

**Annex A**

**Data**

**Classification**

**and**

**Encoding Guide**

**Edition 2.0.0 – July 2024**

**S-128**

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# Document History

Changes to this Product Specification are coordinated by the IHO Nautical Information Provision Working Group (NIPWG). New editions will be made available via the IHO web site. Maintenance of the Product Specification shall conform to IHO Technical Resolution 2/2007 (as amended).

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| **Version Number** | **Date** | **Approved By** | **Purpose** |
| 1.0.0 | 11 Mar 2022 | NIPWG | Release 1.0.0 |
| 1.0.0 | May 2022 | HSSC | Initial published version for evaluation and testing. |
| 1.1.0 | Oct 2023 | KHOA | Align with S-100 Ed 5.0.0 evaluation and testing. |
| 1.2.0 | Feb 2024 | KHOA | Revised Data Modeling |
| 2.0.0 | Mar 2024 | KHOA | Updated to align with S-100 Edition 5.2.0 and Applied feedback from NIPWG |
| 2.0.0 | July 2024 | KHOA | Applied feedback from NIPWG |
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# Overview

## Preface

The “Data Classification and Encoding Guide” has been developed to provide consistent, standardized instructions for encoding S-100 compliant Catalogue of Nautical Products (S-128) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-128 encoding to meet IHO standards for the proper display of Catalogue of Nautical Products information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to a Catalogue of Nautical data product. The content of a dataset is at the discretion of the producing authority provided that the conventions described within this document are followed. A “producing authority” is a Hydrographic Office (HO) or other organization authorized by a government, to produce definitive nautical information.

The entire S-100 Universal Hydrographic Data Model, including the S-128 Product Specification, is available at the following web site, [http://www.iho.int.](http://www.iho.int/)

## S-128 Annex A - Data Classification and Encoding Guide - Metadata

Note: This information uniquely identifies this Annex to the Product Specification and provides information about its creation and maintenance.

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**Identifier:** S-128 Annex A

**Maintenance:** Changes to S-128 Annex A - Data Classification and Encoding Guide are coordinated by the IHO Nautical Information Provision Working Group (NIPWG) and must be made available via the IHO web site.

## Terms, definitions and abbreviations

### Terms and definitions

**aggregation**

special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component (see composition)

**association**

semantic relationship between two or more classifiers that specifies connections among their instances

NOTE: A binary association is an association among exactly two classifiers (including the possibility of an association from a classifier to itself)

**attribute**

named property of an entity

NOTE: Describes the geometrical, topological, thematic, or other characteristic of an entity

**composition**

a strong **aggregation**; if a container object is deleted than all of its containee objects are deleted as well (that is, containee objects cannot exist without the container object)

**curve**

1-dimensional **geometric primitive**, representing the continuous image of a line

NOTE: The **boundary** of a **curve** is the **set** of **points** at either end of the **curve**. If the **curve** is a cycle, the two ends are identical, and the **curve** (if topologically closed) is considered to not have a boundary. The first **point** is called the **start point**, and the last is the **end point**. Connectivity of the curve is guaranteed by the “continuous image of a line”

**enumeration**

A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list (source: ISO 19136:2007, *Geographic information — Geography Markup Language (GML)*)

**feature**

Abstraction of real world phenomena

NOTE: A feature may occur as a type or an instance. The terms “feature type” or “feature instance” should be used when only one is meant

EXAMPLE: The feature instance named “Eiffel Tower” may be classified with other phenomena into a feature type “tower”

**geometric primitive**

geometric object representing a single, connected, homogeneous element of geometry

NOTE: Geometric primitives are non-decomposed objects that present information about geometric configuration. They include **points**, **curves**, **surfaces**

**maximum display scale**

the largest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (largest scale) of the scale range of the dataset

**minimum display scale**

the smallest value of the ratio of the linear dimensions of features of a dataset presented in the display and the actual dimensions of the features represented (smallest scale) of the scale range of the dataset

**point**

0-dimensional geometric primitive, representing a position NOTE: The **boundary** of a point is the empty set

**pointset**

definition required

**skin of the earth**

a subset of the geographic (geo) features that must create a complete non-overlapping coverage of the area of data coverage of an ENC dataset

**surface**

connected 2-dimensional geometric primitive, representing the continuous image of a region of a plane

NOTE: The boundary of a surface is the set of oriented, closed **curves** that delineate the limits of the surface

### Abbreviations

ECDIS Electronic Chart Display and Information System ENC Electronic Navigational Chart

GML Geography Markup Language

HO Hydrographic Office

IHO International Hydrographic Organization IMO International Maritime Organization

ISO International Organization for Standardization SENC System Electronic Navigational Chart

SOLAS Safety of Life at Sea

## Use of language

Within this document:

“Must” indicates a mandatory requirement;

“Should” indicates an optional requirement, that is the recommended process to be followed, but is not mandatory;

“May” means “allowed to” or “could possibly”, and is not mandatory.

## Maintenance

Changes to the Data Classification and Encoding Guide must occur in accordance with the S-128 CNP Product Specification.

# General

The S-128 Data Classification and Encoding Guide describes how data describing the real world should be captured using the types defined in the S-128 Feature Catalogue. It provides the encoding rules and guidance required to create S-128 CNPs. Within the model these sets of characteristics are defined in terms of feature, spatial and information types. A type is defined as a stereotype of class that is used to specify a domain of instances (objects) together with the operations applicable to the objects. A type may have attributes and may be related to other types.

The types used within S-128 are described below. Within this document feature types, information types, associations and attributes appear in **bold** text.

## Feature types

Feature types contain descriptive attributes and do not contain any geometry (that is, information about the shape and position of a real world entity).

Features have two aspects – feature type and feature instance. A feature type is a class and is defined in a Feature Catalogue. A feature instance is a single occurrence of the feature type and represented as an object in a dataset. A feature instance is located by a relationship to one or more spatial instances. A feature instance may exist without referencing a spatial instance.

S-128 makes use of the following feature types:

**Geographic (Geo) feature type** – carries the descriptive characteristics of a real world entity.

**Aggregated feature type** – a relationship between two or more feature types where the aggregation feature is made up of component features.

**Cartographic feature type** – contains information about the cartographic representation (including text) of real world entities.

**Meta feature type** – contains information about other features.

## Geometric primitives

The allowable geometric primitive for each feature type is defined in the Feature Catalogue. Within this document, allowable primitives are included in the tables containing a description of each feature type. Allowable geometric primitives are point, pointset, curve and surface.

Each spatial value must be referenced by at least one feature instance.

Within this document, allowable primitives are included in the description of each feature type. It is recommended that curves and surface boundaries should not be encoded at a point density greater than 0.3mm at the maximum display scale for the ENC data.

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84. Long lines may need to have additional coordinates inserted to cater for the effects of projection change.

The presentation of line styles may be affected by curve length. Therefore, the encoder must be aware that splitting a curve into numerous small curves may result in poor symbolization.

## Information types

An information type is an identifiable object that can be associated with features in order to carry information particular to the associated features. An example of the use of an information type may be the requirement to include a note about overhead cables. Information types can also be associated with other information types. This may be done where there is further supplementary information that is relevant to the information type. Information types carry attributes but not geometry.

## Attributes

Attributes may be simple type or complex type. Complex (C) attributes are aggregates of other attributes that can be simple type or complex type. Simple attributes are assigned to one of 11 types.

The binding of attributes to feature types, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity is defined in the Feature Catalogue. Within this document, the allowable attributes are included in the description of each feature type, as well as the allowable values for enumeration type attributes.

### Multiplicity

In order to control the number of allowed attribute values or sub-attribute instances within a complex attribute, S-100 uses the concept of multiplicity. This defines lower and upper limits for the number of values, whether the order of the instances has meaning and if an attribute is mandatory or not. Common examples are shown in the table below:

Format : *MinOccurs*, *MaxOccurs* (if \* Infinite) *(ordered)* – sequential

Table 2‑1 Multiplicity of attributes

|  |  |
| --- | --- |
| **Multiplicity** | **Explanation** |
| 0,1 | An instance is not required; there can be only one instance. |
| 1,1 | An instance is required and there must only be one instance. |
| 0,\* | An instance is not required and there can be an infinite number of instances. |
| 1,\* | An instance is required and there can be an infinite number of instances. |
| 1,\* (ordered) | An instance is required and there can be an infinite number of instances, the order of which has a specific meaning. |
| 2,2 | Two instances are required and no more than two. |

### Simple attribute types

Each simple attribute is assigned to one of 11 types:

EN Enumeration: A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list.

BO Boolean: A value representing binary logic. The value can be either *True* or *False*. The default state for Boolean type attributes (that is, where the attribute is not populated for the feature) is *False*.

RE Real: A signed Real (floating point) number consisting of a mantissa and an exponent. The representation of a real is encapsulation and usage dependent.

Examples: 23.501, -0.0001234, -23.0, 3.141296

IN Integer: A signed integer number. The representation of an integer is encapsulation and usage dependent.

Examples: 29, -65547

TE Free text: A CharacterString, that is an arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets.

TD Truncated Date: A truncated date allows a partial date to be encoded as an extension to the ISO 8601 compliant date attribute type values for year, month and day according to the Gregorian Calendar. Character encoding of a date is a string which follows the calendar date format (complete representation, basic format) for date specified by ISO 8601:2004.

Example: 19980918 (YYYYMMDD)

TI Time: A time is given by an hour, minute and second. Character encoding of a time is a string that follows the local time (complete representation, basic format) format defined in ISO 8601:2004.

Time zone according to UTC is optional. Example: 183059 or 183059+0100 or 183059Z

The complete representation of the time of 27 minutes and 46 seconds past 15 hours locally in Geneva (in winter one hour ahead of UTC), and in New York (in winter five hours behind UTC), together with the indication of the difference between the time scale of local time and UTC, are used as examples.

Geneva*:* 152746+0100

New York: 152746-0500

DA Date: A date provides values for year, month and day according to the Gregorian Calendar.  
Example (XML/GML): 1998-09-18 (YYYY-MM-DD)

DT Date and Time: A DateTime is a combination of a date and a time type. Character encoding of a DateTime shall follow ISO 8601:2004 (see TD and TI above and clause 2.4.1).

Example: 19850412T101530

UR URL: A uniform resource locator (URL) is a URI that provides a means of locating the resource by describing its primary access mechanism (RFC 3986).   
EXAMPLE http://registry.iho.int

UN URN: A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141.   
EXAMPLE urn:mrn:iho:s127:1:0:0:RouteingMeasure

Real or integer attribute values must not be padded by non-significant zeroes. For example, for a signal period of 2.5 seconds, the value populated for the attribute **signal period** must be 2.5 and not 02.50.

### Mandatory and conditional attributes

Some attributes are mandatory and must be populated for a given feature type. There are some reasons why attribute values may be considered mandatory:

* + - * They are fundamental to the definition of a feature;
      * They are required to support correct portrayal of a feature instance;
      * Certain features make no logical sense without specific attributes;
      * Some attributes are required for safety of navigation.

Within this document, mandatory attributes (multiplicity 1,1; 1,n (n>1); or 1,\*) are identified in the description of each feature type.

### Missing attribute values

Where a value of a mandatory attribute is not known, the attribute must be populated with an empty (null) value. Where the value of a non-mandatory attribute is not known, the attribute should not be included in the dataset. In a base dataset, when an attribute code is present but the attribute value is missing, it means that the producer wishes to indicate that this attribute value is unknown.

In an Update dataset, when an attribute code is present but the attribute value is missing it means:

* + - * That the value of this attribute is to be replaced by an empty (null) value if it was present in the original dataset; or
      * That an empty (null) value is to be inserted if the attribute was not present in the original dataset.

### Textual information

The complex attribute **information** contains information as text using the sub-attribute **text**, or the name of an external file using the sub-attribute **file reference**.

Character strings contained in **information** sub-attribute **text** must be UTF-8 character encoding. **Information** should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give more detailed information about a feature. Text populated in **text** must not exceed 300 characters.

The exchange language for textual information should be English, therefore it is not required to populate the sub-attribute **language** for an English version of textual information. Languages other than English may be used as a supplementary option, for which **language** must be populated with an appropriate value to indicate the language. Generally this means, when a national language is used in the textual attributes, the English translation must also exist.

# Geo Features

## Catalogue Element

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Catalogue of element | | | | | | |
| **S-128 Geo Feature: CatalogueElement** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Agency Responsible For Production | |  |  | | TE | 0, 1 |
| Catalogue Element Classification | |  | 1 : ENC  2 : Bathymetric Chart  3 : Water Level Product  4 : Surface Current Product  5 : MSI Service  6 : AtoN Information  7 : Catalogue Service  8 : Routing Service  9 : Ice Information  10 : Routing Information  11 : Special Purpose Chart  12 : Nautical Publication  13 : Printed nautical chart | | EN | 1, \* |
| Catalogue Element Identifier | |  |  | | UN | 0, 1 |
| Classification | |  |  | | TE | 0, 1 |
| IMO Maritime Service | |  | 1 : Vessel traffic service  2 : Aids to navigation service  3 : Reserved for future use  4 : Port support service  5 : Maritime safety information service  6 : Pilotage service  7 : Tug service  8 : Vessel shore reporting  9 : Telemedical assistance service  10 : Maritime assistance service  11 : Nautical chart service  12 : Nautical publications service  13 : Ice navigation service  14 : Meteorological information service  15 : Real-time hydrographic and environmental information services  16 : Search and rescue service | | EN | 0, \* |
| Not For Navigation | |  |  | | BO | 1, 1 |
| Feature Name | |  |  | | C | 0, \* |
| Language | |  |  | | (S) TE | 1, 1 |
| Name | |  |  | | (S) TE | 1, 1 |
| Name Usage | |  | 1 : default name display  2 : alternate name display  3 : no chart display | | (S) EN | 0, 1 |
| Information | |  |  | | C | 0, \* |
| File Locator | |  |  | | (S) TE | 0, 1 |
| File Reference | |  |  | | (S) TE | 0, 1 |
| Headline | |  |  | | (S) TE | 0, 1 |
| Language | |  |  | | (S) TE | 0, 1 |
| Text | |  |  | | (S) TE | 0, \* |
| Online Resource | |  |  | | (S) C | 0, 1 |
| Application Profile | |  |  | | (S) TE | 0, 1 |
| Linkage | |  |  | | (S) TE | 1, 1 |
| Name Of Resource | |  |  | | (S) TE | 0, 1 |
| Online Description | |  |  | | (S) TE | 0, 1 |
| Protocol | |  |  | | (S) TE | 0, 1 |
| Protocol Request | |  |  | | (S) TE | 0, 1 |
| Source Indication | |  |  | | C | 0, 1 |
| Category Of Authority | |  | 2 : border control  3 : police  4 : port  5 : immigration  6 : health  7 : coast guard  8 : agricultural  9 : military  10 : private company  11 : maritime police  12 : environmental  13 : fishery  14 : finance  15 : maritime  16 : customs  17 : hydrographic office  18 : RENC  19 : VARs | | (S) EN | 0, 1 |
| Country Name | |  |  | | (S) TE | 0, 1 |
| Reported Date | | (SORDAT) |  | | (S)TD | 0, 1 |
| Source | |  |  | | (S) TE | 0, 1 |
| Source Type | |  | 1 : law or regulation 2 : official publication 7 : mariner report, confirmed   1. : mariner report, not confirmed 2. : industry publications and reports 3. : remotely sensed images 4. : photographs 5. : products issued by HO service 6. : news media   14 : traffic data  15 : maritime | | (S) EN | 0, 1 |
| Feature Name | |  |  | | (S) C | 0, \* |
| Language | |  |  | | (S) TE | 1, 1 |
| Name | |  |  | | (S) TE | 1, 1 |
| Name Usage | |  | 1 : default name display  2 : alternate name display  3 : no chart display | | (S) EN | 0, 1 |
| Support File | |  |  | | (S) C | 0, \* |
| Comment | |  |  | | (S) TE | 0, 1 |
| Digital Signature Reference | |  | 8 : ECDSA-384-SHA2 | | (S) EN | 1, 1 |
| Digital Signature Value | |  |  | | (S) TE | 0, 1 |
| Edition Number | |  |  | | (S) TE | 0, 1 |
| File Locator | |  |  | | (S) TE | 1, 1 |
| File Name | |  |  | | (S) TE | 1, 1 |
| Issue Date | |  |  | | (S) DA | 0, 1 |
| Other Data Type Description | |  |  | | (S) TE | 0, 1 |
| Support File Format | |  | 1 : ASCII  2 : JPEG2000  3 : HTML  4 : XML  5 : XSLT  6 : VIDEO  7 : TIFF  8 : PDF/A or U/A  9 : LUA  100 :other | | (S) EN | 1, 1 |
| Support File Purpose | |  | 1. : new   2 : replacement  3 : deletion | | (S) EN | 1, 1 |
| Default Locale | |  |  | | (S) C | 1, 1 |
| Character Encoding | |  |  | | (S)TE | 1, 1 |
| Country Name | |  |  | | (S)TE | 1, 1 |
| Language | |  |  | | (S)TE | 0, 1 |
| Support File Specification | |  |  | | (S) C | 1, 1 |
| Date | |  |  | | (S)DA | 1, 1 |
| Name | |  |  | | (S)TE | 1, 1 |
| Version | |  |  | | (S)TE | 1, 1 |
| Time Interval Of Product | |  |  | | C | 0, 1 |
| Expiration Date | |  |  | | DA | 0, 1 |
| Issue Date | |  |  | | DA | 1, 1 |
| Issuance Cycle | |  |  | | (S) C | 0, 1 |
| Periodic Date Range | |  |  | | (S) C | 0, 1 |
| Date End | | (SORDAT) |  | | (S) TD | 1, 1 |
| Date Start | | (SORDAT) |  | | (S) TD | 1, 1 |
| Time Interval Of Cycle | |  |  | | (S) C | 0, 1 |
| Type Of Time Interval Unit | |  | 1 : hour  2 : day  3 : month  4 : year | | (S) EN | 1, \* |
| Value Of Time | |  |  | | (S) IN | 1, 1 |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | |
| **Class** | **Role** | **Mult** | **Class** | **Role** | **Mult** |
| Assoc iation | ProductMapping | **CatalogueEle ments** | theSource | 1 | **CatalogueEle ments** | theRequirement | 0, \* |

## Navigational Product

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Navigation product | | | | | | |
| **NavigationalProduct** | | | | | | |
|  | | | | | | |
|  | | | | | | |
|  |  | | |  | | |
|  | |  |  | |  |  |
| Approximate Grid Resolution | |  |  | | RE | 0, \* |
|  | |  |  | | IN | 0, \* |
|  | |  |  | |  | 0, 1 |
| Edition Number | |  |  | | IN | 0, 1 |
| Maximum Display Scale | |  |  | | IN | 0, 1 |
| Minimum Display Scale | |  |  | | IN | 0, 1 |
| Navigation Purpose | |  | 1. : port 2. : transit 3. : overwiew | | EN | 0, 3 |
| Optimum Display Scale | |  |  | | IN | 0, 1 |
| Produc | |  |  | |  |  |
|  | |  |  | | UN |  |
| Product Number | |  |  | | TE | 0, 1 |
|  | |  | 1. Navigational Purpose Overview 2. Navigational Purpose General 3. Navigational Purpose Coastal 4. Navigational Purpose Approach 5. Navigational Purpose Harbour 6. Navigational Purpose Berthing | |  |  |
| Update Date | |  |  | | DA | 0, 1 |
| Update Number | |  |  | | IN | 0, 1 |
| Horizontal Datum Epsg | |  | 3395 : EPSG3395 (World Mercator)  3857 : EPSG3857 (Pseudo-Mercator)  4326 : EPSG4326 (WGS84) | | EN | 0, 1 |
| Vertical Datum | |  | 1: Mean Low Water Springs 2: Mean Lower Low Water Springs 3: Mean Sea Level 4: Lowest Low Water 5: Mean Low Water 6: Lowest Low Water Springs 7: Approximate Mean Low Water Springs 8: Indian Spring Low Water 9: Low Water Springs 10: Approximate Lowest Astronomical Tide 11: Nearly Lowest Low Water 12: Mean Lower Low Water 13: Low Water 14: Approximate Mean Low Water 15: Approximate Mean Lower Low Water 16: Mean High Water 17: Mean High Water Springs 18: High Water 19: Approximate Mean Sea Level 20: High Water Springs 21: Mean Higher High Water 22: Equinoctial Spring Low Water 23: Lowest Astronomical Tide 24: Local Datum 25: International Great Lakes Datum 1985 26: Mean Water Level 27: Lower Low Water Large Tide 28: Higher High Water Large Tide 29: Nearly Highest High Water 30: Highest Astronomical Tide 31: Local Low Water Reference Level 32: Local High Water Reference Level 33: Local Mean Water Reference Level 34: Equivalent Height of Water (German GlW) 35: Highest Shipping Height of Water (German HSW) 36: Reference Low Water Level According to Danube Commission 37: Highest Shipping Height of Water According to Danube Commission 38: Dutch River Low Water Reference Level (OLR) 39: Russian Project Water Level 40: Russian Normal Backwater Level 41: Ohio River Datum 43: Dutch High Water Reference Level 44: Baltic Sea Chart Datum 2000 45: Dutch Estuary Low Water Reference Level (OLW) 46: International Great Lakes Datum 2020  47: Sea Floor  48: Sea Surface  49: Hydrographic Zero | | EN | 0, 1 |
|  | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | |
| **Class** | **Role** | **Mult** | **Class** | **Role** | **Mult** |
| Assoc iation | Correlated | **NavigationalProduct** | theMain | 0, \* | **NavigationalProduct** | thePanel | 0, \* |



## 

## Electronic Product

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Electronic navigation product | | | | | | |
| **S-128 Geo Feature: ElectronicProduct** | | | | | | |
| **Super Type: NavigationalProduct** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Compression Flag | |  |  | | BO | 0, 1 |
| Dataset Name | |  |  | | TE | 0, 1 |
| Issue Date | |  |  | | DA | 1, 1 |
| Issue Time | |  |  | | DA | 0, 1 |
| Type Of Product Format | |  | 1 : GML  2 : ISO/IEC 8211  3 : PDF  4 : HTML  5 : ePub  6 : paper  7 : HDF-5  8 : BSB  9 : GeoTiff  10 : Application  11 : XML  12 : PNG | | EN | 1, 1 |
| Product Specification | |  |  | | C | 0, 1 |
| Date | |  |  | | (S) DA | 1, 1 |
| ISSN | |  |  | | (S) TE | 0, 1 |
| Name | |  |  | | (S) TE | 1, 1 |
| Version | |  |  | | (S) TE | 1, 1 |
| INT 1 Reference:  Remarks:  Issue Date in S-57 and S-101 ENCs defines the date when the ENC cell edition was issued. The issue date must be greater than the previous issue date of the dataset.  Distinction: | |  |  | |  |  |
|  | | | | | | |



## Physical Product

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Paper navigation product | | | | | | |
| **S-128 Geo Feature: PhysicalProduct** | | | | | | |
| **Super Type: NavigationalProduct** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Edition Date | |  |  | | DA | 1, 1 |
| ISBN | |  |  | | TE | 0, 1 |
| Publication Number | |  |  | | TE | 0 ,1 |
| Reference To NM | |  |  | | C | 0, 1 |
| Publication Date | |  |  | | DA | 1, 1 |
| Week Of Year | |  |  | | (S) C | 0, 1 |
| Week Number | |  |  | | (S) IN | 1, 1 |
| Year Number | |  |  | | (S) IN | 1, 1 |
| Type Of Paper | |  |  | | TE | 0, 1 |
| Print Information | |  |  | | C | 0, 1 |
| Print Agency | |  |  | | (S) TE | 0, 1 |
| Print Nation | |  |  | | (S) TE | 0, 1 |
| Re Print Edition | |  |  | | (S) TE | 0, 1 |
| Re Print Nation | |  |  | | (S) TE | 0, 1 |
| Print Size | |  |  | | (S) C | 1, 1 |
| ISO216 | |  | 1 : A0  2 : A1  3 : A2  4 : A3  5 : A4  6 : A5  7 : A6  8 : A7 | | (S) EN | 0, 1 |
| Custom Paper Size | |  |  | | (S) C | 0, 1 |
| x | |  |  | | (S) IN | 1, 1 |
| y | |  |  | | (S) IN | 1, 1 |
|  | | | | | | |







## S100 Service

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: S-100-based non-navigation product. | | | | | | |
| **S-128 Geo Feature: S100 Service** | | | | | | |
| **Super Type: CatalogueElement** | | | | | | |
| **Primitives: surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Compression Flag | |  |  | | BO | 0, 1 |
| Service Name | |  |  | | TE | 0, 1 |
| Service Status | |  | 1. : provisional 2. : released 3. : deprecated 4. : deleted | | EN | 0, 1 |
| Type Of Product Format | |  | 1 : GML  2 : ISO/IEC 8211  3 : PDF  4 : HTML  5 : ePub  6 : paper  7 : HDF-5  8 : BSB  9 : GeoTiff  10 : Application  11 : XML  12 : PNG | | EN | 1, 1 |
| Product Specification | |  |  | | C | 0, 1 |
| Date | |  |  | | (S) DA | 1, 1 |
| ISSN | |  |  | | (S) TE | 0, 1 |
| Name | |  |  | | (S) TE | 1, 1 |
| Version | |  |  | | (S) TE | 1, 1 |
| Service Specification | |  |  | | C | 0, 1 |
| Date | |  |  | | (S) DA | 1, 1 |
| Name | |  |  | | (S) TE | 1, 1 |
| Version | |  |  | | (S) TE | 1, 1 |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | |







# Information types

## 4.1 Catalogue Section Header

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Catalogue section header | | | | | | | | | | | | | |
| **S-128 Information Type: CatalogueSectionHeader** | | | | | | | | | | | | | |
| **Super Type:** | | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | | | | |
| **S-128 Attribute** | | | | **S-57**  **Acronym** | | **Allowable Encoding Value** | | | | **Type** | | **Multiplicity** | |
| Catalogue Section Number | | | |  | |  | | | | IN | | 1, 1 | |
| Catalogue Section Title | | | |  | |  | | | | TE | | 0, 1 | |
| Information | | | |  | |  | | | | C | | 0, 1 | |
| File Locator | | | |  | |  | | | | (S)TE | | 0, 1 | |
| File Reference | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Headline | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Language | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Text | | | |  | |  | | | | (S)TE | | 0, \* | |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | | | | | | | | |
| **Feature/Information associations** | | | | | | | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | | | | | | | |
| **Class** | | | **Role** | | **Mult** | | **Class** | | **Role** | | **Mult** |
| Assoc iation | Product Package | **CatalogueEle ments** | | | theCatalogue Elements | | 1 | | **CatalogueSectionHeader** | | elementContainer | | 1, \* |

## 4.2 Contact Details

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. | | | | | | | | | | | | | |
| **S-128 Information Type: ContactDetails** | | | | | | | | | | | | | |
| **Super Type:** | | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | | | | |
| **S-128 Attribute** | | | | **S-57**  **Acronym** | | **Allowable Encoding Value** | | | | **Type** | | **Multiplicity** | |
| Contact Address | | | |  | |  | | | | C | | 0, \* | |
| Administrative Division | | | |  | |  | | | | (S) TE | | 0, 1 | |
| City Name | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Country Name | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Delivery Point | | | |  | |  | | | | (S) TE | | 0, \* | |
| Postal Code | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Information | | | |  | |  | | | | C | | 0, \* | |
| File Locator | | | |  | |  | | | | (S) TE | | 0, 1 | |
| File Reference | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Headline | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Language | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Text | | | |  | |  | | | | (S) TE | | 0, \* | |
| Online Resource | | | |  | |  | | | | C | | 0, \* | |
| Application Profile | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Linkage | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name Of Resource | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Online Description | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Protocol | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Protocol Request | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Source Indication | | | |  | |  | | | | C | | 0, \* | |
| Category of Authority | | | |  | | 1. : border control 2. : police 3. : port 4. : immigration 5. : health 6. : coast guard 8 : agricultural 7. : military 8. : private company 11 : maritime police 12 : environmental 9. : fishery 10. : finance 11. : maritime 12. : customs 13. : hydrographic office 14. : RENC   19 : VARs | | | | (S) EN | | 1, \* | |
| Country Name | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Reported Date | | | | (SORDAT) | |  | | | | (S) TD | | 1, 1 | |
| Source | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Source Type | | | |  | | 1 : law or regulation 2 : official publication 7 : mariner report, confirmed   1. : mariner report, not confirmed 2. : industry publications and reports 3. : remotely sensed images 4. : photographs 5. : products issued by HO service 6. : news media 14 : traffic data 15 : maritime | | | | (S) EN | | 1, 1 | |
| Feature Name | | | |  | |  | | | | (S) C | | 0, \* | |
| Language | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name Usage | | | |  | | 1 : default name display  2 : alternate name display  3 : no chart display | | | | (S) EN | | 0, 1 | |
| Telecommunications | | | |  | |  | | | | C | | 0, \* | |
| Contact Instructions | | | |  | |  | | | | (S) TE | | 0, \* | |
| Telecommunication Identifier | | | |  | |  | | | | (S) TE | | 0, \* | |
| Telecommunication Service | | | |  | | 1. : voice 2. : facsimile 3. : sms 4. : data 5. : streamed data 6 : telex 6. : telegraph 7. : email | | | | (S) EN | | 0, \* | |
| Contact Instructions | | | |  | |  | | | | TE | | 1, 1 | |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | | | | | | | | |
| **Feature/Information associations** | | | | | | | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | | | | | | | |
| **Class** | | | **Role** | | **Mult** | | **Class** | | **Role** | | **Mult** |
| Assoc iation | ProducerContact | **theProducer** | | | theProducer | | 0,1 | | **ContactDetails** | | theContactDetails | | 0,\* |
| Assoc iation | Distributor Contact | **DistributorInformation** | | | theDistributor | | 0, 1 | | **ContactDetails** | | theContactDetails | | 0, \* |

## 4.3 Indication Of Carriage Requirement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: requirements for transportation | | | | | | |
| **S-128 Information Type: IndicationOfCarriageRequirement** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives: None** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Domestic Carriage Requirements | |  |  | | TE | 0, 1 |
| International Carriage Requirements | |  |  | | TE | 0, 1 |
| INT 1 Reference:  Remarks:  This will be improved in S-128 PS Package v1.21.  Distinction: | | | | | | |

## 4.4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  | | | | | | | | | | | | | |
|  | | |  | | | | |  | | | | | |
|  | | | |  | |  | | | |  | |  | |
| Information | | | |  | |  | | | | C | | 0, 1 | |
| File Locator | | | |  | |  | | | | (S)TE | | 0, 1 | |
| File Reference | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Headline | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Language | | | |  | |  | | | | (S)TE | | 0, 1 | |
| Text | | | |  | |  | | | | (S)TE | | 0, \* | |
| Online Resource | | | |  | |  | | | | C | | 0, \* | |
| Application Profile | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Linkage | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name Of Resource | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Online Description | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Protocol | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Protocol Request | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Pricing | | | |  | |  | | | |  | | 0, \* | |
|  | | | |  | |  | | | |  | | 0 | |
|  | | | |  | |  | | | |  | |  | |
|  | | | |  | |  | | | |  | |  | |
| Source Indication | | | |  | |  | | | | C | | 0, \* | |
| Category Of Authority | | | |  | | 2 : border control  3 : police  4 : port  5 : immigration  6 : health  7 : coast guard  8 : agricultural  9 : military  10 : private company  11 : maritime police  12 : environmental  13 : fishery  14 : finance  15 : maritime  16 : customs  17 : hydrographic office  18 : RENC 19 : VARs | | | | (S) EN | | 0, 1 | |
| Country Name | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Reported Date | | | | (SORDAT) | |  | | | | (S)TD | | 0, 1 | |
| Source | | | |  | |  | | | | (S) TE | | 0, 1 | |
| Source Type | | | |  | | 1: law or regulation  2 : official publication  7 : mariner report,  confirmed  8 : mariner report, not  confirmed  9 : industry publications  and reports  10 : remotely sensed  images 11 : photographs  12 : products issued by  HO service  13 : news media  14 : traffic data 15 : maritime | | | | (S) EN | | 0, 1 | |
| Feature Name | | | |  | |  | | | | (S) C | | 0, \* | |
| Language | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name | | | |  | |  | | | | (S) TE | | 1, 1 | |
| Name Usage | | | |  | | 1 : default name display  2 : alternate name display  3 : no chart display | | | | (S) EN | | 0, 1 | |
|  | | | | | | | | | | | | | |
| **Feature/Information associations** | | | | | | | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | | | | | | | |
| **Class** | | | **Role** | | **Mult** | | **Class** | | **Role** | | **Mult** |
| Assoc iation | PriceOfElement | **CatalogueEle ment** | | | theCatalogueElement | | 0, 1 | | **PriceInformation** | | thePriceInformation | | 0, \* |
| Assoc iation | PriceOfNauticalProduct | **CatalogueSectionHeader** | | | theCatalogueOfNauticalProduct | | 0, \* | | **PriceInformation** | | thePriceInformation | | 0,\* |



## 4.5 Producer Information

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Information about the country of production. | | | | | | | | | | | | | |
| **S-128 Information Type: ProducerInformation** | | | | | | | | | | | | | |
| **Super Type:** | | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | | | | |
| **S-128 Attribute** | | | | **S-57**  **Acronym** | | **Allowable Encoding Value** | | | | **Type** | | **Multiplicity** | |
| Agency Name | | | |  | |  | | | | TE | | 0, 1 | |
| Agency Responsible For Production | | | |  | |  | | | | TE | | 1, 1 | |
| INT 1 Reference:  Remarks:  The purpose of having separate attributes for *agencyName* and *agencyResponsibleForProduction* is to distinguish between the organization responsible for the S-128 dataset’s content (*agencyResponsibleForProduction*) and the organization that actually carries out the production process (*agencyName*). This separation allow flexibility in cases where the producing agency acts on behalf of another responsible body, ensuring that both roles are clearly identified.  Distinction: | | | | | | | | | | | | | |
| **Feature/Information associations** | | | | | | | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | | | | | | | |
| **Class** | | | **Role** | | **Mult** | | **Class** | | **Role** | | **Mult** |
| Assoc iation | ProductionDetails | **CatalogueSectionHeader** | | | catalogueHeader | | 0, \* | | **Producer Information** | | theProducer | | 0,1 |

## 4.6 Distributor Information

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: Distributor information | | | | | | |
| **S-128 Geo Feature: Distributor Information** | | | | | | |
| **Super Type:** | | | | | | |
| **Primitives:** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-128 Attribute** | | **S-57**  **Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Distributor Name | |  |  | | TE | 1, 1 |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature/Information associations** | | | | | | | |
| **Type** | **Association Name** | **Association Ends** | | | | | |
| **Class** | **Role** | **Mult** | **Class** | **Role** | **Mult** |
| Assoc iation | DistributionDetails | **CatalogueSectionHeader** | catalogueHeader | 1, 1 | **DistributorInformation** | theDistributor | 0, \* |







# Association Names



## Carriage Requirement

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: carriage requirement  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Element | **Catalogue Element** | 1, \* |
| The Requirement | **Indication Of Carriage Requirement** | 0, \* |

## Distribution Details

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact information of nautical product suppliers.  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Catalogue Header | **Catalogue Section Header** | 1, 1 |
| The Distributor | **Distributor Information** | 0, \* |

## Distributor Contact

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact information of distributor  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Distributor | **Distributor Information** | 1, 1 |
| The Contact Details | **Contact Details** | 0, \* |

## Product Mapping

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: mapping information between S-100 products and existing publications.  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Source | **Catalogue Element** | 1, 1 |
| The Reference | **Catalogue Element** | 0, \* |

## Price Of Element

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: price of element  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Catalogue Element | **Catalogue Element** | 0, 1 |
| The Price Information | **Price Information** | 0, \* |

## Price Of Nautical Product

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: The price of nautical product. Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Catalogue Of Nautical Product | **Catalogue Section Header** | 1, 1 |
| The Price Information | **Price Information** | 0, \* |

## Producer Contact

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact information of producer  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Producer | **Producer Information** | 1, 1 |
| The Contact Details | **Contact Details** | 0, \* |

## Production Details

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Contact information of nautical product publishing organizations.  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | Catalogue Header | **Catalogue Section Header** | 1, 1 |
| The Producer | **Producer Information** | 0, 1 |

## Product Package

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: Package of the various substances which are transported, stored or exploited. Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | The Catalogue Element | **Catalogue Element** | 1, 1 |
| Element Container | **Catalogue Section Header** | 1, \* |

## Correlated

|  |  |  |  |
| --- | --- | --- | --- |
| IHO Definition: A mutual relationship or connection, in which one thing affects or depends on another.  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Associated With** | **Multiplicity** |
| Association | TheMain | **Navigational Product** | 0, \* |
| ThePanel | **Navigational Product** | 0, \* |



# Association Roles

## Catalogue Header

|  |
| --- |
| IHO Definition: The top section of a catalogue. |

## 

|  |
| --- |
| IHO Definition: Container of element. |

## The Catalogue of Element

|  |
| --- |
| IHO Definition: Catalogue of Elements. |

## The Catalogue of Nautical Product

|  |
| --- |
| IHO Definition: Types of nautical products. |

## The Contact Details

|  |
| --- |
| IHO Definition: Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. |

## The Distributor

|  |
| --- |
| IHO Definition: One that distributes. |

## The Element

|  |
| --- |
| IHO Definition: A component or part within the context of maritime information and charts. |

## The Price Information

|  |
| --- |
| IHO Definition: Information of price. |

## The Producer

|  |
| --- |
| IHO Definition: Information about the producer or creator of chart. |

## The Reference

|  |
| --- |
| IHO Definition: Indicates supporting material or information related to a specific element or data. |

## The Requirement

|  |
| --- |
| IHO Definition: Essential conditions of functionalities for a specific system of process. |

## The Source

|  |
| --- |
| IHO Definition: Source of information of data. |

## The Main

|  |
| --- |
| IHO Definition: The primary or central component of the product that serves the most significant or leading function in its operation.. |

## The Panel

|  |
| --- |
| IHO Definition: A supplementary or secondary part of the product. |

# Attribute and Enumerate Descriptions

## Administrative Division

|  |
| --- |
| IHO Definition: A generic term for an administrative region within a country at a level below that of the sovereign state.  Remarks:   * No remarks. |

## Agency Name

|  |
| --- |
| IHO Definition: The name of an agency, entity or organization.  Remarks:   * No remarks. |

## Agency Responsible For Production

|  |
| --- |
| IHO Definition: Identifies the agency which produced the data.  Remarks:   * No remarks. |

## Application Profile

|  |
| --- |
| IHO Definition: Name of an application profile that can be used with the online resource.  Remarks:   * No remarks. |

## Approximate Grid Resolution

|  |
| --- |
| IHO Definition: Approximate grid resolution for nautical products.  Remarks:   * A single value may be provided when all axes have a common resolution. For multiple value provision, use axis order as specified in dataset. May be approximate for ungeorectified data. For example, for 5 metre resolution, the value 5 must be encoded. If the grid cell size varies over the extent of the grid, an approximated value based on model parameters or production metadata should be used. For S-111, approximateGridResolution is mandatory for grid formats, thus with multiplicity [1..\*]. It is also mandatory for S-104. |

## Catalogue Element Classification

|  |
| --- |
| IHO Definition: Catalogue element classification.  **1) ENC**  IHO Definition: Electronic Navigational Chart.  **2) Bathymetric Chart**  IHO Definition: Bathymetric Surface.  **3) Water Level Product**  IHO Definition: Water Level Information for Surface Navigation.  **4) Surface Current Product**  IHO Definition: Surface Currents.  **5) MSI Service**  IHO Definition: MSI(Maritime Safety Information) service.  **6) AtoN Information**  IHO Definition: Marine Aids to Navigational.  **7) Catalogue Service**  IHO Definition: Catalogue Service.  **8) Routing Service**  IHO Definition: the services associated with the route.  **9) Ice Information**  IHO Definition: ice information.  **10) Routing Information**  IHO Definition: the information associated with the route.  **11) Special Purpose Chart**  IHO Definition: a special purpose chart.  **12) Nautical Publication**  IHO Definition: Catalogue of Nautical Products.  **13) Printed Nautical Chart**  IHO Definition: Printed Nautical Chart  Remarks:   * No remarks. |

## Catalogue Element Identifier

|  |
| --- |
| IHO Definition: catalogue Element Identifier.  Remarks:   * No remarks. |

## Catalogue Section Number

|  |
| --- |
| IHO Definition: Catalogue section number.  Remarks:   * No remarks. |

## Catalogue Section Title

|  |
| --- |
| IHO Definition: Catalogue section title.  Remarks:   * No remarks. |

## Category Of Authority

|  |
| --- |
| IHO Definition: The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.   1. **border control**   IHO Definition: The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries.   1. **police**   IHO Definition: The department of government, or civil force, charged with maintaining public order.   1. **port**   IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.   1. **immigration**   IHO Definition: The authority controlling people entering a country   1. **health**   IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique   1. **coast guard**   IHO Definition: Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.   1. **agricultural**   IHO Definition: The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country.   1. **military**   IHO Definition: A military authority which provides control of access to or approval for transit through designated areas or airspace.   1. **private company**   IHO Definition: A private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area.   1. **maritime police**   IHO Definition: A governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil.   1. **environmental**   IHO Definition: An authority with responsibility for the protection of the environment.   1. **fishery**   IHO Definition: An authority with responsibility for the control of fisheries.   1. **finance**   IHO Definition: An authority with responsibility for the control and movement of money.   1. **maritime**   IHO Definition: A national or regional authority charged with administration of maritime affairs.   1. **Customs**  IHO Definition: The agency or establishment for collecting duties, tolls.  1. **hydrographic office**   IHO Definition: State agency in charge of marine surveys.   1. **RENC**   IHO Definition: Regional ENC Coordination Centre Entities set up by the IHO.   1. **VARs**   IHO Definition: Value Added Resellers (VARs), who are able to offer comprehensive end-use services that bring together various navigational products into one package  Remarks:   * No remarks. |

## Character Encoding

|  |
| --- |
| IHO Definition: Designation of the character set to be used to encode the textual value of the locale.  Remarks:   * No remarks. |



## City Name

|  |
| --- |
| IHO Definition: The name of a town or city.  Remarks:   * No remarks. |

## Classification

|  |
| --- |
| IHO Definition: Indicates the security classification of the dataset.  Remarks:   * No remarks. |

## Comment

|  |
| --- |
| IHO Definition: Comment regarding an entity obvious from context.  Remarks:   * No remarks.. |

## Compilation Scale

|  |
| --- |
| IHO Definition: In ECDIS, the scale at which the data was compiled.  Remarks:   * No remarks. |

## Compression Flag

|  |
| --- |
| IHO Definition: Indicates if the resource is compressed.  Remarks:   * No remarks. |

## Contact Instructions

|  |
| --- |
| IHO Definition: Instructions provided on how to contact a particular person, organisation or service.  Remarks:   * No remarks. |

## Contract Period

|  |
| --- |
| IHO Definition: The available period of contact.  Remarks:   * No remarks. |

## Country Name

|  |
| --- |
| IHO Definition: The name of a nation.  Remarks:   * No remarks. |

* 1. **Currency**

|  |
| --- |
| IHO Definition: The metal or paper medium of exchange that is presently used.  Remarks:   * No remarks. |

* 1. **Dataset Name**

|  |
| --- |
| IHO Definition: A logical entity of data consisting of several elements (fields) grouped under one criterion.  Remarks:   * No remarks. |

* 1. **Date**

|  |
| --- |
| IHO Definition: The version date of the specification.  Remarks:   * No remarks. |

## Date End

|  |
| --- |
| IHO Definition: The latest date on which an object (for example a buoy) will be present.  Remarks:   * No remarks. |

## Date Start

|  |
| --- |
| IHO Definition: The earliest date on which an object (for example a buoy) will be present.  Remarks:   * No remarks. |

## Delivery Point

|  |
| --- |
| IHO Definition: Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.  Remarks:   * No remarks. |



## Digital Signature Value

|  |
| --- |
| IHO Definition: Value derived from the digital signature.  Remarks:   * No remarks. |

## Name Usage

|  |
| --- |
| IHO Definition: Classification of the type and display level of the name of a feature in an end-user system.  Remarks:   * For ECDIS, all encoded instances of the complex attribute feature name will be able to be viewed in the ECDIS Pick Report, regardless of the value populated for name usage. |

## Distribution Status

|  |
| --- |
| IHO Definition: Supply status of nautical products.  **1) production**  IHO Definition: The act or process of producing something.  **2) withdrawn**  IHO Definition: The action to withdraw a time stamp (Used when a time stamp has been reported incorrectly).  Remarks:   * No remarks. |

## Distributor Name

|  |
| --- |
| IHO Definition: Name of the distributor.  Remarks:   * No remarks. |

## Domestic Carriage Requirement

|  |
| --- |
| IHO Definition: Domestic Carriage requirements.  Remarks:   * No remarks. |

## Edition Date

|  |
| --- |
| IHO Definition: Date of publishing for example of a publication, chart, or product.  Remarks:   * No remarks.. |

## Edition Number

|  |
| --- |
| IHO Definition: Edition of the ENC being referenced.  Remarks:   * No remarks. |



* 1. **Expiration Date**

|  |
| --- |
| IHO Definition: Expiration date of nautical product data.  Remarks:   * No remarks. |



* 1. **File Locator**

|  |
| --- |
| IHO Definition: The location of a fragment of text or other information in a support file. Remarks:   * Application schemas must describe how the associated file is identified. The associated file will commonly be named in a file reference co-attribute of the same complex attribute. Each DCEG must specify requirements for the format of the associated file and the semantics of file locator. For example, the value of file locator may be an HTML ID in an HTML file, line number in a text file) or a bookmark in a PDF file. |

* 1. **File Name**

|  |
| --- |
| IHO Definition: The name of an entity of data.  Remarks:   * No remarks. |

* 1. **File Reference**

|  |
| --- |
| IHO Definition: The file name of an externally referenced text file. Remarks:   * No remarks. |

* 1. **Headline**

|  |
| --- |
| IHO Definition: Words set at the head of a passage or page to introduce or categorize.  Remarks:   * No remarks. |



* 1. **IMO Maritime Service**

|  |
| --- |
| IHO Definition: International Maritime Organization (IMO) maritime services.  **1) Vessel traffic service**  IHO Definition: VTS Information Service(IS)  **2) Aids to navigation service**  IHO Definition: Navigational Assistance Service(NAS)  **3) Reserved for future use**  IHO Definition: Traffic Organization Service(TOS)  **4) Port support service**  IHO Definition: Local Port Service  **5) Maritime safety information service**  IHO Definition: Maritime Safety Information Service(MSI)  **6) Pilotage service**  IHO Definition: Pilotage service  **7) Tug service**  IHO Definition: Tug Service  **8) Vessel shore reporting**  IHO Definition: Vessel Shore Reporting  **9) Telemedical assistance service**  IHO Definition: Telemedical Assistnace Service(TMAS)  **10) Maritime assistance service**  IHO Definition: Maritime Assistnace Service(MAS)  **11) Nautical chart service**  IHO Definition: Nautical Chart Service  **12) Nautical publications service**  IHO Definition: Nautical Publications Service  **13) Ice navigation service**  IHO Definition: Ice Navigation Service  **14) Meteorological information service**  IHO Definition: Meteorological Information Service  **15) Real-time hydrographic and environmental information services**  IHO Definition: Real-time Hydrographic and Environmental Information Service  **16) Search and rescue service**  IHO Definition: Search and Rescue Service  Remarks:  • No remarks. |

* 1. **International Carriage Requirement**

|  |
| --- |
| IHO Definition: International Carriage requirements.  Remarks:   * No remarks.. |

* 1. **ISBN**

|  |
| --- |
| IHO Definition: International Standard Book Number.  Remarks:   * No remarks. |

* 1. **ISO216**

|  |
| --- |
| IHO Definition: A paper-size standard established by the International Organization for Standardization.  Remarks:   * No remarks. |

* 1. **ISSN**

|  |
| --- |
| IHO Definition: International Standard Serial Number.  Remarks:   * No remarks. |

* 1. **Issue Date**

|  |
| --- |
| IHO Definition: Date up to which the Data Producer has incorporated all applicable changes.  Remarks:   * Issue date in S-57 and S-101 ENCs defines the date when the ENC cell edition was issued. The issue date must be greater than the previous issue date of the dataset. |

## Issue Time

|  |
| --- |
| IHO Definition: Time of day at which the data was made available by the Data Producer.  Remarks:   * No remarks. |



## Language

|  |
| --- |
| IHO Definition: The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.  Remarks:   * The language is encoded by a 3 character code following ISO 639-3/T. |

## Linkage

|  |
| --- |
| IHO Definition: Location (address) for online access using a URL/URI address or similar addressing scheme.  Remarks:   * No remarks. |

## Category of Product Mapping

|  |
| --- |
| IHO Definition: A classification of the internal relationships between products and services.  **1) Higher Priority Alternative**  IHO Definition: A higher prioritized or recommended alternative product or service, that can fully replace another.  **2) Lower Priority Alternative**  IHO Definition: A lower prioritized or not recommended alternative product or service, that can fully replace another.  **3) Recommended Enhancement Provider**  IHO Definition: A recommended additional product or service, that provides added value to another.  **4) Lower Priority Alternative**  IHO Definition: A product or service, that is recommended to make use of added value provided by another product or service.  Remarks:   * No remarks. |



## Maximum Display Scale

|  |
| --- |
| IHO Definition: The value considered by the Data Producer to be the maximum (largest) scale at which the data is to be displayed before it can be considered to be “grossly overscaled”.  Remarks:   * No remarks. |

## Minimum Display Scale

|  |
| --- |
| IHO Definition: The smallest intended viewing scale for the data. Remarks:   * No remarks. |

## Name

|  |
| --- |
| IHO Definition: The individual name of a feature.  Remarks:   * No remarks. |

## Name Of Resource

|  |
| --- |
| IHO Definition: Name of the online resource.  Remarks:   * No remarks. |



## Not For Navigation

|  |
| --- |
| IHO Definition: Indicates the dataset is not intended to be used for navigation.  Remarks:   * No remarks. |

## Online Description

|  |
| --- |
| IHO Definition: Description of online resources.  Remarks:   * No remarks. |

## Optimum Display Scale

|  |
| --- |
| IHO Definition: The largest intended viewing scale for the data.  Remarks:   * No remarks. |

## Original Product Number

|  |
| --- |
| IHO Definition: A Product which has been drawn up as a result of direct survey.  Remarks:   * Enter Original Chart Number for Original Product Number |

## Other Data Type Description

|  |
| --- |
| IHO Definition: Support file format other than those listed.  Remarks:   * No remarks. |











## Postal Code

|  |
| --- |
| IHO Definition: Known in various countries as a postcode, or ZIP code, the postal code is a series of letters and/or digits that identifies each postal delivery area.  Remarks:   * No remarks. |

## Price

|  |
| --- |
| IHO Definition: The property of having material worth.  Remarks:   * No remarks. |

## Print Agency

|  |
| --- |
| IHO Definition: Name of the publishing institution of the paper chart for navigation.  Remarks:   * No remarks. |

## Print Nation

|  |
| --- |
| IHO Definition: Country with printed nautical paper chart.  Remarks:   * No remarks. |







## Producer Nation

|  |
| --- |
| IHO Definition: Country of publication of nautical products.  Remarks:   * No remarks. |

## Product Number

|  |
| --- |
| IHO Definition: Product number. Note, can be either paper chart number or ENC file name.  Remarks:   * Encode Chart Number in the Product Number |

## Product Reference

|  |
| --- |
| IHO Definition: product reference.  Remarks:   * No remarks. |

## Protocol

|  |
| --- |
| IHO Definition: Connection protocol to be used. Example: ftp, http get KVP, http POST, etc.  Remarks:   * No remarks. |

## Protocol Request

|  |
| --- |
| IHO Definition: Request used to access the resource. Structure and content depend on the protocol and standard used by the online resource, such as Web Feature Service standard.  Remarks:   * No remarks. |

## Publication Number

|  |
| --- |
| IHO Definition: Publication number of the nautical product.  Remarks:   * No remarks. |



## Re Print Edition

|  |
| --- |
| IHO Definition: Reprinted version of nautical paper chart.  Remarks:   * No remarks. |

## Re Print Nation

|  |
| --- |
| IHO Definition: Reprinted country name of nautical paper chart.  Remarks:   * No remarks. |



## Reference to NM

|  |
| --- |
| IHO Definition: Reference information of notice to mariners.  Remarks:   * The date of the last group of NMs consulted for its correction, even if this group and possibly preceding groups did not in fact contain any updates to be made to the product in question. |

## Reported Date

|  |
| --- |
| IHO Definition: The date that the item was observed, done, or investigated.  Remarks:   * No remarks. |

## S-100\_Digital Signature Reference

|  |
| --- |
| IHO Definition: Specifies the algorithm used to compute digitalSignatureValue.   1. **ECDSA-384-SHA2**   IHO Definition: Elliptic Curve Digital Signature Algorithm (ECDSA) that based upon the issuing certificate. It's signed with the issuer's key P-384.  Remarks:   * No remarks. |



## 

|  |
| --- |
|  |

## 

|  |
| --- |
|  |

## 

|  |
| --- |
|  |







## Service Name

|  |
| --- |
| IHO Definition: name of maritime service.  Remarks:   * No remarks. |

## Service Status

|  |
| --- |
| IHO Definition: Types of status of nautical services.  Remarks:   * No remarks.. |



## Source

|  |
| --- |
| IHO Definition: The publication, document, or reference work from which information comes or is acquired.  Remarks:   * No remarks. |

## Source Date

|  |
| --- |
| IHO Definition: The production date of the source; for example the date of measurement.  Remarks:   * No remarks. |

## Source Type

|  |
| --- |
| IHO Definition: Type of the source. law or regulation IHO Definition: Treaty, convention, or international agreement; law or regulation issued by a national or other authority. official publication IHO Definition: Publication not having the force of law, issued by an international organisation or a national or local administration. mariner report, confirmed IHO Definition: Reported by mariner(s) and confirmed by another source. mariner report, not confirmed IHO Definition: Reported by mariner(s) but not confirmed. industry publications and reports IHO Definition: Shipping and other industry publications, including graphics, charts and web sites. remotely sensed images IHO Definition: Information obtained from satellite images. photographs IHO Definition: Information obtained from photographs. products issued by HO service IHO Definition: Information obtained from products issued by Hydrographic Offices. news media IHO Definition: Information obtained from news media. traffic data IHO Definition: Information obtained from the analysis of traffic data. maritime IHO Definition: A national or regional authority charged with administration of maritime affairs.  Remarks:   * No remarks. |

## Specific Usage

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| IHO Definition: The use for which the dataset is intended   1. **Navigational Purpose Overview**   IHO Definition: For use in the study of the characteristics of maritime zones, in the formulation of plans, in the selection of routes, etc., showing only relevant elements of the coastline, harbours, islands, principal navigational marks and obstructions, and submarine landforms.  Scale <1:1499999.   1. **Navigational Purpose General**   IHO Definition: A nautical chart with universality (i.e., generality) in use, characterized by the requirement that the chart must comprehensively describe various natural elements and socioeconomic elements, and that each element of the subject matter expressed is universal.  The scale is between 1:350000-1:1499999.   1. **Navigational Purpose Coastal**   IHO Definition: Used for marine navigation, mainly displaying submarine landforms, navigational marks, navigational obstacles and other elements related to navigation.  The scale is between 1:90000-1:349999.   1. **Navigational Purpose Approach**   IHO Definition: Used for near-shore navigation, mainly showing the marine elements close to coastal areas. The scale is between 1:22000-1:89999.   1. **Navigational Purpose Harbour**   IHO Definition: Used for entering and leaving harbours, selecting anchorage, studying harbour topography, and carrying out the construction of harbours.  The scale is between 1:4000-1:21999.   1. **Navigational Purpose Berthing**   IHO Definition: For ships berthing. Scale > 1:4000.  Remarks:   * No remarks. |

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## Telecommunication Identifier

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| IHO Definition: An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.  Remarks:   * No remarks. |

## Telecommunication Service

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| IHO Definition: Classification of methods of communication over a distance by electrical, electronic, or electromagnetic means. voice IHO Definition: The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking. facsimile IHO Definition: Sometimes called telecopying or telefax (the latter short for telefacsimile), is the telephonic transmission of scanned printed material (both text and images), normally to a telephone number connected to a printer or other output device. sms IHO Definition: Short Message Service is a form of text messaging communication on phones and mobile phones. data IHO Definition: Materials that serve as the basis for initiation. streamed data IHO Definition: Data that is constantly received by and presented to an end-user while being delivered by a provider. telex IHO Definition: A system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter). telegraph IHO Definition: An apparatus, system or process for communication at a distance by electric transmission over wire. email IHO Definition: Messages and other data exchanged between individuals using computers in a network.  Remarks:   * No remarks. |

## Text

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| IHO Definition: A non-formatted digital text string.  Remarks:   * Should be used, for example, to hold the information that is for short cautionary or explanatory notes. Therefore, text populated in text must not exceed 300 characters. Text may be in English, or in a national language. No formatting of text is possible within text. If formatted text, or text strings exceeding 300 characters, is required, then an alternate concept should be used. |



## Type Of Paper

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| IHO Definition: Types of paper chart.  Remarks:   * No remarks. |

## Type Of Product Format

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| --- |
| IHO Definition: Types of product format.   1. **GML**   IHO Definition: Geography Markup Language. An XML-based geographic information encoding language developed by the Open GIS Consortium (OGC) to enhance the interoperability of geographic information.   1. **ISO/IEC 8211**   IHO Definition: Specification for a data descriptive file for information interchange.   1. **PDF**   IHO Definition: Portable Document Format. A file format developed by Adobe in 1993 to present documents, including text formatting and images, in a manner independent of application software, hardware, and operating systems.   1. **HTML**   IHO Definition: Hypertext Markup Language. A type of basic web language used to create web documents.   1. **ePub**   IHO Definition: E-book file format.   1. **paper**   IHO Definition: For printing hydrographic charts, heavyweight, single layer paper is used. Such paper is generally made wholly or partly from rags and simulates hand-made paper. It is strong, moisture resistant and manufactured to withstand surface erasure.   1. **HDF-5**   IHO Definition: Grid file format.   1. **BSB**   IHO Definition: Raster data format used by USA and Canada and others.   1. **GeoTiff**   IHO Definition: Extension of the TIFF specification to allow the storage of geo- referencing information.   1. **Application**   IHO Definition: Manipulation and processing of data in support of user requirements.   1. **XML**   IHO Definition: Extensible Markup Language.   1. **PNG**   IHO Definition: Portable Network Graphics format.  Remarks:   * No remarks. |

## Type of Time Interval Unit

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| IHO Definition: Type of Time Interval Unit.   1. **hour**   IHO Definition: 60 minutes or 3600 seconds.   1. **day**   IHO Definition: for a day   1. **month**   IHO Definition: for a month   1. **year**   IHO Definition: A period of one year  Remarks:   * This attribute is used for periodically published data, such as S-111. The periodicity is entered as shown in the example below.   For example, if you want to express 26hrs, you would express it as 1day 2hour.  For example, if you want to express 45days, you would express it as 1month 15hour.  For example, if you want to express 18months, you would express it as 1year 6month. |

## Update Date

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| IHO Definition: Update date information.  Remarks:   * Update Date in S-57 and S-101 ENCs defines the date when the latest update for the current ENC cell edition was issued. This field is used whenever there is an update or re-issue of the cell. |

## Update Number

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| IHO Definition: Update number of the ENC being referenced.  Remarks:   * No remarks. |

## Value of Time

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| IHO Definition: Actual time for time interval units  Remarks:   * No remarks. |

## Version

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| IHO Definition: The version number of the specification.  Remarks:   * No remarks. |







## X

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| IHO Definition: The horizontal length(cm) of the paper to be printed  Remarks:   * No remarks. |

## Y

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| --- |
| IHO Definition: The vertical length(cm) of the paper to be printed  Remarks:   * No remarks. |







## Publication Date

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| IHO Definition: The date when the notice was officially published.  Remarks:   * No remarks. |

## Week Number

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| IHO Definition: This is the number that represents which week of the year it is.  Remarks:   * No remarks. |

## Year Number

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| IHO Definition: This is the number that indicates the year to which the week belongs.  Remarks:   * No remarks. |

## Horizontal Datum Epsg

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| IHO Definition: Horizontal reference as an EPSG code representing a valid entry in the EPSG Geodetic Parameter Dataset, as maintained by the Geodesy Subcommittee of the IOGP Geomatics Committee, and provided online at epsg.org.   * + 1. **EPSG3395 (World Mercator)**   IHO Definition: A global Mercator projection commonly used for mapping applications requiring accurate distance measurements near the equator.   * + 1. **EPSG3857 (Pseudo-Mercator)**   IHO Definition: A popular web mapping projection used by Google Maps, OpenStreetMap, and Bing Maps. Distorts at the poles but is widely used in online maps.   * + 1. **EPSG4326 (WGS84)**   IHO Definition: World Geodetic System 1984, used globally for GPS and geographic coordinates. Specifies coordinates in latitude and longitude degrees.  Remarks:   * codeListType=open enumeration; encoding=other: [something] |

## Vertical Datum

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| IHO Definition: The reference level used for expressing the vertical measurements of points on the earth's surface. Also called datum level, reference plane, levelling datum, datum for sounding reduction, datum for heights.   * + 1. **Mean Low Water Springs**   IHO Definition: The average height of the low waters of spring tides. This level is used as a tidal datum in some areas.   * + 1. **Mean Lower Low Water Springs**   IHO Definition: The average height of lower low water springs at a place.   * + 1. **Mean Sea Level**   IHO Definition: The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level..   * + 1. **Lowest Low Water**   IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or somewhat lower.   * + 1. **Mean Low Water**   IHO Definition: The average height of all low waters at a place over a 19-year period..   * + 1. **Lowest Low Water Springs**   IHO Definition: An arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years.   * + 1. **Approximate Mean Low Water Springs**   IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Low Water Springs (MLWS)..   * + 1. **Indian Spring Low Water**   IHO Definition: An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides. It was first used in waters surrounding India.   * + 1. **Low Water Springs**   IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS)..   * + 1. **Approximate Lowest Astronomical Tide**   IHO Definition: An arbitrary level, usually within 0.3m from that of Lowest Astronomical Tide (LAT).   * + 1. **Nearly Lowest Low Water**   IHO Definition: An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian Spring Low Water (ISLW).   * + 1. **Mean Lower Low Water**   IHO Definition: The average height of the lower low waters at a place over a 19-year period.   * + 1. **Low Water**   IHO Definition: The lowest level reached at a place by the water surface in one oscillation.   * + 1. **Approximate Mean Low Water**   IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Low Water (MLW).   * + 1. **Approximate Mean Lower Low Water**   IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Lower Low Water (MLLW).   * + 1. **Mean High Water**   IHO Definition: The average height of all high waters at a place over a 19-year period.   * + 1. **Mean High Water Springs**   IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS)..   * + 1. **High Water**   IHO Definition: The highest level reached at a place by the water surface in one oscillation.   * + 1. **Approximate Mean Sea Level**   IHO Definition: An arbitrary level, usually within 0.3m from that of Mean Sea Level (MSL)..   * + 1. **High Water Springs**   IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS).   * + 1. **Mean Higher High Water**   IHO Definition: The average height of higher high waters at a place over a 19-year period.   * + 1. **Equinoctial Spring Low Water**   IHO Definition: The level of low water springs near the time of an equinox.   * + 1. **Lowest Astronomical Tide**   IHO Definition: The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions..   * + 1. **Local Datum**   IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority.   * + 1. **International Great Lakes Datum 1985**   IHO Definition: A vertical reference system with its zero based on the mean water level at Rimouski/Pointe-au-Pere, Quebec, over the period 1970 to 1988..   * + 1. **Mean Water Level**   IHO Definition: The average of all hourly water levels over the available period of record.   * + 1. **Lower Low Water Large Tide**   IHO Definition: The average of the lowest low waters, one from each of 19 years of observations.   * + 1. **Higher High Water Large Tide**   IHO Definition: The average of the highest high waters, one from each of 19 years of observations.   * + 1. **Nearly Highest High Water**   IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.   * + 1. **Highest Astronomical Tide**   IHO Definition: The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions   * + 1. **Local Low Water Reference Level**   IHO Definition: Low water reference level of the local area.   * + 1. **Local High Water Reference Level**   IHO Definition: High water reference level of the local area   * + 1. **Local Mean Water Reference Level**   IHO Definition: Mean water reference level of the local area.   * + 1. **Equivalent Height of Water (German GlW)**   IHO Definition: A low water level which is the result of a defined low water discharge - called &quot;equivalent discharge&quot;.   * + 1. **Highest Shipping Height of Water (German HSW)**   IHO Definition: Upper limit of water levels where navigation is allowed..   * + 1. **Reference Low Water Level According to Danube Commission**   IHO Definition: The water level at a discharge, which is exceeded 94 % of the year within a period of 30 years.   * + 1. **Highest Shipping Height of Water According to Danube Commission**   IHO Definition: The water level at a discharge, which is exceeded 1% of the year within a period of 30 years.   * + 1. **Dutch River Low Water Reference Level (OLR)**   IHO Definition: The water level at a discharge, which is exceeded 95% of the year within a period of 20 years.   * + 1. **Russian Project Water Level**   IHO Definition: Conditional low water level with established probability..   * + 1. **Russian Normal Backwater Level**   IHO Definition: Highest water level derived from the upper backwater stream in watercourse or reservoir under the normal operational conditions.   * + 1. **Ohio River Datum**   IHO Definition: The Ohio River datum.   * + 1. **Dutch High Water Reference Level**   IHO Definition: Dutch High Water Reference Level   * + 1. **Baltic Sea Chart Datum 2000**   IHO Definition: The datum refers to each Baltic country&apos;s realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).   * + 1. **Dutch Estuary Low Water Reference Level (OLW)**   IHO Definition: Dutch Estuary Low Water Reference Level (OLW)   * + 1. **International Great Lakes Datum 2020**   IHO Definition: The 2020 update to the International Great Lakes Datum (IGLD), the official reference system used to measure water level heights in the Great Lakes, connecting channels, and the St. Lawrence River system.   * + 1. **Sea Floor**   IHO Definition: The bottom of the ocean and seas where there is a generally smooth gentle gradient. Also referred to as sea bed (sometimes seabed or sea-bed), and sea bottom.   * + 1. **Sea Surface**   IHO Definition: A two-dimensional (in the horizontal plane) field representing the air-sea interface, with high-frequency fluctuations such as wind waves and swell, but not astronomical tides, filtered out.   * + 1. **Hydrographic Zero**   IHO Definition: A vertical reference near the lowest astronomical tide (LAT), below which the sea level falls only very exceptionally.  Remarks:   * No remarks. |

# Complex Attributes

## Contact Address

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| IHO Definition: Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it.  Sub-attributes:  **Administrative Division** (see clause 7.1)  **City Name** (see clause 7.12)  **Country Name** (see clause 7.19)  **Delivery Point** (see clause 7.25)  **Postal Code** (see clause 7.57)  Remarks:   * No remarks. |

## Custom Paper Size

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| IHO Definition: user specified paper size width x, height y.  Sub-attributes:  **x** (see clause 7.91)  **y** (see clause 7.92)  Remarks:   * No remarks. |

## Default Locale

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| IHO Definition: Default language and character set used in the dataset.  Sub-attributes:  **Character Encoding** (see clause 7.11)  **Country Name** (see clause 7.19)  **Language** (see clause 7.45)  Remarks:   * No remarks. |

## Feature Name

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| IHO Definition: Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.  Sub-attributes:  **Language** (see clause 7.45)  **Name** (see clause 7.50)  **Name Usage** (see clause 7.27)  Remarks:   * No remarks. |



## Information

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| IHO Definition: Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text.  Sub-attributes:  **File Locator** (see clause 7.34)  **File Reference** (see clause 7.36)  **Headline** (see clause 7.37)  **Language** (see clause 7.45)  **Text** (see clause 7.83)  Remarks:   * No remarks. |

## Issuance Cycle

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| IHO Definition: The cycle of issuing the nautical product data.  Sub-attributes:  **Periodic Date Range** (see clause 8.8)  **Time Interval Of Cycle** (see clause 8.19)  Remarks:   * No remarks. |

## Online Resource

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| IHO Definition: Information about online sources from which a resource or data can be obtained.  Sub-attributes:  **Application Profile** (see clause 7.4)  **Linkage** (see clause 7.46)  **Name Of Resource** (see clause 7.51)  **Online Description** (see clause 7.53)  **Protocol** (see clause 7.64)  **Protocol Request** (see clause 7.65)  Remarks:   * No remarks. |

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## Pricing

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| IHO Definition: A sum of money paid or a claim discharged.  Sub-attributes:  **Contract Period** (see clause 7.18)  **Currency** (see clause 7.20)  **Price** (see clause 7.58)  Remarks:   * No remarks. |

## Print Information

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| IHO Definition: Information on the printing of nautical paper charts.  Sub-attributes:  **Print Agency** (see clause 7.59)  **Print Nation** (see clause 7.60)  **Re Print Edition** (see clause 7.67)  **Re Print Nation** (see clause 7.68)  **Print Size** (see clause 8.11)  Remarks:   * No remarks |

## Print Size

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| --- |
| IHO Definition: Size of nautical paper charts.  Sub-attributes:  **ISO216** (see clause 7.41)  **Custom Paper Size** (see clause 8.2)  Remarks:   * No remarks. |

## Product Specification

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| IHO Definition: Product standard name referenced when manufacturing nautical products.  Sub-attributes:  **Date** (see clause 7.22)  **ISSN** (see clause 7.42)  **Name** (see clause 7.50)  **Version** (see clause 7.90)  Remarks:   * No remarks.. |

## S-100\_Support File

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| IHO Definition: Information on additional files used in addition to nautical products.  Sub-attributes:  **Comment** (see clause 7.14)  **Digital Signature Reference** (see clause 7.71)  **Digital Signature Value** (see clause 7.26)  **Edition Number** (see clause 7.32)  **File Locator** (see clause 7.34)  **File Name** (see clause 7.35)  **Issue Date** (see clause 7.43)  **Other Data Type Description** (see clause 7.57)  **Support File Format** (see clause 7.73)  **Support File Purpose** (see clause 7.74)  **Default Locale** (see clause 8.3)  **Support File Specification** (see clause 8.14)  Remarks:   * No remarks. |

## S-100\_Support File Specification

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| --- |
| IHO Definition: The reason for inclusion of the support file.  Sub-attributes:  **Date** (see clause 7.22)  **Name** (see clause 7.50)  **Version** (see clause 7.90)  Remarks:   * No remarks. |

## Service Specification

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| --- |
| IHO Definition: Product standard name referenced when developing nautical product service.  Sub-attributes:  **Date** (see clause 7.22)  **Name** (see clause 7.50)  **Version** (see clause 7.90)  Remarks:   * No remarks. |

## Source Indication

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| IHO Definition: Information about the source document, publication, or reference from which object data or textual material included or referenced in a dataset are derived.  Sub-attributes:  **Category Of Authority** (see clause 7.10)  **Country Name** (see clause 7.19)  **Reported Date** (see clause 7.70)  **Source** (see clause 7.77)  **Source Type** (see clause 7.79)  **Feature Name** (see clause 8.4)  Remarks:   * No remarks. |















## Telecommunications

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| IHO Definition: A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.  Sub-attributes:  **Contact Instructions** (see clause 7.17)  **Telecommunication Identifier** (see clause 7.81)  **Telecommunication Service** (see clause 7.82)  Remarks:   * No remarks. |

## Time Interval of Product

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| IHO Definition: The temporal interval over which the product is issued.  Sub-attributes:  **Expiration Date** (see clause 7.33)  **Issue Date** (see clause 7.43)  **Issuance Cycle** (see clause 8.6)  Remarks:   * No remarks. |



## Time Interval of Cycle

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| --- |
| IHO Definition: A means or channel of communicating at a distance by electrical or electromagnetic means such as telegraphy, telephony, or broadcasting.  Sub-attributes:  **Type Of Time Interval Unit** (see clause 7.86)  **Value Of Time** (see clause 7.89)  Remarks:   * No remarks. |



## Reference To NM

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| IHO Definition: Reference information of notice to mariners.  Sub-attributes:  **Publication Date** (see clause 7.93)  **Week Of Year** (see clause 8.21)  Remarks:   * The date of the last group of NMs consulted for its correction, even if this group and possibly preceding groups did not in fact contain any updates to be made to the product in question. |

## Week Of Year

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| --- |
| IHO Definition: Week of the year.  Sub-attributes:  **Week Number** (see clause 7.94)  **Year Number** (see clause 7.95)  Remarks:   * No remarks. |

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