identifier. This Identifier takes the following form:

MD.SS.NNN

Where MD= the MD Number, SS= the Section Title (Cl: Clarifications, Co: Correction, Ex: Extension), and NNN= the Item's sequential number within a section. For example, 1.Co.12 is the 12th item in the Corrections Section for MD 1. All items within a section are presented in the same order as the sections of the Standard.

For details of the use of the MD by hydrographic offices still producing ENC's conforming to Edition 3.0, see the Introduction to the Explanatory Booklet which was issued with Edition 3.1.

INDEX OF MAINTENANCE DOCUMENTS

Number	Date	Entered by	Remarks
1	Nov. 1997	IHB	Approved at September 1997 meeting of IHO/CHRIS/TSMAD
2	June 1998	IHB	Approved at May 1998 meeting of IHO/CHRIS/TSMAD
3 *	January 1999	IHB	Approved at October 1998 meeting of IHO/CHRIS/TSMAD
4 *	July 1999	IHB	Approved at June 1999 meeting of IHO/CHRIS/TSMAD
5 *	May 2000	IHB	Approved at April 2000 meeting of IHO/CHRIS/TSMAD
6*	September 2000	IHB	No amendments approved at the September 2000 TSMADWG meeting.
7*	April 2001	IHB	Approved at the April 2001 TSMADWG meeting.
8*	March 2002	IHB	Approved at the December 2001 TSMADWG meeting.

(*) cumulative

S-57 Maintenance Document
Clarifications

Clarifications

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Introduction

This section is maintained by the "Transfer Standard Maintenance and Application Development Working Group" (TSMAD) of the IHO "Committee on Hydrographic Requirements for Information Systems" (CHRIS) and describes all known points of ambiguity in the Standard raised by member nations and the resolution agreed to by the TSMAD WG. This section contains improvements to the wording of the Standard and minor changes to correct editorial errors that do not result in a substantive change to the Standard. A substantive change is one that would affect an implementation of the base Standard.

As mentioned in the Introduction to the MD, each item in this section is assigned a unique identifier, its Clarification Number. The change or action associated with the item is then described. Space for comments is included for each item. These comments might include the reason for the change, the office originating the change or other information deemed useful.

S-57 Part 1

General Introduction

7. Maintenance

- 3.Cl.1 The TSMAD WG, at its 3rd meeting in Monaco, October 1998, agreed that the maintenance procedure should be amended in order to make provision for a limited new edition (3.x), directly after the 4 years freeze period. It was also decided that, in order to minimize the repercussions of making substantive changes to the standard, only a limited number of changes would be implemented. Finally it was agreed that, for convenience, any future Maintenance Documents will be cumulative, i.e. they will also incorporate all previously agreed changes. It was noted that this "Maintenance" section of the standard was no longer applicable and needed revision. (See [3.Co.1](#)).

S-57 Part 2

Theoretical data model

2.2.1.2 Chain-node

- 1.Cl.2 The data model for chain-node states that a point representations are coded as either isolated or connected nodes. Figure 2.4 implies that they can only be isolated nodes. The text description of the model is correct and should be taken as the authority. Figure 2.4 will be corrected in the next version of S-57. (See also [1.Co.2](#)).
- 4.Cl.1 The statement that "Duplication of coincident linear geometry is prohibited" is incorrect for the chain-node data model. Coincident geometry can be duplicated if it is considered that there is no logical topological relationship between objects. (See also [4.Co.3](#)).

2.2.1.3 Planar graph

- 1.Cl.3 The data model for planar-graph states that a point representations are coded as for chain node i.e. they can be either isolated or connected nodes. Figure 2.4 implies that they can only be isolated nodes. The text description of the model is correct and should be taken as the authority. Figure 2.4 will be corrected in the next version of S-57. (See also [1.Co.2](#)).

2.2.1.4 Full topology

- 1.Cl.4 The data model for full topology states that a point representations are coded as for planar graph i.e. they can be either isolated or connected nodes. Figure 2.5 implies that they can only be isolated nodes. The text description of the model is correct and should be taken as the authority. Figure 2.5 will be corrected in the next version of S-57. (See also [1.Co.3](#)).

S-57 Part 3

Data Structure

2.6 Floating point values

- 1.Cl.5 The final paragraph of this clause refers only to the ASCII implementation of S-57. Therefore, the statement – 'If the multiplication factor is not used its value must be set to 1' also applies only to the ASCII implementation of S-57. (See also [1.Co.4](#)).

3.2.1 Coordinate units

- 1.Cl.6 For some products a specific coordinate multiplication factor may be defined by the product specification. For such products the COMF subfield may be left empty. (See also [1.Co.5](#)).

3.3 3-D (sounding) multiplication factor

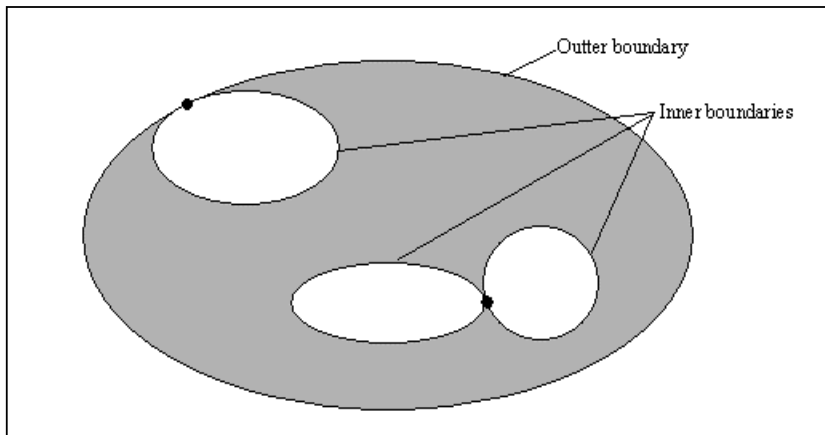
- 1.Cl.7 For some products a specific 3-D (sounding) multiplication factor may be defined by the product specification. For such products the SOMF subfield may be left empty. (See also [1.Co.6](#)).

4.4 Feature record attribute field

- 2.Cl.1 National attributes must not be encoded in the Feature Record Attribute field (ATTF). National attributes must be encoded in the Feature Record National Attribute (NATF) field regardless of the lexical level of the text they contain.

4.7.3.1 General

- 4.Cl.2 In the case of areas with holes, all internal boundaries must be completely contained within the external boundary and the internal boundaries must not intersect each other or the external boundary. However, internal boundaries may touch tangentially (i.e. at one point) as shown in the diagram below. In the case of chain-node and planar graph data structures such an intersection will be at a common node. (See also [4.Co.4](#)).



7.3.2.2 Data set projection field structure

- 5.Cl.1 There is an inconsistency for the FPMF sub-field in Table 7.7, column 4 rows 7 and 8, and as specified in column 5 of row 9. (See also [5.Co.7](#)).

7.6.1 Feature record identifier field structure

- 4.Cl.3 The range of the Record Version [RVER] subfield is defined as 1 to $2^{16} - 2$. (See also [4.Co.5](#)).

7.7.1.1 Vector record identifier field structure

- 4.Cl.4 The range of the Record Version [RVER] subfield is defined as 1 to $2^{16} - 2$. (See also [4.Co.6](#)).

8.3.1 General

- 3.Cl.2 The information in each update record refers to the record version one smaller than the update record itself. This applies to all update record types including those containing pointer and coordinate control fields.

8.3.5 Coordinate identity within the update mechanism

- 3.Cl.3 The update mechanism relies on the fact that the coordinate string held in the target system is an exact copy of that held by the data producer. Therefore, there must be no generalisation (to remove points) or smoothing (to add points) by the target system as this would change the indices of the coordinates.

8.4.2.2 Record update instruction subfield - use for feature record

- 1.Cl.8 For some products (for example ENC) under certain circumstances (for example when re-issuing an existing cell) it may be necessary to insert records whose record version is not 1. In such cases where the product specification explicitly states that values other than 1 are allowed, the product specification should be taken as the authority. (See also [1.Co.7](#)).

8.4.3.2 Record update instruction subfield - use for feature record

- 1.Cl.9 For some products (for example ENC) under certain circumstances (for example when re-issuing an existing cell) it may be necessary to insert records whose record version is not 1. In such cases where the product specification explicitly states that values other than 1 are allowed, the product specification should be taken as the authority. (See also [1.Co.8](#)).

Annex A - ISO/IEC 8211 summary and examples

A.2.4.1 Field area of the DDR

- 1.Cl.10 Within this clause all references to "field control field" should read "file control field". (See also [1.Co.9](#)).
- 1.Cl.11 Table A.7 is incomplete. Two extra items should be included. (See also [1.Co.10](#)).
- 1.Cl.12 The truncated escape sequence for lexical level 2 shown in table A.7 is not the same as the escape sequence described in ISO/IEC 10646. However, for the purposes of this version of S-57 the escape sequence shown in table A.7 is the one that should be used and it should be interpreted as ISO/IEC 10646 UCS 2, level 1. (See also [1.Co.10](#)).

A.3 Use of ISO/IEC 8211 for S-57

- 7.Cl.10 The size of the record length field (LR RP 0-4) is set to 5 and a numeric representation must be used for its value in an S-57 conforming data set. This implies that the largest integer that can be encoded in the numeric form is 99999. However ISO/IEC 8211 does not restrict the record size to that number of bytes, neither does S-57. If a LR larger than 99999 bytes is encoded in an S-57 conforming data set, ISO/IEC 8211 specifies that the record length field (LR RP 0-4) must be set to 0. The actual record size must then be derived from the LR directory.

A.4.1 ASCII example

- 1.Cl.13 In the example under the 'DDR field area' '(field control field)' should read '(file control field)' (See also [1.Co.11](#)).
- 1.Cl.14 In the example the last 3 fields of the 'DDR field area (data descriptive fields)' should have data structures of 'array/explicit point' (2200) not 'array/mixed data types' (2600). (See also [1.Co.11](#)).

- 1.Cl.15 In the example the national language encoding of 'Noordzee1' in the 'DR 1 field area' is shown as 'big endian'. S-57 explicitly states that all values should be encoded using the 'little endian' convention. Therefore, the example should read – '00301N•o•o•r•d•z•e•e•□•1•Δ•▽•'
(See also [1.Co.11](#)).

A.4.2 Binary example

- 1.Cl.16 In the example under the 'DDR field area' '(field control field)' should read '(file control field)'.
(See also [1.Co.12](#)).
- 1.Cl.17 In the example in the 'DDR field area (data descriptive fields)' a number of fields have been given the wrong data structure type:
- The 'Feature record to feature object pointer field' should be 2600.
 - The 'Feature record to spatial record pointer field' should be 2600.
 - The 'Vector record pointer field' should be 2600.
 - The '2-D coordinate field' should be 2500.
 - The '3-D coordinate field' should be 2500.
 - The 'Arc coordinate field' should be 2500.
 - The 'Ellipse coordinate field' should be 2500.
 - The 'Curve coordinate field' should be 2500.
- (See also [1.Co.12](#)).

- 1.Cl.18 In the DR 1 field of the example the third binary field should read '▲▲▲▲▲▲▲▲▲▲'. (See also [1.Co.12](#)).
- 1.Cl.19 In the example the national language encoding of 'Noordzee1' in the 'DR1 field area' is shown as 'big endian'. S-57 explicitly states that all values should be encoded using the 'little endian' convention. Therefore, the example should read – '▲▲N•o•o•r•d•z•e•e•□•1•Δ•▽•'. (See also [1.Co.12](#)).

Annex B - Alternate character sets

B.2 Implementation of alternate character sets in ISO/IEC 8211

- 1.Cl.20 The escape sequence for lexical level 2 used in this clause is not the same as the escape sequence described in ISO/IEC 10646. However, for the purposes of this version of S-57 the escape sequence shown in this clause is the one that should be used and it should be interpreted as ISO/IEC 10646 UCS 2, level 1. (See also [1.Co.13](#)).

S-57 Appendix A

Chapter 1 - Object Classes

Code 4 – ACHARE – Anchorage area

- 7.Cl.3 The definition needs to be expanded to include “seaplanes”. (See also [7.Co.15](#))

Code 55 – FSHFAC – Fishing Facility

- 8.Cl.3 The definition for fishing facilities limiting them to shallow water is too restrictive. Some facilities such as tunny nets can be found in deep water and could be an obstruction to navigation. (See [8.Co.4](#)).

Code 74 – LNDMRK – Landmark

7.Cl.4 The distinction needs to be expanded to include “control point” and “silo/tank” (See also [7.Co.16](#)).

Code 87 – OFSPLF – Offshore Platform

7.Cl.11 The existing definition needs to be more generic and should be interpreted as: ‘A permanent offshore platform structure, either fixed or floating’. (See [7.Co.6](#))

Code 95 - PONTON - Pontoon

4.Cl.5 The current definition of pontoon implies that a pontoon can only be a landing, pier head or bridge support. This is considered to be too restrictive and in future the list above should be treated as indicative only. Other appropriate floating structures, not included in the list, therefore may be encoded using the object class ‘Pontoon’. (See also [4.Co.7](#)).

Code 112 - RESARE – Restricted area

2.Cl.2 The current definition of a restricted area covers only those areas where navigation is restricted. In future it should be interpreted as also covering areas of restricted access, including areas on land. (See also [2.Co.2](#))

Code 122 – SLCONS – Shoreline construction

3.Cl.4 The definition is too specific and it has been recognised that some shoreline constructions may be afloat. Instances have been found where a training wall is always under water/ submerged (WATLEV = 3). It therefore does not exist "between the water and the land". The feature could exist some distance from the coastline, not forming part of the coastline and not fitting the definition for COALNE. Such a feature would be a man made structure and should be considered to fit the definition of a training wall. The definition for Shoreline Construction should be interpreted as follows: “A fixed artificial structure in the water and/or adjoining the land. It may also refer to training walls, which are not necessarily connected to, nor form part of the shoreline”. (See also [3.Co.3](#))

S-57 Appendix A

Chapter 2 - Attributes

2.Cl.3 Use of leading and/or trailing zeros for attribute values.

All numeric examples in the Object Catalogue are given without leading and trailing zeros (eg. CURVEL). If the format description for an attribute value allows for more numeric positions than shown in the example it does not imply that the value should be padded with zeros. The use, or non-use, of leading or trailing zeros is product specific. Therefore, a product specification should state whether and how leading or trailing zeros are used in the specific product.

2.Cl.4 Format statements in the Object Catalogues

For numeric attributes the format statement indicates the maximum number of digits allowed.

Code 2 – BCNSHP – Beacon shape

- 7.Cl.12 The definition implies that stakes, poles, perches and posts must be embedded in the water, and should therefore be interpreted as: “an elongated wood or metal pole, fixed on land or in the water to serve as a navigational aid or a support for a navigational aid”. (Adapted from IHO Dictionary S-32, 5th Edition, 4960). (See [7.Co.12](#))

Code 28 – CATFOR - Category of fortified structure

- 7.Cl.13 The meaning and definition for Martello tower is too narrow and should be interpreted as follows: “Fortified tower” (value 5). Definition: “A tower or a small round fort (e.g. Martello tower) for coastal defence”. (See also [7.Co.1](#))

Code 30 – CATHAF – Category of harbour facility

- 7.Cl.5 the definition for value 10 (container terminal) is too narrow and should be interpreted as: “a terminal with facilities to load/unload or store shipping containers” (See also [7.Co.17](#))

Code 35 – CATLMK - Category of landmark

- 7.Cl.14 The definitions for mast (value 7) and tower (value 17) should be interpreted as follows:
 mast: a relatively tall structure usually held vertical by guylines. (Adapted from IHO Chart specifications, M-4).
 tower: a relatively tall, self-supporting structure. (Adapted from Digital Geographic Information Working Group – DGIWG, Oct 1987). (See also [7.Co.2](#))

Code 43 – CATOFFP - Category of offshore platform

- 7.Cl.6 The definition for value 8 (floating production, storage and offloading vessel (FPSO)) is too narrow, and should be interpreted as: “an offshore facility consisting of a moored vessel by which the product is extracted, stored or exported”. (adapted from United Kingdom Hydrographic office CSDO 607.2 (13), May 1994) ” (See also [7.Co.18](#))

Code 54 – CATTRK – Category of recommended track

- 2.Cl.6 The definition of value 1 (based on a system of fixed marks) states that the route must be based on at least two structures. This overlooks the possibility of a route being based on a single structure and a bearing, which is frequently the case. This was not the intention. Therefore the definition should be interpreted as one option and the additional option as follows should also be allowed:

“Or a straight route which comprises a single structure or natural feature which may carry lights and/or top marks and a specified bearing which vessels can follow with safety.”
 (See also [2.Co.5](#))

Code 56 - CATREA - Category of restricted area

- 2.Cl.5 The definitions for Nature reserve (value) and Ecological reserve (value) should be interpreted as including water areas. (See also [2.Co.3](#))

Code 65 – CATSCF Category of small craft facility

- 3.Cl.5 The present description of attribute value 3 “boat hoist” is too narrow and should be interpreted as covering all boats. (See also [3.Co.4](#))

Code 72 - CATZOC - Category of zone of confidence in data

- 1.Cl.42 The final report of the IHO Data Quality Working Group was published in November 1997. This has resulted in some minor changes to the wording (but not the values) in the ZOC table for the attribute Category of zone of confidence. (See also [1.Co.34](#)).

Code 77 – COMCHA –Communication channel

- 8.Cl.4 The example in the “Indication” is not in accordance with the documented “Format”. (See also [8.Co.5](#)).

Code 79 - CPDATE - Compilation date

- 4.Cl.6 It has been recognized that it may only be possible to define a date in terms of the year or the year and the month. The wording in the "Indication" and "Format" sections for this attribute are therefore too restrictive. The following two extra formats should also be allowed:

CCYYMM	(No specific day required - mandatory)
CCYY	(No specific month required - mandatory)

(See also [4.Co.8](#)).

Code 85 - DATEND - Date end

- 4.Cl.7 It has been recognized that it may only be possible to define a date in terms of the year or the year and the month. The wording in the "Indication" and "Format" sections for this attribute are therefore too restrictive. The following two extra formats should also be allowed:

CCYYMM	(No specific day required - mandatory)
CCYY	(No specific month required - mandatory)

(See also [4.Co.9](#)).

Code 86 - DATSTA - Date start

- 4.Cl.8 It has been recognized that it may only be possible to define a date in terms of the year or the year and the month. The wording in the "Indication" and "Format" sections for this attribute are therefore too restrictive. The following two extra formats should also be allowed:

CCYYMM	(No specific day required - mandatory)
CCYY	(No specific month required - mandatory)

(See also [4.Co.10](#)).

Code 102 - INFORM - Information

- 1.Cl.21 The remark – 'The textual information could be, for example, a list, a table or a text' - should be ignored as this does not agree with the fact that formatting characters are not allowed in INFORM strings. (See also [1.Co.14](#))
- 8.Cl.1 Some ECDIS and QA software systems limit the number of characters that can be displayed in INFORM. There is no guidance on the maximum number of characters that can be encoded, and it is therefore resolved that an upper limit of 300 characters should be adopted. (See also [8.Co.2](#))

Code 107 – LITCHR – Light characteristics

- 8.Cl.7 The present meaning and definition for attribute value 28 (alternating) is not consistent with

the existing IALA definition and should be read as follows:

alternating (continuous): a signal light that shows continuously, in any given direction, two or more colours in a regularly repeated sequence with a regular periodicity. (IALA International Dictionary of Aids to Marine Navigation).

(See also [8.Co.9](#))

- 8.Cl.8 For purposes of consistency with the IHO and IALA dictionaries, the meaning for attribute values 13, 14, 15, and 16 should be read as follows;

Value 13 (fixed/flash) - "fixed and flashing"

Value 14 (flash/long flash) - "flashing and long flashing"

Value 15 (occulting/flash) - "occulting and flashing"

Value 16 (fixed/long flash) - "fixed and long flashing"

(See also [8.Co.11](#))

- 8.Cl.9 In order to align the meaning for attribute value 7 with IHO and IALA dictionaries, "isophased" should be read as "isophase"

Code 125 – QUASOU – Quality of sounding measurement

- 4.Cl.9 For a wreck (or obstruction) where the least depth is unknown, the attribute value 2 (depth unknown) does not apply to the depth of the sea bottom near the object. (See also [4.Co.11](#)).

Code 139 – SIGFRQ – Signal frequency

- 2.Cl.7 The type of format and an example are missing. (See also [2.Co.6](#))

Code 141 – SIGGRP – Signal group

- 8.Cl.6 In order to be consistent with the new table that has been added to the Appendix B1 Annex A Edition 2.1 (UOC), the following examples can be used:

Light characteristic	SIGGRP indication
AIWR	-> ()
Iso	-> (1)
IQ	-> () (See also 8.Co.7)

- 8.Cl.10 The examples for AI.LFIWR, FI+LFI(2+3) and FI(2)+LFI(3) are not correct and need amending. (See also [8.Co.8](#))

Code 143 – SIGSEQ – Signal sequence

- 2.Cl.8 Remove ')' from the end of the example.

Code 147 - SORDAT - Source date

- 4.Cl.10 It has been recognized that it may only be possible to define a date in terms of the year or the year and the month. The wording in the "Indication" and "Format" sections for this attribute are therefore too restrictive. The following two extra formats should also be allowed:

CCYYMM (No specific day required - **mandatory**)

CCYY (No specific month required - **mandatory**)

(See also [4.Co.12](#)).

Code 158 - TXTDSC - Textual description

- 1.Cl.22 This attribute is generally used for long text strings or those that require formatting, however,

there is no restriction on the type of text (except for lexical level) that can be held in files referenced by TXTDSC. (See also [1.Co.15](#))

Code 165 - T_TINT – Tide, current – time interval of values

2.Cl.9 The type of format and an example are missing. (See also [2.Co.7](#))

Code 300 - NINFOM - Information in national language

1.Cl.23 The remark – 'The textual information could be, for example, a list, a table or a text' - should be ignored as this does not agree with the fact that formatting characters are not allowed in NINFOM strings. (See also [1.Co.16](#)).

8.Cl.2 Some ECDIS and QA software systems limit the number of characters that can be displayed in INFORM. There is no guidance on the maximum number of characters that can be encoded, and it is therefore resolved that an upper limit of 300 characters should be adopted. (See also [8.Co.3](#))

Code 304 - NTXTDS - Textual description in national language

1.Cl.24 This attribute is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by NTXTDS. (See also [1.Co.17](#))

S-57 Appendix A

Annex A – IHO Codes for Producing Agencies

3.Cl.6 It was decided at the 3rd TSMAD meeting, October 1998, that changes to S-57 Annex A "IHO Codes for Producing Agencies" would no longer be included in the maintenance documents, but would be maintained by means of new editions. (See also [3.Co.2](#))

S-57 Appendix A

Annex B – Attribute/Object Class Cross-Reference

2.Cl.10 A number of omissions from the cross reference list have been noted. These mainly, but not exclusively, concern attributes of type B and C. A more detailed investigation is underway to determine the extent of the omissions.

3. Spatial and Meta Object Attributes

Code: 402 - QUAPOS - Quality of position

7.Cl.9 Add the following to QUAPOS: "QUAPOS may be applied to any S-57 spatial object."

S-57 Appendix B.1 **ENC Product Specification**

1. Introduction

- 4.Cl.11 Within the ENC Product Specification document "must" indicates a mandatory requirement. (See also [4.Co.13](#)).

1.4 Maintenance

- 1.Cl.25 It was decided at the 1st TSMAD Meeting, September 1997, that this product specification would be maintained under the mechanism described in S-57 Part 1 clause 7 and that Annex A of this document ("Use of the Object Catalogue for ENC") would not be covered by this maintenance mechanism but would be maintained by means of new editions. (See also [1.Co.18](#))

2.1 Navigational Purpose

- 3.Cl.7 Considering the fact that the scale and the information shown in the ENC is commonly dependant on paper charts, it was considered, at the 3rd TSMAD Meeting, October 1998, that the description for Navigational Purposes needed to be expanded. (See also [3.Co.5](#)).

2.2 Cells

- 1.Cl.26 Clarification of the fourth paragraph - Each cell must be completely covered by meta objects of class M_COVR. The areas that contain data must be covered by M_COVR objects with CATCOV = 1. Any other areas that do not contain data must be covered by M_COVR objects with CATCOV = 2. (See also [1.Co.19](#)).
- 1.Cl.27 Clarification to the fifth paragraph (Point or line feature objects which are at the border of coverage (M_COVR with CATCOV = 1) of cells with the same navigational purpose must be part of only one cell). (See also [5.Co.6](#)).

2.3 Topology

- 4.Cl.12 If there is a logical topological relationship between objects, coincident linear geometry must not be duplicated. (See also [4.Co.14](#)).

3.4 Meta Objects

- 2.Cl.11 In the last sentence of the last paragraph, 'atribute' should read 'attribute'.
- 8.Cl.5 Clause 3.4 is no longer consistent with the new wording in Clause 2.2.3.1 of Appendix B1 – Annex A (UOC) which was agreed by TSMAD/4. (See also [8.Co.6](#)).

3.5.2 Mandatory attributes

- 1.Cl.28 The attribute COLPAT is mandatory for any object (except LIGHTS) that has more than one colour. (See also [1.Co.21](#)).
- 1.Cl.29 In table 3.2 the entry for BRIDGE should state that when a bridge is not over navigable water there are no mandatory attributes. Rather than just when it is over non-navigable water. (See also [1.Co.22](#)).
- 3.Cl.8 The existing text does not make it clear whether an attribute code or attribute value is being considered mandatory and the following clarification is provided: "If the value of the mandatory attribute is unknown, it must be encoded as described in S-57 Appendix A Chapter 2,

Paragraph 2.1 Introduction – Expected Input.” (*Superseded by [7.Co.24](#)*)

- 1.Cl.30 In table 3.2 the entry for M_ACCY conflicts with the statement in S-57 Appendix B.1 Annex A clause 2.2.4.1 which states that the use of the attributes HORACC, SOUACC and VERACC is prohibited. Table 3.2 is therefore incorrect and the only mandatory attribute is POSACC. (*See also [1.Co.23](#)*).

3.5.3 Prohibited attributes

- 2.Cl.12 The list of prohibited attributes does not include those that relate to prohibited objects. A number of additions are required. (*See also [2.Co.9](#)*)

3.5.5 Text attribute values

- 1.Cl.31 The lexical level used for the 'Feature Record Attribute' [ATTF] field must be 0 or 1 (ISO 8859-1). Lexical level 0,1 or 2 may be used for the 'Feature Record National Attribute' [NATF] field. (*See also [1.Co.24](#)*).

3.5.6 Hierarchy of meta data

- 1.Cl.32 In table 3.3 the entry for sounding datum (6th row) contradicts the statement in S-57 Appendix B.1 Annex A clause 2.1.3 that the sounding datum cannot be set for individual objects related to depth using the attribute VERDAT. Therefore table 3.3 is incorrect and the attribute VERDAT should be ignored in the final column for row 6. (*See also [1.Co.25](#)*).
- 4.Cl.13 In table 3.3 the entry for M_ACCY conflicts with the statement in S-57 Appendix B.1 Annex A clause 2.2.4.1 which states that the use of HORACC, SOUACC and VERACC is prohibited. Table 3.3 is therefore incorrect. The only attribute that can be used in this context is POSACC. (*See also [4.Co.15](#)*).
- 7.Cl.15 In the third column and last row of table 3.3; M_SREL should be interpreted as M_QUAL. (*See also [7.Co.20](#)*)

3.8 Geometry

- 1.Cl.33 The statement that 'linear features must not be encoded at a point density greater than 0.3mm at compilation scale' should be treated as a recommendation rather than a rule. (*See also [1.Co.26](#)*)
- 4.Cl.14 Linear geometry between two explicit coordinates is defined as a loxodromic line on WGS84. Long lines may need to have additional explicit coordinates to cater for the effects of projection change. (*See also [4.Co.16](#)*).

3.10 Groups

- 1.Cl.34 All feature objects that are not in Group 1 must be in Group 2. This includes meta objects and collection objects. (*See also [1.Co.28](#)*)

3.10.1 Group 1 (skin of the earth)

- 4.Cl.15 The geometry of coincident boundaries between group 1 objects must not be duplicated. (*See also [4.Co.17](#)*).

3.11.1 Language

- 2.Cl.13 All national attributes must be encoded in the Feature Record National Attribute (NATF) field. (*See also [2.Co.10](#)*)

- 5.CL.2 The existing section concerning language is not clear and needs to be altered. (See also [5.Co.8](#)).

4.4 Units

- 1.Cl.35 The 'Data Set Parameter' [DSPM] field is not used in the ER application profile, therefore, the COMF and SOMF are not explicitly defined within an ENC update file. An ENC update file must use the same COMF as the original base cell file that they are intended to update. The SOMF is always 10.

5.4.1 Content of the exchange set

- 1.Cl.36 In this clause the terms 'ASCII text format' and 'ASCII file' are used to indicate that binary files (such as MS-Word or WordPerfect) must not be used. The character set (lexical level) which may be used for the contents of these files should follow the lexical level of the attribute field in which the file is referenced .

5.5 Data sets

- 7.Cl.1 The issue date (the ISDT sub-field of the DSID field) should be interpreted as the date from which the data can be used. (See also [7.Co.3](#))

5.6 File naming

- 1.Cl.37 In order to conform with ISO 9660 level 1 file names must be composed of only upper case characters A to Z, digits 0 to 9 and _ (underscore). The filename may be up to 8 characters long with an extension of 3 characters. The separator must be the character (period). Directory names may be up to 8 characters long. (See also [1.Co.32](#))

5.6.4 Text and picture files

- 1.Cl.38 If the file is referenced from a national attribute field [NATF] encoded using lexical level 2, the file name in that attribute field must also be in lexical level 2 (two byte encoding), using only the ISO 646 (the first seven bits) subset of ISO 10646. It is up to the decoder to convert the filename to the lexical level appropriate for the receiving file system.

5.7 Updating

- 4.Cl.16 To inform the mariner that a new edition is available, an update cell file is created, containing only the Data Set Information record with the "Data Set Identifier" [DSID] field. The "Data Set Structure Information" [DSSI] field is not required. (See also [7.Cl.7](#) and [4.Co.18](#)).

- 7.Cl.7 The first sentence of the forth last paragraph should be interpreted as: "To inform the mariner that a new edition is available, an update cell file **may be** created, containing only the Data Set General Information record with the "Data Set Identifier" [DSID] field." (*Supersedes first sentence of 4.Cl.16*)

- 7.Cl.8 In order to be consistent with 4.Cl.16, the 4th last paragraph of this section should be interpreted as follows: "In order to delete a data set, an update cell file is created, containing only the Data Set General Information record with the Data Set Identifier [DSID] field. The Edition Number [EDTN] subfield must be set to 0. **The [DSSI] field must not be included in this update message.** This message is only used to cancel a base cell file." (See also [7.Co.30](#))

- 7.Cl.2 "Issue date" should be interpreted as the date from which the data can be used. (See also [7.Co.4](#))

5.9.1 Implementation

7.Cl.16 The last sentence should be interpreted as “The CRC values are recorded in ASCII as hexadecimal numbers.” (See also 7.Co.28)

6.3.2.11, 6.3.2.12, 6.4.2.4, 6.4.2.12, 6.4.2.13

1.Cl.39 In all the clauses above the ATVL subfield should be indicated as mandatory. Also the term ASCII value should be interpreted as meaning 'general text' as defined by S-57 Part 3 clause 2.4 (this point also applies to clause 6.3.2.5). (See also [1.Co.33](#))

6.4.1 Update cell file structure

1.Cl.40 In the diagram the field tags for the 2-D Coordinate field and the 3-D Coordinate (Sounding array) field should read SG2D and SG3D respectively.

6.4.2.14 Feature record to feature object pointer control field FFPC

1.Cl.41 In table 6.29 the tag in the final row should read NFPT (*not NOPT*).

S-57 Appendix B.1 Annex C *Recommended ENC Validation Checks.*

8.Cl.11 At the 8th TSMAD meeting, it was agreed that the ENC Product Specification and all its Annexes should be frozen. It was noted however that Annex C was originally intended as an aid to ECDIS manufacturers and validation software companies, and as it may need periodic amendments, this document should not be frozen. It was therefore decided that it should no longer be included as an ENC Product Specification Annex, and will therefore become a “standalone” IHO publication.

S-57 Appendix B2 *IHO Object Catalogue Data Dictionary Product Specification*

1.3 Maintenance (*New section*)

1.Cl.42 It was decided at the 1st TSMAD Meeting, September 1997, that this product specification would be maintained under the mechanism described in S-57 Part 1 clause 7. (See also [1.Co.35](#)).

S-57 Maintenance Document
Corrections

Corrections

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Introduction

This section is maintained by the "Transfer Standard Maintenance and Application Development Working Group" (TSMAD) of the IHO "Committee on Hydrographic Requirements for Information Systems" (CHRIS) and describes substantive changes to the Standard raised by member nations and the resulting action agreed by the TSMAD WG. A substantive change is one that affects an implementation of the base version of the Standard. These corrections will be applied to the next major edition of the Standard.

As mentioned in the Introduction to the MD, each item in this section is assigned a unique identifier, its Correction Number. The change or action associated with the item is then described. Space for comments is included for each item. These comments might include the reason for the change, the office originating the change or other information deemed useful.

S-57 Part 1

General Introduction

7. Maintenance

3.Co.1 Replace the existing wording with the following revised maintenance procedure:

"Changes to this Standard are coordinated by the "Transfer Standard Maintenance and Application Development Working Group" (TSMAD) of the IHO "Committee on Hydrographic Requirements for Information Systems" (CHRIS). National hydrographic offices which wish changes to be made to the standard, either to correct errors which they have identified or to enhance its applicability, must address their comments to the International Hydrographic Bureau. Other users of the Standard, for example equipment manufacturers, must address their comments to their national hydrographic office. (Addresses of IHO Member States' hydrographic offices can be found in IHO Yearbook, publication P-05).

The International Hydrographic Bureau maintains the Standard by means of "Cumulative Maintenance Documents". These maintenance documents are distributed with the Standard and their contents are also available on the IHO Web site (<http://www.iho.shom.fr>). Each maintenance document contains the following three sections:

Clarifications. This section contains improvements to the wording of the Standard. These are editorial amendments which do not result in any substantive change to the Standard.

Corrections. This section contains substantive changes to the Standard to correct factual errors or amend the contents of the Standard. These changes will be only included in the next major edition (Ed 4.0) of the Standard.

Extensions. This section contains extensions, or other significant changes to the Standard, which have been agreed by the appropriate IHO committee or working group and will be included in the next edition (Ed 4.0) of the standard.

The only exception to this mechanism is the case where an error is found within the Standard (during the freeze period) that would affect the safety of navigation. Under this circumstance an interim new edition (Ed 3.x) of the Standard should be produced to correct this error. No other corrections or extensions would in principle be included in such a new edition produced during the freeze period.

Items contained in the latest Cumulative Maintenance Document will be included in the Standard at the time of its next major release. However, at the end of the freeze period it may be considered appropriate to release a limited new edition (Edition 3.x) of the Standard, containing only selected portions of the latest Cumulative Maintenance Document.

These documents, and the associated maintenance mechanism, do not apply to the product specifications contained in Appendix B of this Standard unless a product specification explicitly states that it is to be maintained by this mechanism. The maintenance procedure for a particular product specification is described in that specification." ([See 3.Cl.1](#)).

S-57 Part 2

Theoretical data model

2.2.1.1 Cartographic spaghetti

4.Co.1 Change 3rd line to read "Area representations are coded as closed loops of edges".

2.2.1.2 Chain-node ; 2.2.1.3 Planar Graph

1.Co.2 Replace Figure 2.4 with the following diagram (See also [1.CI.2](#) and [1.CI.3](#)).

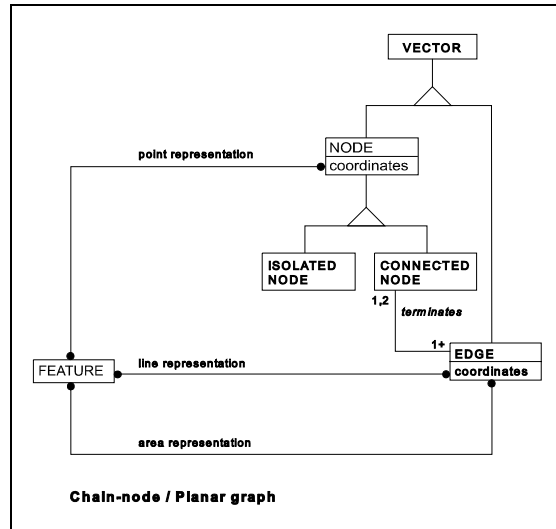


figure 2.4

2.2.1.2 Chain-node

4.Co.2 Change 5th line to read "Area representations are coded as closed loops of edges".

4.Co.3 Delete "Duplication of coincident linear geometry is prohibited" from the 6th line. (See also [4.CI.1](#)).

2.2.1.4 Full topology

1.Co.3 Replace Figure 2.5 with the following diagram (See also [1.Cl.4](#)).

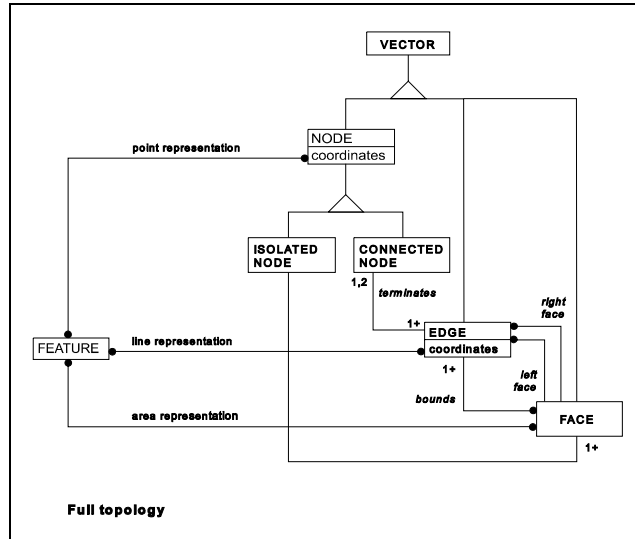


figure 2.5

S-57 Part 3

Data Structure

2.6 Floating point values

1.Co.4 Change the end of the last paragraph to read "all floating point values can be encoded as R-types (see clause 7.2.2.1) in which case the multiplication factor is not used and its value must be set to 1."

3.2.1 Coordinates units

1.Co.5 In last paragraph, change the third sentence to read "The factor is defined by the encoder and held in the "Coordinate Multiplication Factor" [COMF] subfield, unless otherwise specified by a product specification." (See also [1.Cl.6](#))

3.3 3-D (Sounding) multiplication factor

1.Co.6 In last paragraph, change the third sentence to read "The factor is defined by the encoder and held in the "3-D (sounding) Multiplication Factor" [SOMF] subfield, unless otherwise specified by a product specification." (See also [1.Cl.7](#))

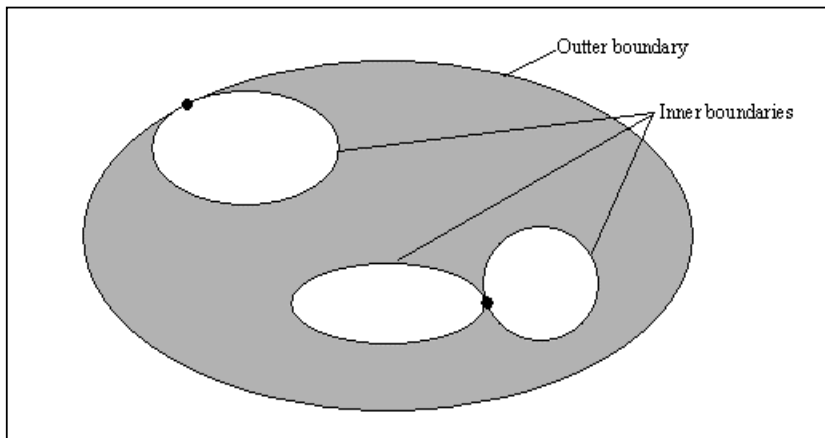
4.4 Feature record attribute field

2.Co.1 Change the first line of this clause to read – “Attributes of feature objects, except national attributes (see clause 4.5), must be encoded in the “Feature Record Attribute” [ATTF] field.”

4.7.3.1 General

4.Co.4 Insert the following paragraph at the end of the existing section:

In the case of areas with holes, all internal boundaries must be completely contained within the external boundary and the internal boundaries must not intersect each other or the external boundary. However, internal boundaries may touch tangentially (i.e. at one point) as shown in the diagram below. In the case of chain-node and planar graph data structures such an intersection will be at a common node. (See also [4.Cl.2](#)).



7.3.2.2 Data set projection field structure

5.Co.7 In Table 7.7, change the value for False Easting and False Northing (rows 7 and 8 of column 4) from b24 *) to b24. (See also [5.Cl.1](#)).

7.6.1 Feature record identifier field structure

4.Co.5 Add the following to the "Subfield content and specification" column of table 7.20 for the Record Version [RVER] subfield:

"Range: 1 to $2^{16} - 2$ ". (See also [4.Cl.3](#)).

7.7.1.1 Vector record identifier field structure

4.Co.6 Add the following to the "Subfield content and specification" column of table 7.28 for the Record Version [RVER] subfield:

"Range: 1 to $2^{16} - 2$ ". (See also [4.Cl.4](#)).

8.4.2.2 Record update instruction subfield - use for feature record

1.Co.7 Replace the first bullet point with the following :

- I {1} INSERT - Feature record must be inserted. The RVER subfield must contain "1" unless otherwise specified in the relevant product specification. (See also [1.Cl.8](#))

8.4.3.2 Record update instruction subfield - use for vector record

1.Co.8 Replace the first bullet point with the following :

- I {1} INSERT - Feature record must be inserted. The RVER subfield must contain "1" unless otherwise specified in the relevant product specification. (See also [1.Cl.9](#))

Annex A - ISO/IEC 8211 summary and examples

A.2.4.1 Field area of the DDR

1.Co.9 Within sub-clause (a), including its title, replace all six instances "field control field" with "file control field". (See also [1.Cl.10](#))

1.Co.10 Replace Table A.7 with the following table :

RP	Len	Entry name	Content
0	1	Data structure code	"0" - single data item "1" - linear structure "2" - multi-dimensional structure
1	1	Data type code	"0" - character string "1" - implicit point (integer) "2" - explicit point (real) "5" - binary form "6" - mixed data types
2	2	Auxiliary controls	"00"
4	2	Printable graphics	","&"
6	3	Truncated escape sequence	Lexical level 0 - " " (SPACES) Lexical level 1 - "-A " (-,A,SPACE) Lexical level 2 - "%/@"

Table A.7

(See also [1.Cl.11](#))

A.4.1 ASCII example

1.Co.11 Replace the whole example with the following :

DDR leader

019003LE1□0900319□!□5504

DDR directory

0000001630000000010004400163FRID0011400207FOID0007400321ATTF0006000395
 NATF0006900450FFPC0008900524FFPT0008300613FSPC0008900696FSPT0009100785
 VRID0008300876ATTV0005900959VRPC0007001018VRPT0007701088SGCC0005901165
 SG2D0004601224SG3D0005101270ARCC0007801321AR2D0006001399EL2D0007401459
 CT2D0004801533∇

DDR field area (file control field)

0000;&□□□□Δ0001FRIDFRIDFOIDFRIDATTFRIDNATFFRIDFFPCFRIDFFPTFRIDFSPCFRID
 FSPT0001VRIDVRIDATTVVRIDVRPCVRIDVRPTVRIDSGCCVRIDSG2DVRIDSG3DVRIDARCCA
 RCCAR2DARCCCEL2DARCCCT2D∇

DDR field area (data descriptive fields)

- 0100;&□□□□ISO□8211□Record□IdentifierΔΔ(I(5))∇
- 1600;&□□□□Feature□record□identifier□fieldΔRCNM!RCID!PRIM!GRUP!OBLI!RVER!RUINΔ(A(2),I(10),A(1),I(3),I(5),I(3),A(1))∇
- 1600;&□□□□Feature□object□identifier□fieldΔAGEN!FIDN!FIDSΔ(A(2),I(10),I(5))∇
- 2600;&-A□Feature□record□attribute□fieldΔ*ATTL!ATVLΔ(I(5),A)∇
- 2600;&%/@Feature□record□national□attribute□fieldΔ*ATTL!ATVL□(I(5),A)∇
- 1600;&□□□□Feature□record□to□feature□object□pointer□control□fieldΔFFUI!FFIX!NFPTΔ(A(1),2I)∇
- 2000;&□□□□Feature□record□to□feature□object□pointer□fieldΔ*LNAM!RIND!COMTΔ(A(17),2A)∇
- 1600;&□□□□Feature□record□to□spatial□record□pointer□control□fieldΔFSUI!FSIX!NSPTΔ(A(1),2I)∇
- 2000;&□□□□Feature□record□to□spatial□record□pointer□fieldΔ*NAME!ORNT!USAG!MASKΔ(A(12),3A(1))∇
- 1600;&□□□□Vector□record□identifier□fieldΔRCNM!RCID!RVER!RUINΔ(A(2),I(10),I(3),A(1))∇
- 2600;&□□□□Vector□record□attribute□fieldΔ*ATTL!ATVLΔ(I(5),A)∇
- 1600;&□□□□Vector□record□pointer□control□fieldΔVPUI!VPIX!NVPTΔ(A(1),2I)∇
- 2000;&□□□□Vector□record□pointer□fieldΔ*NAME!ORNT!USAG!TOPI!MASKΔ(A(12),4A(1))∇
- 1600;&□□□□Coordinate□control□fieldΔCCUI!CCIX!CCNCΔ(A(1),2I)∇
- 2200;&□□□□2-D□Coordinate□fieldΔ*YCOO!XCOOΔ(2R)∇
- 2200;&□□□□3-D□Coordinate□fieldΔ*YCOO!XCOO!VE3DΔ(3R)∇
- 1600;&□□□□Arc/Curve□definition□fieldΔATYP!SURF!ORDR!RESO!FPMFΔ(2A(1),I(1),R,I)∇

2200;&□□□□Arc□coordinate□fieldΔSTPT!CTPT!ENPT*YCOO!XCOOΔ(2R)▽
 2200;&□□□□Ellipse□coordinate□fieldΔSTPT!CTPT!ENPT!CDPM!CDPR*YCOO!XCOOΔ
 (2R)▽

2200;&□□□□Curve□coordinate□fieldΔ*YCOO!XCOOΔ(2R)▽

DR 1 (geo feature record) leader

00245□D□□□□□00109□□□□5504

DR 1 directory

00010000600000FRID0002600006FOID0001800032ATTF0004100050NATF0002900091
 FSPT0001600120▽

DR 1 field area

00001▽

FE0000000001P00200018001I▽

NL000000000100001▽

000044Δ000753,1Δ000763Δ00116North□sea□1Δ▽

00301N●●●●●rd●z●e●e●●1●●●●●

VI0000000001NNN▽

DR 2 (vector spatial record) leader

00110□D□□□□□00067□□□□5504

DR 2 directory

00010000600000VRID0001700006SG2D0002000023▽

DR 2 field area

00002▽

VI0000000001001I▽

52.10475Δ4.3004833Δ▽

A.4.2 Binary example

1.Co.12 Replace the whole example with the following:

DDR leader

018833LE1□0900319□!□5504

DDR directory

0000001630000000010004300163FRID0010000206FOID0007000306ATTF0005900376
 NATF0006800435FFPC0009000503FFPT0008600593FSPC0009000679FSPT0009000769
 VRID0007800859ATTV0005800937VRPC0007100995VRPT0007601066SGCC0006001142
 SG2D0004801202SG3D0005301250ARCC0007301303AR2D0006201376EL2D0007601438
 CT2D0005001514▽

DDR field area (file control field)

0000;&□□□Δ0001FRIDFRIDFOIDFRIDATTFRIDNATFFRIDFFPCFRIDFFPTFRIDFSPCFRID
 FSPT0001VRIDVRIDATTVVRIDVRPCVRIDVRPTVRIDSGCCVRIDSG2DVRIDSG3DVRIDARCCA
 RCC
 AR2DARCCCEL2DARCCCT2D▽

DDR field area (data descriptive fields)

0500;&□□□ISO□8211□Record□IdentifierΔΔ(b12)▽

1600;&□□□Feature□record□identifier□fieldΔRCNM!RCID!PRIM!GRUP!OBJL!RVER!RUINΔ(b11,b
 14,2b11,2b12,b11)▽

1600;&□□□Feature□object□identifier□fieldΔAGEN!FIDN!FIDSΔ(b12,b14,b12)▽

2600;&-A□Feature□record□attribute□fieldΔ*ATTL!ATVLΔ(b12,A)▽

2600;&%/@Feature□record□national□attribute□fieldΔ*ATTL!ATVLΔ(b12,A)▽

1600;&□□□Feature□record□to□feature□object□pointer□control□fieldΔFFUI!
 FFIX!NFPTΔ(b11,2b12)▽

2600;&□□□Feature□record□to□feature□object□pointer□fieldΔ*LNAM!RIND!
 COMTΔ(B(64),b11,A)▽

1600;&□□□Feature□record□to□spatial□record□pointer□control□fieldΔFSUI!
 FSIX!NSPTΔ(b11,2b12)▽

2600;&□□□Feature□record□to□spatial□record□pointer□fieldΔ*NAME!ORNT!
 USAG!MASKΔ(B(40),3b11)▽

1600;&□□□Vector□record□identifier□fieldΔRCNM!RCID!RVER!RUINΔ(b11,b14,
 b12,b11)▽

2600;&□□□Vector□record□attribute□fieldΔ*ATTL!ATVLΔ(b12,A)▽

1600;&□□□Vector□record□pointer□control□fieldΔVPUI!VPIX!NVPTΔ
 (b11,2b12)▽

2600;&□□□Vector□record□pointer□fieldΔ*NAME!ORNT!USAG!TOPI!MASKΔ(B(40),
 4b11)▽

1600;&□□□Coordinate□control□fieldΔCCUI!CCIX!CCNCΔ(b11,2b12)▽

2500;&□□□2-D□Coordinate□fieldΔ*YCOO!XCOOΔ(2b24)▽

2500;&□□□3-D□Coordinate□fieldΔ*YCOO!XCOO!VE3DΔ(3b24)▽

1600;&□□□Arc/Curve□definition□fieldΔATYP!SURF!ORDR!RESO!FPMFΔ(3b11,
 2b14)▽

2500;&□□□Arc□coordinate□fieldΔSTPT!CTPT!ENPT*YCOO!XCOOΔ(2b24)▽
 2500;&□□□Ellipse□coordinate□fieldΔSTPT!CTPT!ENPT!CDPM!CDPR*YCOO!XCOOΔ
 (2b24)▽

2500;&□□□Curve□coordinate□fieldΔ*YCOO!XCOOΔ(2b24)▽

DR 1 (geo feature record) leader

00197□D□□□□□00109□□□5504

DR 1 directory

00010000300000FRID0001200003FOID0000900015ATTF0002900024NATF0002600053
 FSPT0000900079▽

DR 1 field area

▲▲▽
 ▲▲▲▲▲▲▲▲▲▲▲▲▽
 ▲▲▲▲▲▲▲▲▲▽
 ▲▲4▲▲▲3,1▲▲▲3▲▲North□sea□1▲▽
 ▲▲N●o●o●r●d●z●e●e●□●1●▲●▽●
 ▲▲▲▲▲▲▲▲▲▽

DR 2 (vector spatial record) leader

00088□D□□□□□00067□□□5504

DR 2 directory

00010000300000VRID0000900003SG2D0000900012▽

DR 2 field area

▲▲▽
 ▲▲▲▲▲▲▲▲▲▽
 ▲▲▲▲▲▲▲▲▲▽

Annex B - Alternate character sets

B.2 Implementation of alternate character sets in ISO/IEC 8211

- 1.Co.13 In the table below the fourth bullet point, replace the third line with the following :
 "Lexical level 2 (Multilingual - ISO/IEC 10646)(2/5) (2/15) (4/0)"

S-57 Appendix A

IHO Object Catalogue - Introduction

3.Co.2 Add the following new paragraph:

While the IHO Object Catalogue will be maintained under the mechanism described in S-57 Part 1 clause 7, its Annex A "IHO Codes for Producing Agencies" is maintained by means of new editions. (See also [3.Cl.6](#))

S-57 Appendix A

Chapter 1 - Objects

Code 4 – ACHARE – Anchorage area

7.Co.15 Change the definition to: 'An area in which vessels or seaplanes anchor or may anchor. (Adapted from the IHO Dictionary, S-32, 5th Edition, 130).' (See also [7.Cl.3](#)).

Code 36 – CURENT – current – non-navigational

8.Co.16 Include attributes TXTDSC and NTXTDS in Set Attribute_B.

Code 55 – FSHFAC – Fishing Facility

8.Co.4 Remove 'in shallow water' from the definition. (See also [8.Cl.3](#))

Code 58 – FOGSIG – Fog signal

7.Co.5 Add PERSTA and PEREND attributes to Set Attribute_A.

Code 74 – LNDMRK – Landmark

7.Co.16 Change the distinction to:

beacon, special purpose/general; building single; control point; daymark; pylon/bridge support; silo/tank; topmark (See also [7.Cl.4](#))

8.Co.1 Add the attribute CATSPM to Set Attribute_A .

Code 81 – MAGVAR – Magnetic variation

8.Co.15 Include attributes TXTDSC and NTXTDS in Set Attribute_B

Code 87 – OFSPLF – Offshore platform

7.Co.6 Revise the existing definition to: 'A permanent offshore platform structure, either fixed or floating'.

Code 91 - PILBOP - Pilot boarding place

8.Co.14 Add new attribute CALSGN to Set Attribute_A.

Reason - Encoders are placing "call signs" into INFORM. For example, in Australian waters **PILBOP** (pilot boarding places) often have a CALSGN. The attribute COMCHA is not deemed sufficient.
(TSMAD/8/9.3 No 38)

Code 95 - PONTON - Pontoon

4.Co.7 Replace the existing definition with the following:

" floating structure, usually rectangular in shape, which serves as a landing, pier head, bridge support, etc." (See also [4.CI.5](#)).

7.Co.7 Add attribute value 'FUNCTN' to Set Attribute_A.

Code 103 – RTPBCN – Radar transponder beacon

7.Co.8 Add 'PERSTA' and 'PEREND' attributes to Set Attribute_A.

Code 112 - RESARE – restricted area

2.Co.2 The definition of a restricted area should be replaced by the following:

"A specified area on land or water designated by an appropriate authority within which access or navigation is restricted in accordance with certain specified conditions". (See also [2.CI.2](#))

Code 122 – SLCONS – Shoreline construction

3.Co.3 The definition for a shoreline construction should be replaced by the following:

"A fixed artificial structure in the water and/or adjoining the land. It may also refer to training walls, which are not necessarily connected to, nor form part of the shoreline." (See also [3.CI.4](#))

Code 144 – TOPMAR - Topmark

7.Co.9 Add attributes PERSTA, PEREND, DATSTA and DATEND to the list of valid attributes.

Code 302 – M_COVR - Coverage

8.Co.17 Include attributes TXTDSC and NTXTDS in Set Attribute_B.

S-57 Appendix A

Chapter 2 - Attributes

7.Co.25 The following Feature Object Attributes are missing from the Contents section:

Feature Object Attribute	Acronym	Code	Page
Category of harbour facility	CATHAF	30	2.38
Category of hulk	CATHLK	31	2.40
Category of navigation line	CATNAV	41	2.55
Category of production installation	CATPRI		2.65
Category of zone of confidence in data	CATZOC	72	2.106
Exhibition condition of light	EXCLIT	92	2.129

Survey authority	SURATH	150	2.200
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7.Co.26 Change the Feature Object Attributes page references:

Category of gate	from 2.40 to 2.37
Category of mooring/warping facility	from 2.55 to 2.54
Category of production area	from 2.654 to 2.64

Code 2 – BCNSHP – Beacon shape

7.Co.12 Change the definition for stake, pole, perch, post, to: “an elongated wood or metal pole, fixed on land or in the water to serve as a navigational aid or a support for a navigational aid”. (Adapted from IHO Dictionary S-32, 5th Edition, 4960) (See also [7.Cl.12](#))

Code 6 – CALSGN – Call sign

5.Co.1 Modify the existing definition to:

‘The designated call-sign of a station (radio station, radar station, pilot ...)’

Code 28 – CATFOR - Category of fortified structure

7.Co.1 Change the meaning and definition for “Fortified tower” (value 5) to: “A tower or a small round fort (e.g. Martello tower) for coastal defence”. (See also [7.Cl.13](#))

Code 30 – CATHAF – Category of harbour facility

7.Co.17 Change the definition for value 10 (container terminal) to: - “a terminal with facilities to load/unload or store shipping containers” (See also [7.Cl.5](#))

Code 35 – CATLMK - Category of landmark

7.Co.2 Amend the definitions for mast (value 7) and tower (value 17) to the following:
 mast: a relatively tall structure usually held vertical by guylines. (Adapted from IHO Chart specifications, M-4).
 tower: a relatively tall, self-supporting structure. (Adapted from Digital Geographic Information Working Group – DGIWG, Oct 1987). (See also [7.Cl.14](#))

Code 38 – CATMFA – Category of marine farm/culture

5.Co.2 Invert the meaning and definition for value 2

Meaning:	Bivalve molluscs
Definition:	Edible bivalve molluscs (oysters, mussels, scallops...)

Code 43 – CATOFP - Category of offshore platform

7.Co.18 The definition for value 8 (floating production, storage and offloading vessel (FPSO)) must be changed to: “an offshore facility consisting of a moored vessel by which the product is extracted, stored or exported”. (Adapted from United Kingdom Hydrographic office CSDO 607.2 (13), May 1994)” (See also [7.Cl.6](#))

Code 50 – CATQUA - category of quality of data

7.Co.27 Add the missing attribute code “50”

Code 51 – CATRAS – category of radar station

5.Co.3 The following attribute should be of type list.

Reason: In some cases a radar station has both, functions (surveillance and assistance) and should be encoded with CATRAS = 1,2.

8.Co.18 In Correction 5.Co.3 above, change the “Reason” to a “Remark”

Code 54 - CATTRK – Category of track

2.Co.5 Replace the definition of CATTRK value 1 (based on a system of fixed marks) with the following:

“A straight route (known as a recommended track, range or leading line) which comprises:

- a. at least two structures (usually beacons or daymarks) and/or natural features, which may carry lights and/or top-marks. The structures/features are positioned so that when observed to be in line a vessel can follow a known bearing with safety.
or
- b. A single structure or natural feature, which may carry lights and/or a top-mark, and a specified bearing which can be followed with safety”. (See also [2.Cl.6](#)).

Code 56 - CATREA – Category of restricted area

2.Co.3 Change the definitions of Nature reserve (value) and Ecological reserve (value) to read – “A tract of land or water managed...” (See also [2.Cl.5](#))

5.Co.4 Modify the definition of value 22 (fish sanctuary): a place where fish are protected.

New definition: A place where fish (including shellfish and crustaceans) are protected.

Code 64 – CATSLO - Category of slope

7.Co.22 Remove value 5 (pingo) and its definition.

Code 65 – CATSCF Category of small craft facility

3.Co.4 The present description of attribute value 3 “boat hoist” is too narrow and should be changed to read: “boat hoist – a hoist for lifting boats out of the water (also known as a travel lift)”. (See also [3.Cl.5](#))

Code 66 - CATSPM – Category of special purpose mark

2.Co.4 Remove the M-4 reference.

7.Co.10 Delete value 13 “private mark” and the associated definition “a privately maintained mark”.

Remark: Value 13 should be encoded using attribute STATUS value 8: private, if required.

Code 72 - CATZOC - Category of zone of confidence

1.Co.34 Replace the existing ZOC table and the associated comments with the following:

"ZOC Table:

1	2	3		4	5
ZOC ¹	Position Accuracy ²	Depth Accuracy ³		Seafloor Coverage	Typical Survey Characteristics ⁵
A1	± 5 m	=0.50 + 1%d		Full area search undertaken. All significant seafloor features detected ⁴ and depths measured.	Controlled, systematic survey ⁶ high position and depth accuracy achieved using DGPS or a minimum three high quality lines of position (LOP) and a multibeam, channel or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 0.6		
		30	± 0.8		
		100	± 1.5		
		1000	± 10.5		
A2	± 20 m	= 1.00 + 2%d		Full area search undertaken. All significant seafloor features detected ⁴ and depths measured.	Controlled, systematic survey ⁶ achieving position and depth accuracy less than ZOC A1 and using a modern survey echosounder ⁷ and a sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 1.2		
		30	± 1.6		
		100	± 3.0		
		1000	± 21.0		
B	± 50 m	= 1.00 + 2%d		Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.	Controlled, systematic survey achieving similar depth but lesser position accuracies than ZOCA2, using a modern survey echosounder ⁵ , but no sonar or mechanical sweep system.
		Depth (m)	Accuracy (m)		
		10	± 1.2		
		30	± 1.6		
		100	± 3.0		
		1000	± 21.0		
C	± 500 m	= 2.00 + 5%d		Full area search not achieved, depth anomalies may be expected.	Low accuracy survey or data collected on an opportunity basis such as soundings on passage.
		Depth (m)	Accuracy (m)		
		10	± 2.5		
		30	± 3.5		
		100	± 7.0		
		1000	± 52.0		
D	worse than ZOC C	Worse Than ZOC C		Full area search not achieved, large depth anomalies may be expected.	Poor quality data or data that cannot be quality assessed due to lack of information.
U	Unassessed - The quality of the bathymetric data has yet to be assessed				

Remarks:

To decide on a ZOC Category, all conditions outlined in columns 2 to 4 of the table must be met.

Explanatory notes quoted in the table:

¹ The allocation of a ZOC indicates that particular data meets minimum criteria for position and depth accuracy and seafloor coverage defined in this Table. ZOC categories reflect a charting standard and not just a hydrographic survey standard. Depth and position accuracies specified for each ZOC category refer to the errors of the final depicted soundings and include not only survey errors but also other errors introduced in the chart production process. Data may be further qualified by Object Class 'Quality of Data' (M_QUAL) sub-attributes as follows:

- a) Positional Accuracy (POSACC) and Sounding Accuracy (SOUACC) may be used to indicate that a higher position or depth accuracy has been achieved than defined in this Table (e.g. a survey where full seafloor coverage was not achieved could not be classified higher than ZOC B; however, if the position accuracy was, for instance, ± 15 metres, the sub-attribute POSACC could be used to indicate this).
- b) Swept areas where the clearance depth is accurately known but the actual seabed depth is not accurately known may be accorded a 'higher' ZOC (i.e. A1 or A2) providing positional and depth accuracies of the swept depth meets the criteria in this Table. In this instance, Depth Range Value 1 (DRVAL1) may be used to specify the swept depth. The position accuracy criteria apply to the boundaries of swept areas.
- c) SURSTA, SUREND and TECSOU may be used to indicate the start and end dates of the survey and the technique of sounding measurement.

² Position Accuracy of depicted soundings at 95% CI (2.45 sigma) with respect to the given datum. It is the cumulative error and includes survey, transformation and digitizing errors etc. Position accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

³ Depth accuracy of depicted soundings = $a + (b \cdot d)/100$ at 95% CI (2.00 sigma), where d = depth in metres at the critical depth. Depth accuracy need not be rigorously computed for ZOCs B, C and D but may be estimated based on type of equipment, calibration regime, historical accuracy etc.

⁴ Significant seafloor features are defined as those rising above depicted depths by more than:

	<u>Depth</u>	<u>Significant Feature</u>
a.	<10 metres	$>0.1 \cdot \text{depth}$,
b.	10 to 30 metres	>1.0 metre,
c.	>30 metres	$>(0.1 \cdot \text{depth})$ minus 2.0 metres

Note: Mariners should have due regard to the limitations of sounding equipment when assessing margins of safety to be applied.

⁵ Typical Survey Characteristics - These descriptions should be seen as indicative examples only.

- 6 Controlled, systematic surveys (ZOC A1, A2 and B) - surveys comprising planned survey lines, on a geodetic datum that can be transformed to WGS 84.
- 7 Modern survey echosounder - a high precision single beam depth measuring equipment, generally including all survey echosounders designed post 1970." (See also [1.CI.42](#)).

Code 77 – COMCHA –Communication channel

- 8.Co.5 Change current wording in the indication to read:

Indication :

Each VHF-channel should be indicated **in square brackets** by 2 digits and up to 2 characters (A-Z) ;

e.g. VHF channel 7 -> **[07]**
VHF channel 16 -> **[16]**

The indication of several VHF-channels is possible ;

Format:

[XXXX];[XXXX];... (See also [8.CI.4](#))

Code 79 - CPDATE - Compilation date

- 4.Co.8 Replace the wording under 'Indication' with the following:

The compilation data should be encoded using 4 digits for the year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted. This conforms to ISO 8601:1988.

Add the following extra format statements to the 'Formats' section:

CCYYMM (No specific day required - **mandatory**)
CCYY (No specific month required - **mandatory**)
(See also [4.CI.6](#)).

Code 85 - DATEND - Date end

- 4.Co.9 Replace the wording under the 'Indication' with the following:

The 'date end' should be encoded using 4 digits for the year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted. This conforms to ISO 8601:1988.

Add the following extra format statements to the 'Formats' section:

CCYYMM (No specific day required - **mandatory**)
CCYY (No specific month required - **mandatory**)

(See also [4.CI.7](#)).

Code 86 - DATSTA - Date start

4.Co.10 Replace the wording under 'Indication' with the following:

The 'date start' should be encoded using 4 digits for the year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted. This conforms to ISO 8601:1988.

Add the following extra format statements to the 'Formats' section:

CCYYMM	(No specific day required - mandatory)
CCYY	(No specific month required - mandatory)

(See also [4.CI.8](#)).

Code 102 - INFORM - Information

1.Co.14 Delete the remark – "The textual information could be, for example, a list, a table or a text."
(See also [1.CI.21](#))

8.Co.2 Add the following format statement:

Format: up to 300 characters may be included in this string. (See also [8.CI.1](#)).

Code 107 – LITCHR – Light characteristics

8.Co.9 The present meaning and definition for attribute value 28 (alternating) should be changed in order to be consistent with the existing IALA definition.
Change the meaning to "alternating (continuous)"

Change the definition as follows:

alternating (continuous): a signal light that shows continuously, in any given direction, two or more colours in a regularly repeated sequence with a regular periodicity. (IALA International Dictionary of Aids to Marine Navigation).

(See also [8.CI.7](#))

8.Co.10 Attribute value 20 (group alternating) is considered to be the same as value 28 (alternating) and should be removed. (See also [8.Co.9](#)).

8.Co.11 For purposes of consistency with the IHO and IALA dictionaries, the meaning for attribute values 14, 15, and 16 should be changed as follows;

Value 13 (fixed/flash) to "fixed and flashing"

Value 14 (flash/long flash) to "flashing and long flashing"

Value 15 (occulting/flash) to "occulting and flashing"

Value 16 (fixed/long flash) to "fixed and long flashing"

(See also [8.CI.8](#))

8.Co.12 Add the following missing definition;

fixed and flashing: a light in which a fixed light is combined with a flashing light of higher luminous intensity (IHO Dictionary, S-32, 5th Edition, 2781).

8.Co.13 Amend the definitions for attribute values 2, 3, 4, 5, and 8 and the meaning for value 6 as follows;

- flashing: a rhythmic light in which the total duration of light in a period is clearly shorter than the total duration of darkness and all the appearances of light are of equal duration. It may be :
single flashing : a flashing light in which a flash is regularly repeated at a rate of less than 50 flashes per minutes.
group flashing : a flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.
composite group flashing : a flashing light in which a sequence of groups of one or more flashes, which are specified in number, is regularly repeated, and the groups comprise different numbers of flashes.
 (IALA International Dictionary of Aids to Marine Navigation)
- long-flashing: a single-flashing light in which an appearance of light of not less than two seconds duration is regularly repeated. (IALA International Dictionary of Aids to Marine Navigation)
- quick-flashing: a rhythmic light in which flashes are repeated at a rate of not less than 50 flashes per minutes but less than 80 flashes per minutes. It may be :
continuous quick-flashing : a quick-flashing light in which a flash is regularly repeated.
group quick-flashing : a quick-flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.
 (IALA International Dictionary of Aids to Marine Navigation)
- very quick-flashing: a rhythmic light in which flashes are repeated at a rate of not less than 80 flashes per minute but less than 160 flashes per minute. It may be :
continuous very quick-flashing : a very quick-flashing light in which a flash is regularly repeated.
group very quick-flashing : a very quick-flashing light in which a group of two or more flashes, which are specified in number, is regularly repeated.
 (IALA International Dictionary of Aids to Marine Navigation)
- continuous ultra quick-flashing:
 a rhythmic light in which flashes are regularly repeated at a rate of not less than 160 flashes per minute. (IALA International Dictionary of Aids to Marine Navigation)
- occulting: a rhythmic light in which the total duration of light in a period is clearly longer than the total duration of darkness and all the eclipses are of equal duration. It may be :
single-occulting : an occulting light in which an eclipse is regularly repeated.
group-occulting: an occulting light in which a group of two or more eclipses, which are specified in number, is regularly repeated.
composite group-occulting : an occulting light in which a sequence of groups of one or more eclipses, which are specified in number, is regularly repeated, and the groups comprise different numbers of eclipses.
 (IALA International Dictionary of Aids to Marine Navigation)

Code 125 – QUASOU Quality of sounding measurement

4.Co.11 Replace the wording under 'Expected input' with the following:

2 : depth or least depth unknown.

Replace the wording under 'Definition' with the following:

“the depth from chart datum to the bottom, or the shoalest depth of the feature is unknown.”
(See also [4.Cl.9](#)).

Code 139 – SIGFRQ – Signal frequency

2.Co.6 Add a format statement and example as follows:

Format: xxxxxxxxxxxx

Example: 950000000 For a radio signal centred on 950 MHz

(See also [2.Cl.7](#))

Code 141 – SIGGRP – Signal group

8.Co.7 In order to be consistent with the new table that has been added to the Appendix B1 Annex A Edition 2.1 (UOC), the following examples are to be added:

Light characteristic		SIGGRP indication
AIWR	->	()
Iso	->	(1)
IQ	->	() (See also 8.Cl.6)

8.Co.8 Amend the following 3 example as follows:

Light characteristic		SIGGRP indication
Change AI.LFIWR	->	(2)
to AI.LFIWR	->	(1)
Change FI+LFI(2+3)	->	(1)(2+3)
to LFI+FI(2+3)	->	(1)(2+3)
Change FI(2)+LFI(3)	->	(2)(3)
to FI(2)+LFI	->	(2)(1) (See also 8.Cl.10)

Code 143 – SIGPER - Signal period

7.Co.19 Amend the Minimum Value quoted to “Minimum Value > 0”

Code 143 – SIGSEQ – Signal sequence

5.Co.5 Change the resolution of the “Format” and “Example” to two decimal places to agree with resolution.

Code 147 - SORDAT - Source date

4.Co.12 — Replace the wording under 'Indication' with the following:

— The source date should be encoded using 4 digits for the year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific month and/or day is required/known, indication of the month and/or day is omitted. This conforms to ISO 8601:1988.

— Add the following extra format statements to the "Formats" section:

— CCYYMM (No specific day required — **mandatory**)

— CCYY (No specific month required — **mandatory**)

(See also [4.CL.10](#)).

Code 158 - TXTDSC - Textual description

1.Co.15 Change the remark as follows — "The attribute 'textual description' indicates whether a text file containing text extracted from, for example, relevant pilot books or navigational publications is available." (See also [1.Cl.22](#))

Code 165 - T_TINT – Tide, current – time interval of values

2.Co.7 Add a format statement and example as follows:

Format: xxx

Example: 60 For a time interval of 60 minutes.

(See also [2.Cl.9](#))

Code 175 - VALLMA – Value of local magnetic anomaly

7.Co.21 Change the Indication, Format, and Resolution to:

Indication

Unit	minutes
Resolution	0.1'

Format

xxx.x

Example

120.3 or a deviation of 2 degrees 0.3 minutes.

Code 300 - NINFOM - Information in national language

1.Co.16 Delete the remark - "The textual information could be, for example, a list, a table or a text." (See also [1.Cl.23](#))

8.Co.3 Add the following format statement:

Format: up to 300 characters may be included in this string. (See also [8.Cl.2](#)).

Code 304 - NTXTDS - Textual description in national language

- 1.Co.17 Change the remark as follows -"The attribute 'textual description in national language' indicates whether a text file containing text extracted from, for example, relevant pilot books or navigational publications is available." (See also [1.CI.24](#))

S-57 Appendix B1

ENC Product Specification

1.4 Maintenance *(New section)*

- 1.Co.18 Add the following new section:

"1.4 Maintenance

This product specification will be maintained under the mechanism described in S-57 Part 1 clause 7. Annex A of this document ("Use of the Object Catalogue for ENC") is not covered by this maintenance mechanism but is maintained by means of new editions."
(See also [1.CI.25](#))

1.5 Use of language *(New section)*

- 4.Co.13 Add the following new section:

"1.5 Use of language

Within this document "must" indicates a mandatory requirement." (See also [4.CI.11](#)).

2.1 Navigational Purpose

- 3.Co.5 Replace the existing text with the following:

"ENC data is compiled for a variety of navigational purposes. A navigational purpose is determined by:

- The type of navigation for which it is intended;
- The nature of the area to be covered; and
- The quality of information to be shown".

The navigational purpose for which an individual ENC has been compiled is indicated in the "Data Set Identification" [DSID] field, "Intended Usage" [INTU] subfield and in the name of the data set files. The following codes are used:

Subfield content	Navigational purpose	Definition for intended use
1	Overview	For route planning and oceanic crossing.
2	General	For navigating oceans, approaching coasts and route planning.
3	Coastal	For navigating along the coastline, either inshore or offshore.
4	Approach	Navigating the approaches to ports or major channels or through intricate or congested waters.

5	Harbour	Navigating within ports, harbours, bays, rivers and canals, for anchorages.
6	Berthing	Detailed data to aid berthing.

Table 2.1"

(See also [3.CI.7](#)).

2.2 Cells

1.Co.19 Replace the 4th paragraph with the following :

"Each cell must be completely covered by meta objects of class M_COVR. The areas that contain data must be covered by M_COVR objects with CATCOV = 1. Any other areas that do not contain data must be covered by M_COVR objects with CATCOV = 2." (See also [1.CI.26](#))

1.Co.20 Replace the fifth paragraph with "Point or line feature objects which are at the border of coverage (M_COVR with CATCOV = 1) of cells with the same navigational purpose must be part of only one cell." (See also [1.CI.27](#))

5.Co.6 Replace the fifth paragraph with the following:

"Point or line feature objects which are at the border of coverage (M_COVR with CATCOV = 1) of cells with the same navigation purpose must be part of only one cell". (See also [1.CI.27](#)).

2.3 Topology

4.Co.14 Add the following statement after the existing text:

"If there is a logical topological relationship between objects, coincident linear geometry must not be duplicated". (See also [4.CI.12](#)).

3.4 Meta Objects

8.Co.6 Change the current wording to read:

The maximum use must be made of meta objects to reduce the attribution on individual objects. In a base data set (EN Application profile, see clause 6.3), some meta object classes are mandatory. i.e. M_COVR M_QUAL M_NSYS

Meta objects M_COVR must provide an exhaustive, non overlapping coverage of the whole cell.

Meta objects M_QUAL must cover any part of the cell containing depth data or bathymetry. They must not overlap.

The meta object M_NSYS with the attribute MARSYS (to indicate the system of navigational marks) must also provide an exhaustive non-overlapping coverage of the part of the cell containing data. However, other M_NSYS objects with the attribute ORIENT (to indicate a local direction of buoyage) may overlap these objects. (See also [8.CI.5](#))

3.5.2 Mandatory attributes

1.Co.21 Change the sentence in the 3rd paragraph to read : "The attribute COLPAT is mandatory for any object (except LIGHTS) that has more than one colour." (See also [1.CI.28](#))

- 1.Co.22 In Table 3.2, row BRIDGE, 2nd column, change last line to read : "other case :".
(See also [1.Cl.29](#))
- 1.Co.23 In Table 3.2, row M_ACCY, delete attributes HORACC, SOUACC and VERACC and keep POSACC in the 2nd column as the only attribute. (See also [1.Cl.30](#))
- 2.Co.8 Change the entry for OBSTRN to read:

Object Class		Attributes				
OBSTRN	WATLEV	At least one of:	VALSOU	HEIGHT		

7.Co.24 Insert the following sentence before table 3.2
 'All mandatory attributes for an encoded object must be present in an ENC, however if the value of the mandatory attribute is not known, the attribute must be encoded as a missing attribute value (see clause 3.5.1).'

3.5.3 Prohibited attributes

2.Co.9 The list of prohibited attributes should include the following additions:

AGENCY CPDATE NMDATE PRCTRY \$NTXST \$CHARS
 \$CSIZE \$JUSTH \$JUSTV \$SCALE \$SCODE \$SPACE
 \$TINTS \$TXSTR
 (See also [2.Cl.12](#))

3.5.5 Text attribute values

1.Co.24 Replace the first two sentences with the followings :
 "The lexical level used for the "Feature Record Attribute" [ATTF] field must be 0 (ISO/IEC 646 IRV) or 1 (ISO 8859-1). Lexical level 0, 1 or 2 may be used for the "Feature Record National Attribute" [NATF] field." (See also [1.Cl.31](#))

3.5.6 Hierarchy of meta data

- 1.Co.25 In Table 3.3, 6th row (DSPM & SDAT), delete VERDAT from the last column.
(See also [1.Cl.32](#))
- 4.Co.15 Remove the entries for M_ACCY with HORACC, SOUACC and VERACC from table 3.3.
(See also [4.Cl.13](#)).
- 7.Co.20 In the table 3.3, remove the last row

		M_SREL	TECSOU	TECSOU
--	--	--------	--------	--------

and insert the following after the 20th row in the table. (TSMAD/7/7.2 rev 2)

		M_QUAL	TECSOU	TECSOU
--	--	--------	--------	--------

(See also [7.CI.15](#))

3.8 Geometry

- 1.Co.26 In the first paragraph, change the last sentence to read : "It is recommended that linear features should not be encoded at a point density greater than 0.3 mm at compilation scale." (See also [1.CI.33](#))
- 1.Co.27 In the second paragraph, delete the end of the last sentence to keep only: "If the value in the "Usage Indicator" [USAG] subfield is set to {3} (exterior boundary truncated by the data limit), the MASK subfield must be set to {255} (null)."
- 4.Co.16 Add the following statement at the end of the first paragraph:
- "Linear geometry between two explicit coordinates is defined as a loxodromic line on WGS84. Long lines may need to have additional explicit coordinates to cater for the effects of projection change". (See also [4.CI.14](#)).

3.10 Groups

- 1.Co.28 In the first paragraph, change the last sentence to read : "These are Group 1 (skin of the earth) and Group 2 for all other feature objects." (See also [1.CI.34](#))

3.10.1 Group 1 (skin of the earth)

- 4.Co.17 Add the following statement at the end of the first paragraph:
- "The geometry of coincident boundaries between group 1 objects must not be duplicated." (See also [4.CI.15](#)).

3.11.1 Language

- 2.Co.10 Add the following to the end of the paragraph – "All national language attributes must be encoded in the "Feature Record National Attribute" [NATF] field." (See also [2.CI.13](#))
- 5.Co.8 Change the existing text to:
- The exchange language must be English. Other languages may be used as a supplementary option. In general this means that, when a national language is used in the textual national attributes (NINFOM, NOBJNM, NPLDST), the English translation must also exist in the international attributes (INFORM, OBJNAM, PILDST).
- National geographic names can be left in their original national language in the international attributes (INFORM, OBJNAM, PILDST), or transliterated or transcribed and used in the international attributes (INFORM, OBJNAM, PILDST)". (This change does not supersede 2.Co.10) (See also [5.CI.2](#)).

4.4 Units

- 1.Co.29 Add the following paragraph to this clause :
- "For update cell files (see clause 6.4), the 'Data Set Parameter' [DSPM] field is not included and, therefore, the 'Coordinate Multiplication Factor' [COMF] and the '3-D (Sounding)

Multiplication Factor' [SOMF] will not be present. In this case, the COMF and SOMF values from the original base cell file should be used." (See also [1.CI.35](#))

5.4.1 Content of the exchange set

- 1.Co.30 In the third paragraph, replace the third sentence with the following: 'Text files must contain only general text as defined by this standard (see S-57 Part 3, clause 2.4). Picture files must be in TIF format.'
- 1.Co.31 In the sixth paragraph, change the sentence to read: 'The README file is an optional general text file of general information.'

5.5 Datasets

- 7.Co.3 Add the following new sentence at the end of this section:
"The issue date (the ISDT sub-field of the DSID field) is the date from which the data can be used." (See also [7.CI.1](#))
- 7.Co.23 Add the following new sentence to the end of the section:
"The issue date (the ISDT sub-field of the DSID field) is the date from which the data can be used". (See also [7.CI.2](#))

5.6 File naming

- 1.Co.32 Insert the following new paragraph:
- "All file names in S-57 are restricted to the limits described in ISO 9660, level 1; that is, file names may be composed of the upper case alphanumeric characters A to Z, digits 0 to 9 and the special character _ (underscore). The file name may be up to 8 characters long with an extension of 3 characters. The separator must be the character . (period). Directory names may be up to 8 characters long." (See also [1.CI.37](#))

5.7 Updating

- 4.Co.18 The fourth last paragraph should be changed as follows:
"To inform the mariner that a new edition is available, an update cell file is created, containing only the Data Set Information record with the "Data Set Identifier" [DSID] field. The "Data Set Structure Information" [DSSI] field is not required." (See also [4.CI.16](#) and [7.CI.7](#)).
- 7.Co.4 Amend the last definition to read:
"**issue date** date from which the data can be used." (See also [7.CI.2](#))
- 7.Co.13 Amend the paragraph which begins with "edition number":
"**edition number** when a dataset is initially created, the edition number 1 is assigned to it. The edition number is increased by 1 at each new edition. Where a cell is cancelled and its name is re-used at a later date, the edition number of the new cell must be one higher than the final edition number of the cell that it has replaced. Edition number remains the same for a re-issue."
- 7.Co.14 Amend the last paragraph to:
"The record version of each feature or vector record is indicated in the Record Version

[RVER] subfield of the Feature Record Identifier [FRID] field or the Vector Record Identifier [VRID] field. At each update (ER) of a record, this version number is incremented by 1. For all new cells and new editions, the RVER subfield of each feature or vector record must be reset to 1.”

- 7.Co.30 Amend the fifth last paragraph to read: “In order to delete a data set, an update cell file is created, containing only the Data Set General Information record with the Data Set Identifier [DSID] field. The Edition Number [EDTN] subfield must be set to 0. **The [DSSI] field must not be included in this update message.** This message is only used to cancel a base cell file.” (See also [7.Cl.8](#))

5.9.1 Implementation

- 7.Co.28 The last sentence should be changed to “The CRC values are recorded in ASCII as hexadecimal numbers.” (See also 7.Cl.16)

- 6.3.2.5 **Vector Record Attribute field - ATTV**
- 6.3.2.11 **Feature Record Attribute field - ATTF**
- 6.3.2.12 **Feature Record National Attribute field - NATF**
- 6.4.2.4 **Vector Attribute field - ATTV**
- 6.4.2.12 **Feature Record Attribute field - ATTF**
- 6.4.2.13 **Feature Record National Attribute field - NATF**

- 1.Co.33 In all the clauses above, row ATVL, 'M' is to be inserted in column 'use' and the words 'ASCII value' are to be replaced with 'General text' in column 'comment'.
(See also [1.Cl.39](#))

S-57 Appendix B2

IHO Object Catalogue Data Dictionary Product Specification

1.3 **Maintenance** *(New section)*

- 1.Co.35 Add the following new section:

"1.3 Maintenance

This product specification will be maintained under the mechanism described in S-57 Part 1 clause 7.”

(See also [1.Cl.42](#))

S-57 Maintenance Document
Extensions

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Introduction

This section is maintained by the "Transfer Standard Maintenance and Application Development Working Group" (TSMAD) of the IHO "Committee on Hydrographic Requirements for Information Systems" (CHRIS) and describes new developments or enhancements to the Standard proposed by member nations and approved by the TSMAD WG for inclusion in a next edition. These might include such things as new Object Classes, Attribute Values, Application Profiles, Data Models and so forth.

As mentioned in the Introduction to the MD, each item in this section is assigned a unique identifier, its Extension Number. The change or action associated with the item is then described. Space for comments is included for each item. These comments might include the reason for the change, the office originating the change or other information deemed useful.

S-57 Part 1
General Introduction

No extensions.

S-57 Part 2
Theoretical data model

No extensions.

S-57 Part 3
Data Structure

No extensions.

S-57 Appendix A
Chapter 1 - Object Classes

No extensions.

S-57 Appendix A
Chapter 2 - Attributes

No extensions.

S-57 Appendix B1
ENC Product Specification

No extensions.

S-57 Appendix B2
IHO Object Catalogue Data Dictionary Product Specification

No extensions.
