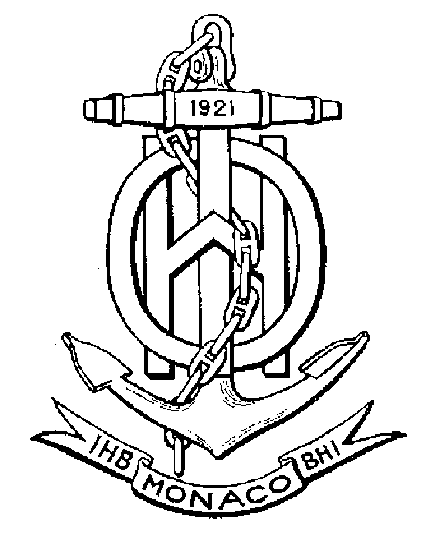
INTERNATIONAL HYDROGRAPHIC ORGANIZATION



IHO UNIVERSAL HYDROGRAPHIC DATA MODEL

Draft Version – September 2016

**Special Publication No. 122**

**Marine Protected Area Product Specification**

**Appendix A**

**Data Classification and Encoding Guide**

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**MONACO**

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Document Control

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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 Marine Protected Area (MPA) (S-122) data.

The purpose of the Data Classification and Encoding Guide is to facilitate S-122 encoding to meet IHO standards for the proper display of Marine Protected Area information in an ECDIS and other electronic charting displays. This document describes how to encode information that the modeller considers relevant to an MPA. The content of an MPA product 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 an organization authorized by a government, HO or other relevant government institution to produce nautical publication information.

The entire S-100 Universal Hydrographic Data Model, including the S-122 MPA Product Specification, is available at the following web site, http://www.iho.int.

## S-122 Data Classification and Encoding Guide – Metadata

Note: This information uniquely identifies this Data Classification and Encoding Guide to the Product Specification and provides information about its creation and maintenance.

|  |  |
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| **Maintenance:** | Changes to S-122 Appendix 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. |

Table 1‑1 MPA product specification metadata

## Terms and definitions

This list is identical with the list in the main body of this product specification.

|  |  |
| --- | --- |
| **Term** | **Definition** |
| **aggregation** | special form of **association** that specifies a whole-part relationship between the aggregate (whole) and a component (see composition) |
| **application** | manipulation and processing of data in support of user requirements (ISO 19101) |
| **application schema** | **conceptual schema** for data required by one or more **applications** (ISO 19101) |
| **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 |
| **boundary** | set that represents the limit of an entity (ISO 19107) |
| **composition** | special form of **association** that specifies a “strong aggregation”.  In a composition association, if a container object is deleted then all of the objects it contains are deleted as well. |
| **conceptual model** | modelthat defines concepts of a **universe of discourse** (ISO 19101) |
| **conceptual schema** | formal description of a **conceptual model** (ISO 19101) |
| **coverage** | **feature** that acts as a function to return values from its range for any direct position within its spatial, temporal or spatiotemporal **domain** (ISO 19123)  *EXAMPLE Raster image, polygon overlay, digital elevation matrix.* |
| **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 **point** is the **end point**. Connectivity of the curve is guaranteed by the “continuous image of a line” |
| **data product** | **dataset** or **dataset series** that conforms to a **data product specification** |
| **data product specification** | detailed description of a **dataset** or **dataset series** together with additional information that will enable it to be created, supplied to and used by another party  *NOTE: A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a dataset. It may be used for production, sales, end-use or other purpose.* |
| **dataset** | identifiable collection of data (ISO 19115)  *NOTE: A dataset may be a smaller grouping of data which, though limited by some constraint such as spatial extent or feature type, is located physically within a larger dataset. Theoretically, a dataset may be as small as a single feature or feature attribute contained within a larger dataset. A hardcopy map or chart may be considered a dataset.* |
| **dataset series** | collection of **datasets** sharing the same product specification (ISO 19115) |
| **domain** | well-defined set (ISO/TS 19103)  *NOTE: Well-defined means that the definition is both necessary and sufficient, as everything that satisfies the definition is in the set and everything that does not satisfy the definition is necessarily outside the set.* |
| **end point** | last point of a curve (ISO 19107) |
| **enumeration** | a fixed list which contains valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list. |
| **feature** | abstraction of real world phenomena (ISO 19101)  *NOTE: A feature may occur as a type or an instance. Feature type or feature instance shall be used when only one is meant.*  EXAMPLE:  The feature instance named “Turning Torso Tower” may be classified with other phenomena into a feature type “tower”. |
| **feature association** | relationship that links instances of one **feature** type with instances of the same or a different **feature** type (ISO19110)  *NOTE 1; A feature association may occur as a type or an instance. Feature association type or feature association instance is used when only one is meant.*  *NOTE 2: Feature associations include aggregation of features.* |
| **feature attribute** | characteristic of a **feature** (ISO 19101)  *NOTE 1: A feature attribute may occur as a type or an instance. Feature attribute type or feature attribute instance is used when only one is meant.*  *NOTE 2: A feature attribute type has a name, a data type and a domain associated to it. A feature attribute for a feature instance has an attribute value taken from the domain.* |
| **geographic data** | data with implicit or explicit reference to a location relative to the Earth (ISO 19109)  *NOTE: Geographic information is also used as a term for information concerning phenomena implicitly or explicitly associated with a location relative to the Earth.* |
| **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 |
| **metadata** | data about data (ISO 19115) |
| **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 |
| **model** | abstraction of some aspects of reality (ISO 19109) |
| **point** | 0-dimensional geometric primitive, representing a position  NOTE:  The **boundary** of a point is the empty set |
| **portrayal** | presentation of information to humans (ISO 19117) |
| **quality** | totality of characteristics of a product that bear on its ability to satisfy stated and implied needs (ISO 19101) |
| **set** | unordered collection of related items (objects or values) with no repetition (ISO 19107) |
| **start point** | first point of a curve (ISO 19107) |
| **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 |
| **universe of discourse** | view of the real or hypothetical world that includes everything of interest (ISO 19101) |

Table 1‑2 List of terms and definitions

## Abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Description** |
| DCEG | Data Classification and Encoding Guide |
| 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 |
| MPA | Marine Protected Area |
| RENC | Regional ENC co-ordinating centre |

Table 1‑3 List of abbreviations

## 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-122 MPA Product Specification clause 6.1.8

# General

## Introduction

The S-122 Data Classification and Encoding Guide (DCEG) contains rules and guidance for converting data describing the real world into data products that conform to the S-122 specification.

The S-122 specification contains an application schema (UML model) describing the conceptual domain model in terms of classes and relationships, and a Feature Catalogue (see S-122 Annex B) that specifies the data model, i.e., specifies the data model types and associations corresponding to the various classes and relationships in the application schema.

To simplify the DCEG text, the various data model types will be provided without the suffixes “class”, “type” or “instance”; e.g. the term “feature” should be understood as “feature class” or “feature type” or “feature instance” as best fits the immediate context in which it is used (and where there might be confusion, it is written out in full as feature class/type/instance).The model defines real world entities as a combination of descriptive and spatial characteristics (S-122 MPA Product Specification clause 4.4).

This section of the DCEG contains general information needed to understand the encoding rules and describes fundamental common rules and constraints. It also describes datasets and metadata. The data model object types used within S-122 and their encoding rules and guidelines are defined in detail in subsequent sections of this document.

Within this document the features, information types, associations and attributes appear in **bold text**.

## Descriptive characteristics

### Feature

A feature contains descriptive attributes that characterize real world entities.

The word ‘feature’ as used in the ISO 191xx series and in S-100 based product specifications has two distinct but related senses – ‘feature type’ and ‘feature instance’. A feature instance is a single occurrence of the feature and is represented as an object in a dataset.

The location of a feature instance on the Earth’s surface is indicated by a relationship to one or more spatial primitive instances. A feature instance may exist without referencing a spatial primitive instance.

#### Geographic feature class

**Geographic (Geo) feature types** carry the descriptive characteristics of a real world entity which is provided by a spatial primitive instance.

#### Meta feature class

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

#### Charted background feature

Due to the fact that a MPA product based on GML, the MPA product could be used as an overlay of an ENC or of any other GIS applications. Consequently, all necessary descriptive and spatial characteristics to provide a charted background should be provided by the underlying application.

### Information type

An information type has no geometry and therefore is not associated to any spatial primitives to indicate its location.

An information type may have attributes and can be associated with features or other information types in order to carry information particular to these associated features or information types.

## Spatial characteristics

### Spatial primitives

The allowable spatial primitive for each feature is defined in the Feature Catalogue. Allowable spatial primitives are point, curve and surface.

Within this document, allowable spatial primitives are included in the description of each feature. For easy reference, Table 2‑1 below summarises the allowable spatial primitives for each feature. In the table, abbreviations are as follows: point (P), curve (C) and surface (S).

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **P** | **C** | **S** |
| Marine Protected Area |  | X | X |
| Restricted Area Navigational |  |  | X |
| Restricted Area Regulatory |  |  | X |
| Traffic Control Service |  |  | X |
| Obstruction | X | X | X |
| Wreck | X |  | X |

Table 2‑1 Features permitted for MPA and their spatial primitives

### Capture density guideline

The MPA capture density will follow the recommendation of the S-101 (ENC) DCEG, that states curves and surface boundaries should not be encoded at a point density greater than 0.3 mm at the maximum display scale.

A curve consists of one or more curve segments. Each curve segment is defined as a loxodromic line on WGS84, or as an arc or circle. 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.

## 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 attributes. Simple (S) attributes are assigned to one the types collected at clause 2.4.1.

The binding of attributes to a feature, the binding of attributes to attributes to construct complex attributes, and attribute multiplicity are all defined in the Feature Catalogue.

Within this document, the allowable attributes are included in the description of each feature, as well as the allowable values for enumeration type attributes.

### Simple attribute types

Each simple attribute (S) is assigned to one of attribute types in Table 2‑2 (in alphabetic order):

|  |  |  |
| --- | --- | --- |
| **Abbre viation** | **Attribute type** | **Description** |
| BO | Boolean | A value representing binary logic. The value can be either True or False. The default state for Boolean type attributes (i.e. where the attribute is not populated for the feature) is False. |
| CL | Code List | A type of flexible enumeration (see “EN” below). A code list type is a list of literals which may be extended only in conformance with specified rules. Attributes of a code list type may take values from the list or other values which are defined according to the rules. The rules should be part of the specification of the individual codelist type. A code list could either be closed (fixed) or open (extensible).  A code list type has the following properties:  1. A description of the code list type,  2. The URI where the list could be found, and  3. An encoding instruction. |
| DA | Date | A date provides values for year, month and day according to the Gregorian Calendar.  Example: 19980918 (YYYYMMDD) |
| DT | Date and Time | A DateTime is a combination of a date and a time type.  Example: 19850412T101530 (YYYYMMDDThhmmss) |
| EN | Enumer-ation | A fixed list of valid identifiers of named literal values. Attributes of an enumerated type may only take values from this list. |
| IN | Integer | A signed integer number. The representation of an integer is encapsulation and usage dependent.  Integer attribute values must not be padded by non-significant zeroes. For example, for a number of 19, the value populated for the attribute must be 19 and not 019.  Examples: 29, -65547 |
| 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.  Real 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.  Examples: 23.501, -0.0001234, -23.0, 3.141296 |
| TD | Trun-cated Date | One or more significant components of the modelling date are omitted.  Example: – – – –02– – (Year and date not encoded)  The exact format depends on the encoding.  A GML dataset would use a GML built-in type and encode it as <gMonth>--02<gMonth>.  An 8211 data format based dataset would truncated encode the date as – – – –02– –. |
| TE | Free text | A CharacterString is an arbitrary-length sequence of characters including accents and special characters from a repertoire of one of the adopted character sets. |
| TI | Time | A time is given by an hour, minute and second. Time zone according to UTC is optional. Character encoding of a time is a string that follows the local time  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. A third example shows the time in local time.  152746+0100 for 15h27min46sec in Geneva  152746-0500 for 15h27min46sec in New York  152746 for 15h27min46sec at local time elsewhere |

Table 2‑2 Simple attribute types

### Mandatory attributes

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

They are required to support the 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 are those with a multiplicity of 1,1 or 1,n (n>1) or 1,\*. The attribute multiplicity is identified in the description of each feature class.

For easy reference, the Table 1‑2 summarises the mandatory attributes for each feature.

| **Feature** | **Mandatory Attributes** |
| --- | --- |
| Marine Protected Area | categoryOfIUCN jurisdiction |
| Restricted Area Navigational | none |
| Restricted Area Regulatory | none |
| Traffic Control Service | categoryOfTrafficControlService |
| Obstruction | categoryOfObstruction waterLevelEffect |
| Wreck | waterlevelEffect |

Table 2‑3 Mandatory attributes for MPA feature classes

### Conditional attributes

The MPA feature classes or information types do not contain conditional attributes.

Complex attributes which are assigned to MPA feature classes or information types have at least one sub-attribute which is mandatory (or conditionally mandatory). Mandatory sub-attributes of complex attributes have not been included in the Table 1‑2. Where the sub-attribute of a complex attribute is conditional, this is indicated in the Remarks section for the relevant feature class entries in chapter 5.

### 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 must not be used.

### 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 is significant and if an attribute is mandatory. Common examples are shown in the Table 2‑4:

Format: MinOccurs, MaxOccurs (a \* indicates that infinite instances are possible, the term(ordered) indicates that the order of the provided instances is significant)

|  |  |
| --- | --- |
| **Multiplicity** | **Explanation** |
| 0,1 | An instance is not required; if provided there must only be 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 is significant. |
| 2,2 | Two instances are required and there must be no more than two. |

Table 2‑4 Multiplicity of attributes

### Spatial attribute types

Spatial attribute types must contain a referenced geometry and may be associated with spatial quality attributes. Each spatial attribute instance must be referenced by a feature instance or another spatial attribute instance.

#### Quality of spatial attributes

The quality of spatial attributes in S-122 is described in a **Quality of Non-Bathymetric Data** meta-feature. This meta-feature defines areas within which uniform assessment exists for the quality.

If the spatial quality attributes for an individual instance of a spatial primitive differ from the quality indicated in the overlying **Quality of Non-Bathymetric Data** meta-feature, the quality attributes for that instance are carried in an information class called **spatial quality**. Only points, multipoints and curves can be associated with **spatial quality**. Currently, no use case for associating surfaces with spatial quality attributes is known, therefore this is prohibited. Vertical uncertainty is prohibited for curves as this dimension is not supported by curves.

Note: S-122 does not make use of the S-101 **Quality of Bathymetric Data** meta- feature since depth range uncertainties are not needed. The **Quality of Non-Bathymetric Data** meta-feature has all the quality attributes needed by S-122.

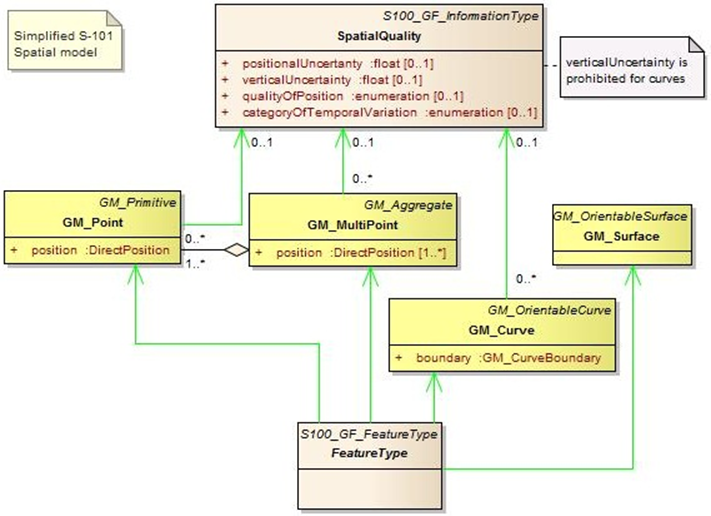


Figure 1 Spatial quality information

### Portrayal feature attributes

The primary use of MPA is within ECDIS where ENC data is displayed based on the rules defined within the S-101 Portrayal Catalogue. While most ECDIS portrayal is based on attributes describing the instance of a particular feature in the real world, certain feature attributes are used in portrayal rules to provide additional functionality in the ECDIS or information to the mariner. Table 2‑5 provides a list of attributes which have been adopted from the S-101 (ENC) product specification and which have specific influence on the MPA portrayal.

|  |  |
| --- | --- |
| **Attribute** | **Effects on portrayal** |
| **displayName** | This Boolean attribute determines if the text for a name should be displayed. If not populated the default rules provided in the portrayal catalogue will be used. |
| **information** | Population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **pictorialRepresentation** | The population of this Text attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **textContent** | The population of this complex attribute will result in the display of the magenta information symbol to highlight additional information to the user. |
| **visuallyConspicuous** | This Boolean attribute determines that visually conspicuous features are shown in black colour rather than brown. |

Table 2‑5 Attributes which have effects on portrayal

Note: Since S-122 data is scale-independent, the S-101 attribute scaleMinimum is superfluous and not used in S-122 datasets.

### Textual information

Textual information may provide additional information essential to understand the presence of the MPA and other features of an S-122 product. This information may also provide legal information pertaining to the S-122 product features.

The methods to provide textual information vary from the simple provision of short text to the more structured provision of extensive text. The length of the text indicates the method and the attribute selection, see chapter 2.4.8.2.

#### Specialized information types for common kinds of textual information

The information types **Restrictions, Recommendation, Regulations, NauticalInformation must be used to encode text information when the DCEG allows them to be associated to the feature or information type and the information is of the appropriate kind (a restriction, regulation, etc.).**

**In exceptional circumstances and only if the use of the information types Restrictions, Recommendation, Regulations, NauticalInformation is not sufficient, SupplementaryInformation** (see clause X.X) can be used to encode additional textual information associated to a feature or a group of features.

In some cases, there may be a specialized attribute that is specifically intended for the data in question. If an appropriate specialized attribute is available, it must be used in preference to **information** or **textContent**. For example, feature names will generally be encoded in the **name** sub-attribute of complex attribute **featureName**, instead of **information**->**text**.

#### Textual information attributes

Textual information which is not appropriate for any of the Text-type attribute (or sub-attribute) allowed for the feature/information type should be encoded using either **information** or **textContent** complex attributes. Generally, either **information** or **textContent** is allowed, but not both.

#### Languages

Both **information** and **textContent** define a **language** sub-attribute for specifying the language in which the text is encoded.

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, when a national language is used in the textual attributes, the English translation must also exist.

#### Minimal use of generalized text attributes

The complex attributes **information** and **textContent** must not be used when it is possible to encode the information by means of any other attribute. The population of these attributes provides symbols on an ECDIS screen. Therefore producers should carefully consider use of these attributes as the symbol may contribute significantly to ECDIS screen clutter.

#### Short textual information

The **text** sub-attribute of complex attribute **information** should generally be used for short notes or to transfer information which cannot be encoded by other attributes, or to give brief information about a feature. The use of the complex attribute **information** as a stand-alone complex attribute is intentionally limited to the information types **ContactDetails,** **Applicability,** **NonStandardWorkingDay** and **ServiceHours,** which do not need the additional attributes defined in **textContent**. The reason of the limited use of **information** as a stand-alone complex attribute is to provide a structured and harmonised approach to textual information within the S-122 product data sets.

The text populated in **text** must not exceed 300 characters. Character strings contained in **text** sub-attribute must be UTF-8 character encoding.

If the **text** sub-attribute of **information** is populated, the **headline**, **fileReference**, and **fileLocator** sub-attributes must not be populated.

#### Complex or lengthy textual information

More complex encodings of text may use either **information** or **textContent**. The feature catalogue and the feature/information type definitions in this DCEG indicate whether **information** or **textContent** is allowed.

The complex attribute **textContent** also has **information** as a complex sub-attribute. If a short note must be encoded in a feature or information type which has only **textContent** as an attribute, it should be encoded as **textContent**-> **information**-> **text**.

Complex text information, such as text longer than 300 characters, formatted text, or HTML extracts from shipping regulations, must be encoded in a file named in either   
**information**->**fileReference** or **textContent**->**information**->**fileReference**. The construction **textContent**->**information**->**fileReference** should be used if the feature/information type provides **textContent** as complex attribute.

The complex attribute **information** defines an optional sub-attribute **headline** which may be used for a short title not exceeding [TBD – a lot less than 300] characters. The content should be short but informative – if the textual information is divided into sections, the most relevant section header from the referenced content may be a good choice.

The complex attribute **textContent** defines an optional sub-attribute **categoryOfText** for indicating whether the text is the full text from the source, an extract from the source, or a summary prepared by the encoder. Populating **categoryOfText** is recommended whenever the textual information is taken or summarized from a law or regulation.

If it is considered necessary to include a description of the source of the textual information, the sub-attribute **sourceIndication** of **textContent** must be used. Encoding a description of the source is strongly recommended for textual information whose source is considered information the end-user must have, e.g., because the date of issue must be conveyed or because it cites official regulations which are frequently updated.

COMMENT: Some government documents are frequently updated, e.g., the U.S. Electronic Code of Federal Regulations, which is currently updated every working day even though a particular section may be stable for years).

### Attributes referencing external files

#### Predefined derived types

Table 2‑6 presents the following predefined derived types which are described in S-100 (§ 1-4.6 in Edition 2.0.0):

|  |  |  |
| --- | --- | --- |
| **Name** | **Description** | **Derived from** |
| URI | A uniform resource identifier which character encoding shall follow the syntax rules as defined in RFC 3986.  EXAMPLE http://registry.iho.int | CharacterString |
| 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 | URI |
| URN | A persistent, location-independent, resource identifier that follows the syntax and semantics for URNs specified in RFC 2141.  EXAMPLE urn:iho:s101:1:0:0:AnchorageArea | URI |

Table 2‑6 Predefined derived types

#### Reference to textual files

The information types **Restrictions, Recommendation, Regulations, NauticalInformation** should be used to encode textual information.

The information type **SupplementaryInformation** and the related attributes must not be used if it is possible to encode the information by means of the information types mentioned above.

The files referenced by **textContent**, sub-complex attribute **information** and its sub attribute **fileReference** must be \*.TXT, \*.HTM or \*.XML files, and may contain formatted text. It is up to the Producing Authority to determine the most suitable means of encoding a particular piece of text. Files must only use UTF-8 character encoding even when the sub-attribute **language** is populated with a language other than English.

If it is necessary to indicate a specific section within a large text file, this may be done by encoding the location in the **fileLocator** sub-attribute of **information**, as described in the table Table 2‑7.

|  |  |  |
| --- | --- | --- |
| **Format** | **File extension** | **Content of fileLocator** |
| Text | TXT | The offset of the start of the section relative to the beginning of the file (the first character in the file has offset 0). |
| HTML | HTM | The HTML fragment identifier, i.e., the value of the HTML *name* or *id* attribute of the target (as defined in the relevant HTML specification). |
| XML | XML | The XML fragment identifier as defined in the relevant specification, e.g., the value of an *xml:id* attribute. |

Table 2‑7 Locators for external files

#### Reference to external sources

References to Internet sources should be encoded using the **onlineResource** sub-attribute of **textContent**. Encoders should be aware that systems may not be able to access the Internet, so **onlineResource** should be used only for non-essential information.

Only sources that can be certified as secure should be provided.

#### Reference to graphics

If it is required to indicate a graphic, the complex attribute **graphic** must be used. The sub-attribute **pictorialRepresentation** must be used to indicate the file name (without the path) of the external graphical file. Graphic files that form part of the MPA product must be content with the characteristics collected in Table 2‑8.

|  |  |
| --- | --- |
| **Characteristics** | **Values** |
| Recommended Resolution: | 96 DPI |
| Minimum Size x,y: | 200,200 pixels |
| Maximum Size x,y: | 800,800 pixels |
| Bit Depth: | 8 Bit Indexed Colour |
| Compression: | LZW |
| Format: | Tiff 6.0 |
| File size | Minimum, consider that 10 Mb is the maximum allowable size of an MPA dataset |

Table 2‑8 Graphics Characteristics

Additional information about the graphic file may be encoded in other sub-attributes of attribute **graphic**, as described in Section 2.4.13.

### Dates

Dates may be complete or truncated values. The definition of the attribute will indicate if it must take a complete value (type *Date* or *DA*) or is allowed to take a truncated value (type *S100\_TruncatedDate* or *TD*). Complete and truncated dates are different value types (see S-100 § 1-2 Table 1-2; also Table 2‑9 of this DCEG).

For attributes that use the complete date type (type *Date* or *DA*), all their components (year, month, and day) must be specified.

For attributes that use the truncated date type (type *S100\_TruncatedDate* or *TD*), zero, one, or two of the year/month/day components may be omitted. If the year component is included, it must be specified using exactly 4 digits.

#### Complete Dates (Informative)

Complete date values must be encoded in conformance with the Date format as specified in S-100 Ed. 2.0.0 (§§ 1-4.5.2) which is the same as the DA format in Table 2‑2 in this document. The data values have to be provided in accordance with the Gregorian Calendar starting with four digits for the year, two digits for the month and two digits for the day.

Example: The date 18 September 2010 is encoded as follows:

In the ISO 8211 format: 20100918

In the GML format: <date>2010-09-18</date>

#### Truncated Dates (Informative)

In Truncated Dates one or more components (year, month, or day) of the date is not specified. Truncated date values must be encoded in conformance with the S100\_TruncatedDate format or equivalent as specified in S-100 Ed. 2.0.0 (§§ 1-4.5.2 and 3-9) which is the same as the *TD* format in Table X.X in this document. If encoding attributes which can take truncated date values (e.g., **fixedDateRange**, **periodicDateRange**, **reportedDate)** and no specific year, month or day is required, the values must be encoded in conformance with the truncated date format as specified in S-100 (§§ 1-4.5.2 and 3-9 in Edition 2.0.0) which define a default format (for ISO 8211) but also allow the use of built-in types.

To encode partial dates in the GML and ISO 8211 data formats:

|  |  |  |
| --- | --- | --- |
| **Description** | **ISO 8211** | **GML** |
| No specific year, same day each year | – – – –MMDD | <gMonthDay>– –MM–DD</gMonthDay> |
| No specific year, same month each year | – – – –MM– – | <gMonth>– –MM</gMonth> |
| No specific day | YYYYMM– – | <gYearMonth>>YYYY–MM </gYearMonth> |
| No specific month and no specific day | YYYY– – – – | <gYear>YYYY</gYear> |

Table 2‑9 Date encoding in GML and ISO 8211 data formats

Note: YYYY = calendar year; MM = month; DD = day.

The dashes (–) indicating that the year, month or date which is not specified must be included in the encoding (with no space between the dashes).

#### Start and end of ranges

In accordance with S-100 Ed. 2.0.0 § 3-8, the start and end instants of a range or period are included in the range or period.

EXAMPLE 1: If the beginning of a date range is encoded as the complete date 01 January 2016, the period begins at 00:00:00 on 1 January 2016, and the whole of New Year’s Day is included in the period. If the end of the date range is encoded as 01 January 2016, the period ends at 24:00:00 on 1 January 2016, i.e., again the whole of New Year’s Day is included in the period.

EXAMPLE 2: If the beginning of a period is encoded in truncated date format as – – – –01– – (i.e., year and day not specified), the period begins at 00:00:00 on 1 January each year. If the end of the period is encoded as – – – –01– –, the period ends at 24:00:00 on 31 January each year.

Note 1) Particular care should be taken if the start or end date is 28 or 29 February. S-100 Ed. 2.0.0 § 3-8 explains the implications for end of February. For example, the truncated date – – – –02– – will be interpreted as 29 February in leap years and 28 February in non-leap years, while – – – –0228 will be interpreted as 28 February in every year.

Note 2) In accordance with ISO practice, 00:00:00 means midnight at the start of a day and 24:00:00 means midnight at the end of a day.

#### Schedules

Weekly service schedules of a feature can be comprehensively described by using the information types **ServiceHours** and **NonStandardWorkingDay**.

EXAMPLE: A feature service is available under normal operation status 24 hours/day on Monday and Wednesday and from 08:00 to 16:00 LT from Thursday to Saturday. The service is not available on public holidays and the 5 of August of each year.

**ServiceHours**

**scheduleByDoW**

**categoryOfSchedule** = 1 (normal operation)

**tmIntervalsByDoW**

**dayOfWeek** = 1 (Monday), 2 (Tuesday)

**dayOfWeekRanges** = 0 (false)

**tmIntervalsByDoW**

**dayOfWeek** = 4 (Thursday), 6 (Saturday)

**dayOfWeekRanges** = 1 (true)

**timeReference** = 2 (LT)

**timeOfDayStart** = 080000

**timeOfDayEnd** = 160000

**NonStandardWorkingDay**

**fixedDate** = – – – – 0805 (5 August)

**variableDate** = public holidays

### Times

If it is required to provide information of the start time and end time of an active period of a feature, must be it must be encoded using the attributes **timeOfDayStart** and **timeOfDayEnd**. The order has significance.

### Combination of date schedules and times

Schedule information can also include time of day. The complex attribute **tmIntervalsByDoW** also includes **timeOfDayStart** and **timeOfDayEnd** attributes to encode the daily start and end times of service. Complete instructions on how to encode schedules are described in section 2.4.10.4.

### Graphic information

A graphic file should be appropriate for the purpose and should supplement the information in terms of navigational relevance. Preferably, the graphic should provide perspective relevant to the view of the mariner. Graphics should be such that all the information in the graphic is legible in the application display.

Graphic information must be encoded using the complex attribute **graphic**. The simple sub-attribute **pictureInformation** should be used to provide credits to the picture creator, copyright owner etc.

The source date can either be of a complete date (see chapter 2.4.10.1) or truncated date (see chapter 2.4.10.2) type.

Assuming that graphic information provides a coastal view, mariners are interested in knowing from which point on sea that graphic has been taken. The complex attribute **bearingInformation** (see chapter 2.4.13.1) provides all necessary information.

#### Bearing information

The most accurate information should be provided if it is necessary to indicate a position from where a picture has been taken. **information** is a sub-complex attribute of **bearingInformation** and should be used to specify that no bearing information can be provided whenever such is the case. **sectorLimits** and **orientation** can be used to describe a certain level of inaccuracy in the position determination.

## Associations

### Introduction

An association expresses a relationship between two classes - features, information types, or a feature and an information type. Objects in the dataset (instances of feature/information types) are related only if the link between them is encoded in the dataset.

EXAMPLE: An **Authority** information type provides the responsible authority information to the **Marine Protected Area** feature. An association named **protectedAreaAuthority** is used to relate the two classes; roles are used to convey the meaning of the relationship.



Figure 2 Information association relating a feature to an information type

An association end may have a multiplicity which describes how many instances the feature or information type instance at the other end is allowed to are to link to. In the figure, any single instance of **Marine Protected Area** may link to any number of **Authority** instances.

### Association names

The association name is normally provided by the UML diagram at the middle of the connection line/arrow between the two involved classes and can be obtained from the feature and information type tables at sections xx, xx and xx).

Association names may be omitted in the UML diagrams for the following reasons:

a) the association is defined by an association class, see 1.1.4 (the name of the association class is used);

b) to avoid cluttering the diagram – however, the name is always documented in the feature/information type tables.Association roles

Either or both association ends can have a name (role). In Figure 2 the roles are theMarineProtectedArea and responsibleAuthority. This association expresses the relationship that a **Marine Protected Area** may have any number of responsible **Authorit(ies)**, and an **Authority** may be responsible for any number of **Marine Protected Area**s.

Roles may be also omitted from the diagram to reduce clutter – again, the role name is documented in the feature/information type tables.

Note: Instead of documenting every single role, Product Specifications may describe rules for defining default roles.

### Association classes

Association classes allow relationships to be characterized by one or more attributes. The attributes of the association class belong to the association itself, not to any of the features or information types it connects. An association class is both an association and a class. Within an S-122 product the association classes **Permission Type** and **Inclusion Type** may be used for relating vessel classes to feature and information types.

#### Permission Type

This association class specifies the relationship of the vessel class to a feature, e.g., whether access to a feature (or use of a facility) is prohibited or permitted for a specified class of vessel. The class of vessel is described by the simple and complex attributes of the information type **Applicability** such as length, cargo, etc. The attributes of the association class describe the nature of the relationship, i.e., whether access to an area is permitted or prohibited, or whether use of a traffic control service is required or recommended.

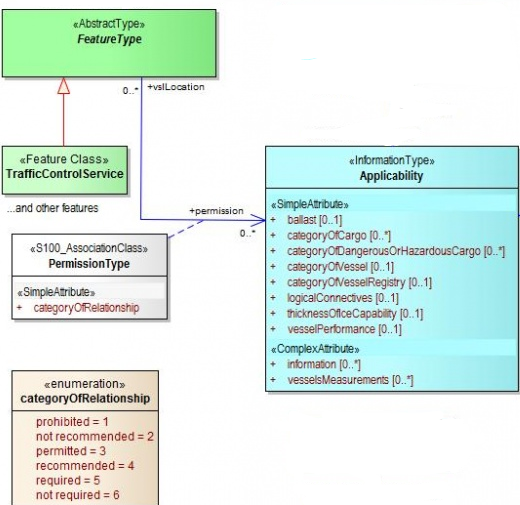


Figure 3 Association class for permission of vessel types in participating

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = Class 3 and an instance of feature **TrafficControlArea**, with **Permission Type**’s attribute **categoryOfRelationship** = required, means that vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code) must participate the **TrafficControlService**.

#### Inclusion Type

This association class defines whether a specified customer (class of vessels, as described by **Applicability**) is excluded or included from a particular regulation, recommendation, etc. Again, the attributes of the association class describe the nature of the relationship; in this case whether the vessel is included or excluded from the regulation, etc.

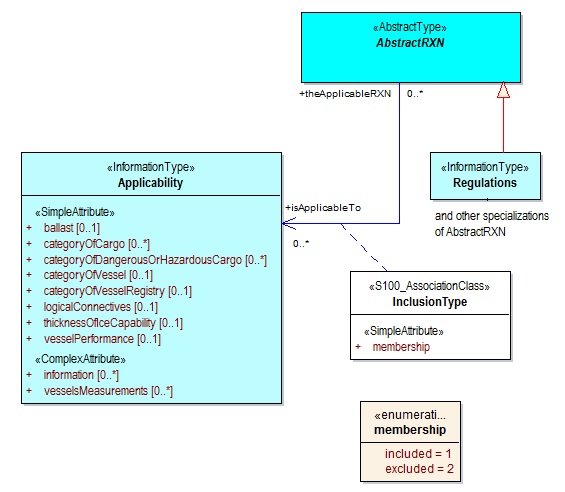


Figure 4 Association class for inclusion of vessel types in regulations

EXAMPLE: An association between an **Applicability** instance with attribute **categoryOfDangerousOrHazardousCargo** = Class 3, with **Inclusion Type**’s attribute **membership** = included, and an association of a **Regulation** instance to the same Inclusion Type, means that the information provided by the **Regulation** (a sub-type of **AbstractRXN)** applies to vessels carrying flammable liquids (hazardous cargo type class 3 in the IMDG Code).

Note (1) Since **AbstractRXN** is an abstract type, it cannot have direct instances in the dataset. Only instances of its (non-abstract) sub-types can be used.

Note (2) Specific tools may use different presentations in their user interfaces, e.g., as two associations (as described in the text of the example), or one association with an association class also shown (as shown in Figure 1).

### Use of various associations

#### General

In general, associations must be encoded whenever the relationship is useful for navigation, monitoring, voyage or route planning, or reporting purposes, or any other purpose for which the dataset is intended. The multiplicity lower bound of “0” at an association end means only that the absence of a link to the relevant instance does not invalidate the dataset. The encoding instructions for individual feature and information types describe what associations are allowed and whether they are required or optional.

#### Generic association for uncategorized additional information

Unless other associations are specified, information types are associated to the relevant features using the association name **additionalInformation** and the role names **provides** and **providedBy**. The association name is not provided on the UML diagrams.

#### Associations to Restrictions, Recommendation, Regulations and Nautical Information

The **Restrictions, Recommendation, Regulations, Nautical Information** are associated to the relevant features using the association name **associatedRxN (inherited from their common abstract super-type)**. The roles at the ends of this association are **appliesInLocation** and **theRxN** (the Restriction, Regulation etc.).

If the regulation applies only to a specific class, or if it mentions an exempt class, an additional association to an **Applicability** object is encoded using the **InclusionType** association class.

#### Conventional Association

Certain features and information types may be permitted or required to have associations to other feature or information types. The allowed or mandatory associations for a feature/information type are listed in the documentation for individual types (Chapters X, Y). Definitions of the associations and roles are given in Chapter Z (Associations).

## Datasets

### Types of Datasets

A dataset is a grouping of features, attributes, geometry and metadata which comprises a specific coverage.

Four types of MPA dataset may be produced and contained within an exchange set:

|  |  |
| --- | --- |
| **Dataset** | **Explanations** |
| Update dataset: | Changing some information in an existing dataset. |
| Re-issue of a dataset: | Including all the Updates applied to the original dataset up to the date of the reissue. A Re-issue does not contain any new information additional to that previously issued by Updates. |
| New dataset: | Including new information which has not been previously distributed by Updates. |
| New Edition of a dataset: | Each New Edition of a dataset must have the same name as the dataset that it replaces. |

Table 2‑10 MPA dataset types

### Overlay exchange sets

Overlay S-122 exchange sets are intended to be used together with S-101 ENC (or similar data products) which will act as a base layer. The base layer is expected to provide navigational and visual context. Generally, an overlay S-122 dataset does not provide “skin of the earth” coverage and there will be large areas with no data coverage because the S-122 application schema does not include any feature for designating a region as “other”, or “not a protected area” (i.e., there is no S-122 equivalent to the S-101 Unsurveyed Area). Further, an overlay exchange set does not include features that provide auxiliary information such as bathymetry within a protected area or navigational marks that may have been installed to indicate the limits of a protected area.

### Data coverage

A MPA dataset can contain more than one **Data Coverage** (see clause X.X). The data boundary is defined by the extent of the **Data Coverage** meta features. Data must only be present within **Data Coverage** meta features.

When a feature extends across datasets of overlapping scale ranges, its geometry must be split at the boundaries of the **Data Coverage** features and its complete attribute description must be repeated in each dataset.

A MPA Update dataset must not change the extent of the data coverage for the base MPA Product. Where the extent of the data coverage for a base MPA Product is to be changed, this must be done by issuing a New Edition of the Product.

### Discovery metadata

Discovery metadata is intended to allow applications to find out important information about datasets and accompanying support files to be examined without accessing the data itself (or without reading the support file). Discovery metadata includes, but is not limited to:

* information identifying the product specification and encoding format;
* edition and version numbers, production/release date, and other details of data creation and updating;
* data coverage of the dataset;
* summary descriptions of content, purpose, use, and limitations;
* identification and contact information for the producer and distributor of the dataset.

S-122 uses the same components of discovery metadata as S-100. The mandatory components for discovery metadata are defined in S-100 Edition 2.0.0 Appendix 4A-D and consist of:

1. Exchange catalogue – a single exchange catalogue for an exchange set. (Subsets of exchange sets are not envisaged.) The elements are defined in S-100 App. 4A § D-2.2 (S100\_ExchangeCatalogue).
2. Dataset discovery metadata for each dataset in the exchange set. Elements are defined in S-100 App. 4A § D-2.6 (S100\_DatasetDiscoveryMetaData).
3. Support file discovery metadata for each support file in the exchange set. Elements are defined in S-100 App. 4A § D-2.11 (S100\_SupportFileDiscoveryMetaData).

Discovery metadata is generally encoded separately from the dataset itself so as to allow applications to read it without processing the dataset itself (i.e., decrypt, decompress, or load the dataset). The encoding format should be easily machine-readable and therefore may be different from the dataset, e.g., the discovery data may be in XML while the data is encoded as ISO 8211 format.

The content and structure of discovery metadata for this product specification is defined in ... (XML format defined by an XML schema available from www.iho.int? URL: [TBD]?)

### Dataset header metadata

Dataset header metadata contains structural and discovery metadata that apply to the whole dataset and are encoded in the dataset file. The elements are described in clause X.X.

### Dataset units

The depth, height and positional uncertainty units in a dataset must be metres.

### Dataset Coverage

MPA datasets are spatially limited.

In areas which include neighbouring producer nations, producing agencies should co-operate to agree on dataset boundaries and ensure no data overlap. Where possible, adjoining nations should agree on common data boundaries within a technical arrangement based on cartographic convenience and benefit to the mariner.

If an MPA extends outside the product coverage and the adjoining object does not exist, e.g. due to delay in the production process by the neighbouring HO product, an indication should be placed at the outer edge of the product.

### Dataset Feature Object Identifiers

Each feature and information instance within an MPA must have a unique universal Feature Object Identifier [FOID]. Where a real-world feature has multiple geometric elements within a single MPA dataset due to the MPA dataset scheme, the same FOID may be used to identify multiple instances of the same feature. Features within a dataset may carry multiple geometries.

Features split across multiple datasets may be identified by the same FOID. Features repeated in different scale ranges may be identified by the same FOID.

FOID must not be reused, even when a feature has been deleted.

### 180° Meridian of Longitude

Datasets must not cross the 180° meridian of longitude.

## Geographic names

### Feature names

If it is required to encode an international or national geographic name, it must be done using complex attribute **featureName** (see clause X.X).

If it is required to encode a geographic name for which there is no existing feature, a specific **MarineProtectedArea, RestrictedArea** or **TrafficControlService** area feature must be created (see clauses X.X, X.X and X.X). In order to minimise the data volume, these features should, where possible, use the geometry of existing features.

Geographic names should be encoded with the complex attribute **featureName. The complex attribute featureName consists of the simple sub-attributes language, name and a Boolean type to indicate whether that particular name is the displayName or not.**

National geographic names can be left in their original national language in a non-English iteration of the complex attribute **featureName** (but only if the national language can be expressed using lexical level 0 or 1), or transliterated or transcribed and used in an English iteration of the complex attribute **featureName**, in which case the national name should be populated in an additional iteration of the **featureName.**

All area and point features within an MPA product should be encoded using **featureName if a name is available**.

1. A group of hydrographic features (e.g. **Obstruction, Wreck**), associated with a particular geographic name, should have the name encoded using **featureName** on a **SeaArea/NamedWaterArea** feature (of type surface or point). The name should not be encoded on the individual hydrographic features.
2. A group of MPA XXXXXXXXXXXXXXX
3. Named features listed in Hydrographic Office’s Sailing Directions that may assist in navigation should be encoded using feature name on the relevant feature (e.g. **Sea Area/Named Water Area, Obstruction, Wreck**).

In all instances, if the exact extent of the feature to be named is known, a feature must be created. If the exact extent is not known, or the area is too small, an existing or specifically encoded point feature should be used to encode the geographic name.

### Text placement

The cartographic feature **TextPlacement** is used specifically to place text cartographically. The properties of the **TextPlacement** feature are described as follows:

Geometry (point) – the point location of the centre of the text string.

Text type – the attribute (or class) which is to be placed.

Flip bearing – the angle forming a semi-circle within which the text can be placed.

The **TextPlacement** feature is associated to the feature which carries the text being placed. The attribute **textType** determines which text string is to be displayed if more than one is present. The **TextPlacement** feature ensures that as an MPA screen rotates from “north up” (e.g. if display is set to “course up”) text can remain readable, or clear other important charted information.

## Scale policy

A MPA product is scale independent. Thus, no scale minimum or maximum policies may apply. Authorities should cooperate at the regional or RENC level to determine a recommended scale range at which the portrayal of the MPA information is suitable and consistent. This scale range must be specified in dataset discovery metadata using the **maximumDisplayScale** and **minimumDisplayScale** elements.

## Masking

To improve the look and feel of the display of MPAs in ECDIS for the mariner certain features, or certain edges of features, should be masked (see S-122 clause X.X).

### Surface features crossing MPA cell boundaries

Figure 5 Overwriting symbols - example

When a single feature of type surface crosses the boundaries of adjoining MPA products, mask the edge where it shares the geometry of the boundary in each MPA:



Figure 6 Surface feature crossing MPA products boundaries

This allows the features to be displayed as a single feature of type surface rather than being divided at the MPA product boundary and having the representation of two separate features.

NOTE: Some production software will automatically truncate (mask) features at the cell boundary.

NOTE: Occasionally an edge of the boundary of an area actually coincides with the MPA product boundary. Where this occurs and the production system applies automatic truncation (masking) of this edge, the compiler must “unmask” that edge so as to avoid the appearance of the area to be “open ended”.

Where features of type surface extend beyond the entire limit of data coverage for the MPA product (see S-101 DCEG clause X.X), all edges of these area features should be masked.

Figure 7 Surface features extending beyond the entire limit of data coverage



The following table lists those features of type surface that should have edges masked where the boundary of the area crosses or extends beyond the MPA product limit or the area of data coverage of the MPA product.

| **Feature Type** | **Comment** |
| --- | --- |
| Marine Protected Area |  |
| Restricted Area Navigational |  |
| Restricted Area Regulatory |  |
| Traffic Control Service |  |
| Obstruction |  |
| Wrecks |  |

Table 2‑11 Features of which edges have to be masked when crossing the MPA product boundary

### “Linear” surface features

If it is required to encode a linear feature when the only allowable primitive for the relevant feature type is surface (e.g. a “linear” Marine Protected Area (see clause X.X)), a “very narrow surface” should be encoded. An edge of this surface should correspond to the position of the line. All other edges should be masked.



Figure 8 “Linear” Marine Protected Area

# Description of table format for feature and information types

**X.X Clause heading**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **FEATURE:** Definition. (Authority for definition). | | | | | | | | | | |
| **S-122 [Geo/Information] Feature: Feature (S-57 Acronym)** S-101 feature and corresponding S-57 acronym (if applicable) | | | | | | | | | | |
| **Primitives:** Allowable geometric primitive(s) [**Point, Curve, Surface]** | | | | | | | | | | |
| *Real World*  Example if real world instance(s) of the Feature. | | *Paper Chart Symbol*  Example(s) of paper chart equivalent symbology for the Feature (if applicable). | | | | | *ECDIS Symbol*  Example(s) of proposed ECDIS symbology for the Feature. | | | |
| **S-122 Attribute** | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | **Multiplicity** | |
| Category of beer | | |  | | | 1 : ale  2 : lager  3 : porter  4 : stout  5 : pilsener  6 : bock beer  7 : wheat beer | | EN | 1,1 | |
| This section liststhe full list of allowable attributes for the S-101 feature. Attributes are listed in alphabetical order. Sub-attributes (Type prefix (S)) of complex (Type C) attributes are listed in alphabetical order and indented directly under the entry for the complex attribute (see below for example). | | | This section liststhe corresponding S-57 attribute acronym. A blank cell indicates no corresponding S-57 acronym. | | | This section liststhe allowable encoding values for S-101 (for enumerate (E) Type attributes only). Further information about the attribute is available in Section XX. | | Attribute type (see clause X.X). | Multiplicity describes the “cardinality” of the attribute in regard to the feature. If “(ordered)” is included, the order of the instances matters. See clause X.X. | |
| Fixed date range | | |  | | |  | | C | 0,1 | |
| Date end | | | (DATEND) | | |  | | (S) DA | 0,1 | |
| Date start | | | (DATSTA) | | |  | | (S) DA | 0,1 | |
| **Feature associations** | | | | | | | | | | |
| **Role Type** | **Association Name** | | | **Role** | **Features** | | | | | **Multiplicity** |
| Association  Aggregation  Composition | Name of the Association | | | Role Name | Features that are at the other end of the association | | | | |  |
| INT 1 Reference: The INT 1 location(s) of the Feature – by INT1 Section and Section Number (if applicable).  **X.X.X Sub-clause heading(s) (see S-4 – B-YYY.Y)**  Introductory remarks. Includes information regarding the real world entity/situation requiring the encoding of the Feature in the ENC, and where required nautical cartographic principles relevant to the Feature to aid the compiler in determining encoding requirements.  Specific instructions to encode the feature.  Remarks:   * Additional encoding guidance relevant to the feature.   **X.X.X.X Sub-sub-clause heading(s) (see S-4 – B-CCC.C)**  Clauses related to specific encoding scenarios for the Feature (if required).  Remarks:   * Additional encoding guidance relevant to the scenario (if required).   Distinction: List of features in the Product Specification distinct from the Feature. | | | | | | | | | | |

Remarks:

S-122 Attribute: Indentation of attributes indicates sub-attributes of complex attributes. Complex attributes may also be sub-attributes of complex attributes, which is indicated by further indentation of the attribute name in the tables.

S-122 Attribute: Attributes shown in grey text are ECDIS “system” attributes which are not visible to the encoder, but are populated by the ENC production system in order to assist with portrayal of ENC data in ECDIS (see Section X.X).

S-57 Acronym: S-57 attribute acronyms shown in italic style text have been re-modelled in S-101 from S-57.

Allowable Encoding Value: For (EN) type attributes, the enumerates listed are only those allowable for the particular occurrence of the attribute relevant to the feature. Allowable values may vary for the attribute depending on the feature to which the attribute is bound. Such bindings are defined in the S-122 Feature Catalogue. The full list of enumerates that may be assigned to an attribute in S-122 can be found in Section X.X – Attribute and Enumerate Descriptions – of this document.

Type: The prefix (C) indicates that the attribute is a complex attribute. Complex attributes are aggregates of other attributes that can be simple type or complex type (see clause X.X). The prefix (S) indicates that the attribute is a sub-attribute of a complex attribute. Complex attributes that are sub-attributes of a complex attribute, and their sub-attributes, are indicated by indentation of the attribute name in the S-122 Attribute column.

# Metadata Features

## Introduction

The maximum use must be made of meta features to reduce the attribution on individual features. In a base dataset (EN Application profile, see S-122 MPA Product Specification main document clause X.X), some meta features are mandatory.

## Mandatory meta features

These mandatory meta features are in the following list:

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

## Data coverage meta feature

**Data Coverage**: In order to assist in data discovery, the meta feature **Data Coverage** must be used to provide coverage of the part of the dataset covered by Skin of the Earth features. See clause X.X.

## Quality of non-bathymetric data

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **QUALITY OF NON-BATHYMETRIC DATA**. An area within which the best estimate of the overall uncertainty of the data is uniform. The overall uncertainty takes into account for example the source accuracy, chart scale, digitising accuracy etc. (Adapted from S-57 Edition 3.1, Appendix A – Chapter 1, Page 1.208, November 2000). | | | | | | |
| **S-101 Metadata Feature: Quality of non-bathymetric data (M\_ACCY)** | | | | | | |
| **Primitives: Surface** | | | | | | |
| *Real World* | *Paper Chart Symbol* | | | *ECDIS Symbol* | | |
| **S-101 Attribute** | | **S-57 Acronym** | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Horizontal distance uncertainty | | (HORACC) |  | | RE | 0,1 |
| Orientation uncertainty | |  |  | | RE | 0,1 |
| Positional uncertainty | | (POSACC) |  | | RE | 1,1 |
| Survey date range | |  |  | | C | 0,1 |
| Date end | | *(SUREND)* | ISO 8601:2004 | | (S) DA | 1,1 |
| Date start | | *(SURSTA)* | ISO 8601:2004 | | (S) DA | 0,1 |
| Vertical uncertainty | | (VERACC) |  | | RE | 0,1 |
| INT 1 Reference:  Quality of positions  The meta feature **Quality of Non-bathymetric Data** may be used to provide an indication of the overall uncertainty of position for all non-bathymetric features. It must not be used to provide the uncertainty of bathymetric information.  The attributes **quality of position** and **positional uncertainty** may be applied to any spatial type, in order to qualify the location of a feature.  **Horizontal distance uncertainty, quality of position** and **positional uncertainty** must not be applied to the spatial type of any geo feature if they are identical to the **horizontal distance uncertainty, quality of position** and **positional uncertainty** values of the underlying meta feature.  **quality of position** gives qualitative information, whereas **positional uncertainty** gives quantitative information.  **Positional uncertainty** on the **Quality of Non-bathymetric Data** applies to non-bathymetric data situated within the area, while **quality of position** or **positional uncertainty** on the associated spatial types qualifies the location of the **Quality of Non-bathymetric Data** feature itself.  Meta features **Quality of Non-bathymetric Data** and **Quality of Bathymetric Data** should not overlap.  Remarks:   * No remarks.   Distinction: Quality of bathymetric data; quality of survey. | | | | | | |

# Geo Features

## Marine Protected Area

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **MARINE PROTECTED AREA:** Any area of the intertidal or sub tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment. (IUCN – The World Conservation Union. 1998. Resolution 17.38 of the 17th General Assembly of the IUCN. Gland, Switzerland and Cambridge, UK.). | | | | | | | | | |
| **S-101 Geo Feature: MarineProtectedArea** | | | | | | | | | |
| **Primitives: Curve, Surface** | | | | | | | | | |
| *Real World*  . | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | |
| **S-101 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of IUCN | | | |  | | 1 : Category Ia  2 : Category Ib  3 : Category II  4 : Category III  5 : Category IV  6 : Category V  7 : Category VI | | EN | 0,1 |
| Category of restrictions | | | | (CATREA) | | 4: nature reserve  5: bird sanctuary  6: game reserve  7: seal sanctuary  10: historic wreck area  20: research area  22: fish sanctuary  23: ecological reserve  27: Environmentally Sensitive Sea Area (ESSA)  28: Particularly Sensitive Sea Area (PSSA)  29: Coral Sanctuary | | EN | 0,\* |
| Jurisdiction | | | | (JRSDTN) | | 1: international  2: national  2: national sub-division | | EN |  |
| Restriction | | | | (RESTRN) | | 1: anchoring prohibited  2: anchoring restricted  3: fishing prohibited  4: fishing restricted  5: trawling prohibited  6: trawling restricted  7: entry prohibited  8: entry restricted  9: dredging prohibited  10: dredging restricted  11: diving prohibited  12: diving restricted  13: no wake  14: area to be avoided  15: construction prohibited  16: discharging prohibited  17: discharging restricted  18: industrial or mineral exploration/ development prohibited  19: industrial or mineral exploration/ development restricted  20: drilling prohibited  21: drilling restricted  22: removal of historical artifacts prohibited  23: cargo transhipment (lightering) prohibited  24: dragging prohibited  25: stopping prohibited  26: landing prohibited  27: speed restricted | | EN | 0,\* |
| Status | | | | (STATUS) | | 1: permanent  2: occasional  3: recommended  4: not in use  5: periodic/intermittent  6: reserved  7: temporary  8: private  9: mandatory  13: historic  14: public  16 : watched  17: un-watched | | EN | 0,\* |
| Graphic | | | |  | |  | | C | 0,\* |
| Pictorial representation | | | | (PICREP) | |  | | TE | 0,1 |
| Picture Caption | | | |  | |  | | TE | 0,1 |
| Source Date | | | |  | |  | | S(DA) | 0,1 |
| Picture Information | | | |  | |  | | TE | 0,1 |
| Bearing Information | | | |  | |  | | C | 0,1 |
| Cardinal Direction | | | |  | |  | | EN | 0,1 |
| Distance | | | |  | |  | | RE | 0,1 |
| Information | | | |  | |  | | C | 0,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| Orientation | | | | (ORIENT) | |  | | C | 0,1 |
| Orientation Uncertainty | | | |  | |  | | R | 0,1 |
| Orientation Value | | | |  | |  | | R |  |
| Sector Limit | | | |  | |  | | C | 0,1 |
| Sector Limit One | | | |  | |  | | R |  |
| Sector Limit Two | | | |  | |  | | R |  |
| Scale maximum | | | | (SCAMAX) | | See clause X.X | | IN | 0,1 |
| Scale minimum | | | | (SCAMIN) | | See clause X.X | | IN | 0,1 |
| Fixed date range | | | |  | |  | | C | 0,1 |
| Date end | | | | (DATEND) | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Textual Content | | | |  | |  | | C | 1,\* |
| Category of Text | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | EN | 0,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | |  | |  | | S (TE) | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Online Resource | | | |  | |  | | C | 0,1 |
| Linkage | | | |  | | ISO 19115-1:2014 | | URL |  |
| Protocol | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Application Profile | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Name of Resource | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Description | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Online function | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | EN | 0,1 |
| Protocol Request | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
|  | | | |  | |  | |  |  |
| **Feature associations** | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | **Multiplicity** |
| Association |  | | Supported by | | **Authority** | | | | 0,\* |
| Association |  | | Supported by | | **Restrictions, Regulations, Recommendations, Nautical Information** | | | | 0,\* |
| INT 1 Reference: nil  Introductory remarks. Marine Protected Areas normally specified by IUCN. If the specification can’t be provided the CATIUC attribute has to set to "unknown".  Navigation within Marine Protected areas can be limited by regulations/restrictions and recommendations. That information is usually provided by relevant authorities.  Remarks:  nil  Remarks:  nil  Distinction: Caution area; Marine farm/culture; Military practice area; Restricted area | | | | | | | | | |

## Traffic Control Services

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **TRAFFIC CONTROL SERVICES:** A service implemented by a relevant authority for shipping, e.g. traffic control, information, assistance. | | | | | | | | | |
| **S-101 Geo Feature: TrafficControlServices** | | | | | | | | | |
| **Primitives: Surface** | | | | | | | | | |
| *Real World*  . | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of traffic control services | | | |  | | 1 : Vessel Traffic Service  2 : Port Service  3 : Ship Reporting System  4 : Broadcast Service | | EN | 0,1 |
| Requirements for maintenance of listening watch | | | |  | |  | | S (TE) | 0,1 |
| Service access procedure | | | |  | |  | | S (TE) | 0,1 |
| Scale maximum | | | | (SCAMAX) | | See clause X.X | | IN | 0,1 |
| Scale minimum | | | | (SCAMIN) | | See clause X.X | | IN | 0,1 |
| Fixed date range | | | |  | |  | | C | 0,1 |
| Date end | | | | (DATEND) | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Textual Content | | | |  | |  | | C | 1,\* |
| Category of Text | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | EN | 0,1 |
|  | | | |  | |  | |  |  |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| File reference | | | | *(TXTDSC) (NTXTDS)* | |  | | (S) TE | 1,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | |  | |  | | S (TE) | 0,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Online Resource | | | |  | |  | | C | 0,1 |
| Linkage | | | |  | | ISO 19115-1:2014 | | URL |  |
| Protocol | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Application Profile | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Name of Resource | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Description | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Online function | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | EN | 0,1 |
| Protocol Request | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
|  | | | |  | |  | |  |  |
| **Feature associations** | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | **Multiplicity** |
| Association | srvControl | | controlAuthority | | **Authority** | | | | 0,\* |
| Association |  | |  | | **Service Hours** | | | | 0,\* |
| Association | trafficServRept | | reptForTrafficServ | | **Ship Report** | | | | 0,\* |
| Association |  | |  | | **Contact Details** | | | | 0,\* |
| Association |  | | permission | | **Applicability** | | | | 0,\* |
| Association |  | | provides | | **Restrictions, Regulations, Recommendations, Nautical Information** | | | | 0,\* |
| INT 1 Reference: nil  Introductory remarks.  Remarks:  The area geometry presents where the service is provided.  Remarks:  nil  Distinction: | | | | | | | | | |

## Restricted Area

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **RESTRICTED AREA:** 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. (Adapted from IHO Dictionary – S-32). | | | | | | | | | |
| **S-101 Geo Feature: Restricted Area (RESARE)** | | | | | | | | | |
| **Primitives: Surface** | | | | | | | | | |
| *Real World*  . | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | |
| **S-101 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of restrictions | | | | (CATREA) | | 4: nature reserve  5: bird sanctuary  6: game reserve  7: seal sanctuary  10: historic wreck area  20: research area  22: fish sanctuary  23: ecological reserve  27: Environmentally Sensitive Sea Area (ESSA)  28: Particularly Sensitive Sea Area (PSSA)  29: Coral Sanctuary | | EN | 0,\* |
| Restriction | | | | (RESTRN) | | 1: anchoring prohibited  2: anchoring restricted  3: fishing prohibited  4: fishing restricted  5: trawling prohibited  6: trawling restricted  7: entry prohibited  8: entry restricted  9: dredging prohibited  10: dredging restricted  11: diving prohibited  12: diving restricted  13: no wake  14: area to be avoided  15: construction prohibited  16: discharging prohibited  17: discharging restricted  18: industrial or mineral exploration/ development prohibited  19: industrial or mineral exploration/ development restricted  20: drilling prohibited  21: drilling restricted  22: removal of historical artifacts prohibited  23: cargo transhipment (lightering) prohibited  24: dragging prohibited  25: stopping prohibited  26: landing prohibited  27: speed restricted | | EN | 0,\* |
| Status | | | | (STATUS) | | 1 : permanent  2 : occasional  3 : recommended  4: not in use  5 : periodic/intermittent  6 : reserved  7: temporary  8: private  9 : mandatory  13: historic  14: public  16 : watched  17 : un-watched | | EN | 0,\* |
| Scale maximum | | | | (SCAMAX) | | See clause X.X | | IN | 0,1 |
| Scale minimum | | | | (SCAMIN) | | See clause X.X | | IN | 0,1 |
| Fixed date range | | | |  | |  | | C | 0,1 |
| Date end | | | | (DATEND) | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Textual Content | | | |  | |  | | C | 1,\* |
| Category of Text | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | EN | 0,1 |
|  | | | |  | |  | |  |  |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| File reference | | | | *(TXTDSC) (NTXTDS)* | |  | | (S) TE | 1,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | |  | |  | | S (TE) | 0,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Online Resource | | | |  | |  | | C | 0,1 |
| Linkage | | | |  | | ISO 19115-1:2014 | | URL |  |
| Protocol | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Application Profile | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Name of Resource | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Description | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Online function | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | EN | 0,1 |
| Protocol Request | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
|  | | | |  | |  | |  |  |
| **Feature associations** | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | **Multiplicity** |
| Association |  | | Supported by | | **Authority** | | | | 0,\* |
| Association |  | | Supported by | | **Restrictions, Regulations, Recommendations, Nautical Information** | | | | 0,\* |
| INT 1 Reference: L 3, 5.2; M 29.1, N 2.1-2, 20-22, 25, 26, 31, 34, 63  **16.26.1 Restricted areas in general (see S-4 – B-431.4; B-435.7; B-435.11; B-437.1-7; B-439.2-4; B-445.9; B-448; B-448.1 and B-449.5)**  There are many types of areas within which certain activities are discouraged or prohibited, or from which certain classes of vessels are excluded. The general term for all areas in which certain aspects of navigation may be restricted or prohibited by regulations is “Restricted Area”, or equivalent. The word “prohibited”, or its equivalent, may appear in terms relating to activities which are contrary to the regulations, e.g. “Anchoring Prohibited”, “Entry Prohibited”.  If it is required to encode a restricted area, it must be done using the feature **Restricted Area** or **Marine Protected Areas.**  Remarks:  The attribute **category of restricted area** is used to describe the reason for the regulation, while the attribute **restriction** describes the restrictions.  An associated instance of the information types **Restrictions**, **Regulations**, **Recommendations** and **Nautical Information**, complex attributes **text content** sub-attribute **information** or solely attribute **information** may be used to provide an additional explanation about the restriction, where required.  **Supplementary Information** (see clause X.X), complex attributes **information** or **textual description** may be used if the information cannot be encoded by using the information types mention at the paragraph above.  If it is required to encode an area for which the mariner must be made aware of circumstances influencing the safety of navigation, it must be done using the feature **Caution Area** (see clause X.X). This feature may be used to identify a danger, a risk, a rule or advice (e.g. an area of continually changing depths) which  is not directly related to a particular feature.  **16.26.1.3 Nature reserves (see S-4 – B-437.3)**  If it is required to encode a marine nature reserve area, it must be done using a **Restricted Area** feature, with attribute **category of restricted area** = *4* (nature reserve).  **16.26.1.4 Speed limits (see S-4 – B-430.2)**  Speed is often limited inside MPAs in order to protect the species that inhabit the area. If it is required to encode this restriction, it must be done using a **Restricted Area** feature, with the attribute **restriction** = *27* (speed restricted), with the speed limit and its unit of measurement encoded using an associated instance of the information type **Regulations** (see clause X.X),  **16.26.1.5 Anchoring restricted (see S-4 – B-431.4)**  If it is required to encode a restricted anchoring area, it must be done using a **Restricted Area** feature, or using other features with the attribute **restriction** (see clause X.X), where **restriction** = *1* (anchoring prohibited), or *2* (anchoring restricted). Additional information about the restriction should be encoded using an associated instance of the information type **Regulations** (see clause X.X).  **16.26.1.6 Areas to be avoided (see S-4 – B-435.7)**  If it is required to encode an IMO designated Area to be Avoided, it must be done using a **Restricted Area** feature, with attribute **restriction** = *14* (area to be avoided).  **16.26.1.7 Environmentally Sensitive Sea Areas (see S-4 – B-437)**  Environmentally Sensitive Sea Areas (ESSA) should be included on ENCs where there is a specifically identified requirement, and where it is practicable, given the maximum display scale of the ENC data and the extent of the ESSA. If there is no such requirement, or if it is not practicable, details of ESSA should only be inserted in associated publications, such as Sailing Directions. It should be noted that the inclusion of ESSA on smaller maximum display scale of the ENC data may be appropriate for voyage planning purposes.  If it is required to encode an Environmentally Sensitive Sea Area, it must be done using a **Restricted Area** feature, with attribute **category of restricted area** = *27* (ESSA) or *28* (PSSA).  An Environmentally Sensitive Sea Area that is shown on the source as a point symbol should be encoded using a small surface **Restricted Area** feature*.*  Distinction: Marine Protected Area  Remarks:  nil | | | | | | | | | |

## Information Area

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

# Cartographic Features

## Cartographic Features derived from S-101 (version 1.0)

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

# Information Types

## Information Types derived from S-101 (version 1.0)

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

## Authority

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **AUTHORITY**. A person or organisation having political or administrative power and control. (Oxford Dictionary of English). | | | | | | | | | |
| **S-122 Information Feature: Authority** | | | | | | | | | |
| **Primitives: None** | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Authority | | | |  | | 1 : customs  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 | | EN | 0,1 |
| Fixed date range | | | |  | |  | | C | 0,1 |
| Date end | | | | (DATEND) | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Textual Content | | | |  | |  | | C | 1,\* |
| Category of Text | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | EN | 0,1 |
|  | | | |  | |  | |  |  |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| File reference | | | | *(TXTDSC) (NTXTDS)* | |  | | (S) TE | 1,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | |  | |  | | S (TE) | 0,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Online Resource | | | |  | |  | | C | 0,1 |
| Linkage | | | |  | | ISO 19115-1:2014 | | URL |  |
| Protocol | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Application Profile | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Name of Resource | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Description | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Online function | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | EN | 0,1 |
| Protocol Request | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| **Information associations** | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | **Multiplicity** |
| Association |  | | Supports | | Marine Protected Area | | | | 0,\* |
| Association |  | | Supported by | | Contact Details | | | | 0,\* |
| Association |  | | Supported by | | Ship Report | | | | 0,\* |
| Association |  | | Supported by | | Service Hours | | | | 0,\* |
| INT 1 Reference:  Remarks:   * No remarks.   Distinction: | | | | | | | | | |

## Ship Report

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **SHIP REPORT**. This describes how a ship should report to a maritime authority, including when to report, what to report and whether the format conforms to the IMO standard. | | | | | | | | | | |
| **S-122 Information Feature: Ship Report** | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Category of Ship Report | | | | |  | | 1 : Sailing Plan  2 : position report  3 : deviation report  4 : final report  5 : dangerous goods report  6 : harmful substances report  7 : marine pollutants report  8 : any other report | | EN | 1,\* |
| IMO Format for Reporting | | | | |  | | True (Yes) | | BO |  |
| Fixed date range | | | |  | | |  | | C | 0,1 |
| Date end | | | | (DATEND) | | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | | |  | | C | 0,\* |
| Display name | | | |  | | |  | | (S) BO | 0,1 |
| Language | | | |  | | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | (S) TE | 1,1 |
| Textual Content | | | | |  | |  | | C | 1,\* |
| Category of Text | | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | EN | 0,1 |
|  | | | | |  | |  | |  |  |
| Language | | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| File reference | | | | | *(TXTDSC) (NTXTDS)* | |  | | (S) TE | 1,1 |
| Information | | | | |  | |  | | C | 1,\* |
| Language | | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | | |  | |  | | S (TE) | 0,1 |
| Source Indication | | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | | |  | |  | |  | 0,1 |
| Source | | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | | |  | |  | | C | 0,\* |
| Display name | | | | |  | |  | | (S) BO | 0,1 |
| Language | | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Online Resource | | | | |  | |  | | C | 0,1 |
| Linkage | | | | |  | | ISO 19115-1:2014 | | URL |  |
| Protocol | | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Application Profile | | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Name of Resource | | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Description | | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Online function | | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | EN | 0,1 |
| Protocol Request | | | | |  | | ISO 19115 | | (S) TE | 0,1 |
| Source Indication | | | | (SORIND) | | |  | | (S) TE | 0,1 |
| Source Type | | | |  | | |  | |  | 0,1 |
| Source | | | |  | | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | | |  | | EN | 0,1 |
| Feature name | | | |  | | |  | | C | 0,\* |
| Display name | | | |  | | |  | | (S) BO | 0,1 |
| Language | | | |  | | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | (S) TE | 1,1 |
| Notice Time | | | | |  | |  | | C | 1,\* |
| Notice Time Hours | | | | |  | |  | |  | 0,\* (ordered) |
| Notice Time Text | | | | |  | |  | |  | 0,1 |
| Operation | | | | |  | |  | |  | 0,1 |
| **Information associations** | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | | **Features** | | | | **Multiplicity** |
| Additional Information |  | | Supports | | | Authority | | | | 0,\* |
| Additional Information |  | | Supports | | | Marine Service | | | | 0,\* |
| Additional Information |  | | Supported by | | | Applicability | | | | 0,\* |
| INT 1 Reference:  Remarks:   * TXTCON is used to describe non-standard ship reports. The Associated Information Object APPLIC indicates characteristics of vessels which use this report. * Distinction: | | | | | | | | | | |

## Contact Details

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **CONTACT DETAILS**. Information on how to reach a person or organisation by postal, internet, telephone, telex and radio systems. | | | | | | | | | |
| **S-122 Information Feature: Contact Details** | | | | | | | | | |
| **Primitives: None** | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Call name (unchanged from the current DCEG draft) | | | | (CALNAM) | |  | | S(TE) | 0,1 |
| Call sign (unchanged from the current DCEG draft) | | | | (CALSGN) | |  | |  |  |
| COMCHA (it is proposed to use it not exclusively for VHF Channels; see below) | | | | (COMCHA) | |  | | TE | 0..\* |
| Maritime Mobile Service Identity (MMSI) Code | | | |  | |  | | I | 0,1 |
| Category of channel or frequency preference | | | |  | |  | | EN | 0,1 |
| Contact Instructions | | | |  | |  | | S(TE) | 0,1 |
| Contact Address | | | |  | |  | | C | 0,\* |
| Delivery Point | | | |  | |  | | S(TE) | 0,\* |
| City Name | | | |  | |  | | S(TE) | 0,1 |
| Administrative Division | | | |  | |  | | S(TE) | 0,1 |
| Country | | | |  | |  | | S(TE) | 0,1 |
| Postal Code | | | |  | |  | | S(TE) | 0,1 |
| Frequency pair | | | |  | |  | | C | 0,1 |
| Frequency shore station transmits | | | |  | |  | | I | 0,\* |
| Frequency shore station receives | | | |  | |  | | I | 0,\* |
| Contact Instructions | | | |  | |  | | S(TE) | 0,\* |
| Online Resource | | | |  | |  | | C | 0,\* |
| Linkage | | | |  | | ISO 19115:2014 | | S(URL) | 1,1 |
| Protocol | | | |  | | ISO 19115:2014 | | S(TE) | 0,1 |
| Application Profile | | | |  | | ISO 19115:2014 | | S(TE) | 0,1 |
| Name of Resource | | | |  | | ISO 19115:2014 | | S(TE) | 0,1 |
| Description | | | |  | | ISO 19115:2014 | | S(TE) | 0,1 |
| Online function | | | |  | | ISO 19115:2014 | | E(CL) | 0,1 |
| Protocol Request | | | |  | | ISO 19115:2014 | | S(TE) | 0,1 |
| Telecommunications | | | |  | |  | | C | 0,\* |
| Telecommunication Identifier | | | |  | |  | | S(TE) | 1,1 |
| Telecommunications Service Carrier | | | |  | |  | | S(TE) | 0,1 |
| Contact Instructions | | | |  | |  | | S(TE) | 0,1 |
| Telecommunications Service | | | |  | |  | | E(CL) | 0,\* |
| Fixed date range | | | |  | |  | | C | 0,1 |
| Date end | | | | (DATEND) | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| Information | | | |  | |  | | C | 1,\* |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | |  | |  | | S (TE) | 0,1 |
| Source Indication | | | | (SORIND) | |  | | (S) TE | 0,1 |
| Source Type | | | |  | |  | |  | 0,1 |
| Source | | | |  | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | |  | | EN | 0,1 |
| Feature name | | | |  | |  | | C | 0,\* |
| Display name | | | |  | |  | | (S) BO | 0,1 |
| Language | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | (S) TE | 1,1 |
| **Information associations** | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | **Multiplicity** |
| Additional Information |  | | Supports | | Authority | | | | 0,\* |
| INT 1 Reference:  Remarks:   * No remarks.   Distinction: | | | | | | | | | |

## Service Hours

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **SERVICE HOURS** The time when a service is available and known exceptions. | | | | | | | | | | | | | | |
| **S-122 Information Feature: Service Hours** | | | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | | *ECDIS Symbol* | | | | | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | | | **Multiplicity** | | |
| Working Schedule | | | | |  | |  | | C | | | 1,\* | | |
| Day of the Week | | | | |  | |  | | EN | | | 0,7 (ordered) | | |
| Working Hours of Day | | | |  | | |  | | C | | | 0,1 | | |
| Time reference | | | |  | | |  | | EN | | | 1 | | |
| Time of Start of Work | | | |  | | |  | | TI | | | 1,\* (ordered) | | |
| Time of End of Work | | | |  | | |  | | TI | | | 1,\* (ordered) | | |
| Day of Wee Range | | | |  | | |  | | C | | | 0,1 | | |
| Day of Week | | | |  | | |  | | EN | | | 2 (ordered) | | |
| Fixed date range | | | |  | | |  | | | C | 0,1 | | |
| Date end | | | | (DATEND) | | |  | | | (S) DA | 0,1 | | |
| Date start | | | | (DATSTA) | | |  | | | (S) DA | 0,1 | | |
| Periodic date range | | | |  | | |  | | | C | 0,\* | | |
| Date end | | | | *(PEREND)* | | | ISO 8601: 2004 | | | (S) DA | 1,1 | | |
| Date start | | | | *(PERSTA)* | | | ISO 8601: 2004 | | | (S) DA | 1,1 | | |
| Feature name | | | |  | | |  | | | C | 0,\* | | |
| Display name | | | |  | | |  | | | (S) BO | 0,1 | | |
| Language | | | |  | | | ISO 639-3 | | | (S) TE | 0,1 | | |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | | (S) TE | 1,1 | | |
| Information | | | | |  | |  | | | C | 1,\* | | |
| Language | | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | | |
| Text | | | | | *(INFORM) (NINFOM)* | |  | | | (S) TE | 1,1 | | |
| File Reference | | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | | S (TE) | 0,1 | | |
| File Locator | | | | |  | |  | | | S (TE) | 0,1 | | |
| Headline | | | | |  | |  | | | S (TE) | 0,1 | | |
| Source Indication | | | | (SORIND) | | |  | | | (S) TE | 0,1 | | |
| Source Type | | | |  | | |  | | |  | 0,1 | | |
| Source | | | |  | | |  | | | (S)TE | 0,1 | | |
| Reported Date | | | |  | | | (((S-100 truncated Date)))) | | |  | 0,1 | | |
| Country | | | |  | | | ISO3166-1-alpha2 | | |  | 0,1 | | |
| Category of Authority | | | | (CATAUT) | | |  | | | EN | 0,1 | | |
| Feature name | | | |  | | |  | | | C | 0,\* | | |
| Display name | | | |  | | |  | | | (S) BO | 0,1 | | |
| Language | | | |  | | | ISO 639-3 | | | (S) TE | 0,1 | | |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | | (S) TE | 1,1 | | |
| **Information associations** | | | | | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | | **Features** | | | | | | | **Multiplicity** | |
| Additional Information |  | | Supports | | | Authority | | | | | | | 0,\* | |
| Additional Information |  | | Supported by | | | Non Standard Working Day | | | | | | | 0,\* | |
| INT 1 Reference:  Remarks:   * No remarks.   Distinction: | | | | | | | | | | | | | | |

## Non Standard Working Day

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **NON STANDARD WORKING DAY** Days when many services are not available. Often days of festivity or recreation when normal working hours are limited, esp. a national or religious festival, etc. | | | | | | | | | | |
| **S-122 Information Feature: Non Standard Working Day** | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | **Type** | **Multiplicity** |
| Fixed Date | | | | |  | | (((S-100 truncated Date)))) | |  | 0,\* |
| Variable Date | | | | |  | |  | | S(TE) | 0,\* |
| Fixed date range | | | |  | | |  | | C | 0,1 |
| Date end | | | | (DATEND) | | |  | | (S) DA | 0,1 |
| Date start | | | | (DATSTA) | | |  | | (S) DA | 0,1 |
| Periodic date range | | | |  | | |  | | C | 0,\* |
| Date end | | | | *(PEREND)* | | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Date start | | | | *(PERSTA)* | | | ISO 8601: 2004 | | (S) DA | 1,1 |
| Feature name | | | |  | | |  | | C | 0,\* |
| Display name | | | |  | | |  | | (S) BO | 0,1 |
| Language | | | |  | | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | (S) TE | 1,1 |
| Information | | | | |  | |  | | C | 1,\* |
| Language | | | | |  | | ISO 639-3 | | (S) TE | 0,1 |
| Text | | | | | *(INFORM) (NINFOM)* | |  | | (S) TE | 1,1 |
| File Reference | | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | S (TE) | 0,1 |
| File Locator | | | | |  | |  | | S (TE) | 0,1 |
| Headline | | | | |  | |  | | S (TE) | 0,1 |
| Source Indication | | | | (SORIND) | | |  | | (S) TE | 0,1 |
| Source Type | | | |  | | |  | |  | 0,1 |
| Source | | | |  | | |  | | (S)TE | 0,1 |
| Reported Date | | | |  | | | (((S-100 truncated Date)))) | |  | 0,1 |
| Country | | | |  | | | ISO3166-1-alpha2 | |  | 0,1 |
| Category of Authority | | | | (CATAUT) | | |  | | EN | 0,1 |
| Feature name | | | |  | | |  | | C | 0,\* |
| Display name | | | |  | | |  | | (S) BO | 0,1 |
| Language | | | |  | | | ISO 639-3 | | (S) TE | 0,1 |
| Name | | | | *(OBJNAM) (NOBJNM)* | | |  | | (S) TE | 1,1 |
| **Information associations** | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | | **Features** | | | | **Multiplicity** |
| Additional Information |  | | Supports | | | Service Hours | | | |  |
| INT 1 Reference:  Remarks:   * No remarks.   Distinction: | | | | | | | | | | |

## Applicability

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **APPLICABILITY** Describes the relationship between vessel characteristics and: (i) the applicability of an associated information object or feature to the vessel; or, (ii) the use of a facility, place, or service by the vessel; or, (iii) passage of the vessel through an area. | | | | | | | | | | | | |
| **S-122 Information Feature: Service Hours** | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | | | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | | | | **Multiplicity** |
| Ballast | | | |  | | 1=Yes | | BO | | | | 0,1 |
| Category of Cargo | | | |  | | 1 : bulk  2 : container  3 : general  4 : liquid  5 : passenger  6 : livestock  7 : dangerous or hazardous | | EN | | | | 0,\* |
| Category of Dangerous or Hazardous Cargo | | | |  | | 1 : Class 1; Division 1.1  2 : Class 1; Division 1.2  3 : Class 1; Division 1.3  4 : Class 1; Division 1.4  5 : Class 1; Division 1.5  6 : Class 1; Division 1.6  7 : Class 2.1  8 : Class 2.2  9 : Class 2.3  10 : Class 3  11 : Class 4.1  12 : Class 4.2  13 : Class 4.3  14 : Class 5.1  15 : Class 5.2  16 : Class 6.1  17 : Class 6.2  18 : Class 7  19 : Class 8  20 : Class 9  21 : Harmful Substances in packaged form | | EN | | | | 0,\* |
| Category of Vessel Registry | | | |  | | 1: domestic  2: foreign | | EN | | | | 0,1 |
| Category of Vessel | | | |  | | 1: general cargo vessel  2: container carrier  3: tanker  4: bulk carrier  5: passenger vessel  6: roll-on roll-off  7: refrigerated cargo vessel  8: fishing vessel  9: service  10 : warship  11: towed or pushed composite unit  12: tug and tow | | EN (CL) | | | | 0,1 |
| Thickness of Ice Capability | | | |  | |  | | IN | | | |  |
| Logical Connectives | | | |  | | 1: logical conjunction  2: logical disjunction | | EN | | | | 0,1 |
| Vessel Performance | | | |  | |  | | TE | | | |  |
| Underkeel Allowance | | | |  | |  | | C | | | | 0,1 |
| underkeelAllowanceFixed | | | |  | |  | | S (Real) | | | | 0,1 |
| underkeelAllowanceVariable | | | |  | |  | | C | | | | 0,1 |
| underkeelAllowance VariableBeamBased | | | |  | |  | | S (Real) | | | | 0,1 |
| underkeelAllowance VariableDraughtBased | | | |  | |  | | S (Real) | | | | 0,1 |
| operation | | | |  | | 1: largest value  2: smallest value | | EN | | | | 0,1 |
| Fixed date range | | | |  | |  | | | | C | 0,1 | |
| Date end | | | | (DATEND) | |  | | | | (S) DA | 0,1 | |
| Date start | | | | (DATSTA) | |  | | | | (S) DA | 0,1 | |
| Information | | | |  | |  | | | | C | 1,\* | |
| Language | | | |  | | ISO 639-3 | | | | (S) TE | 0,1 | |
| Text | | | | *(INFORM) (NINFOM)* | |  | | | | (S) TE | 1,1 | |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | | | S (TE) | 0,1 | |
| File Locator | | | |  | |  | | | | S (TE) | 0,1 | |
| Headline | | | |  | |  | | | | S (TE) | 0,1 | |
| Feature name | | | |  | |  | | | | C | 0,\* | |
| Display name | | | |  | |  | | | | (S) BO | 0,1 | |
| Language | | | |  | | ISO 639-3 | | | | (S) TE | 0,1 | |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | | | (S) TE | 1,1 | |
| Periodic date range | | | |  | |  | | | | C | 0,\* | |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | | | (S) DA | 1,1 | |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | | | (S) DA | 1,1 | |
| Source Indication | | | | (SORIND) | |  | | | | (S) TE | 0,1 | |
| Source Type | | | |  | |  | | | |  | 0,1 | |
| Source | | | |  | |  | | | | (S)TE | 0,1 | |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | | | |  | 0,1 | |
| Country | | | |  | | ISO3166-1-alpha2 | | | |  | 0,1 | |
| Category of Authority | | | | (CATAUT) | |  | | | | EN | 0,1 | |
| Feature name | | | |  | |  | | | | C | 0,\* | |
| Display name | | | |  | |  | | | | (S) BO | 0,1 | |
| Language | | | |  | | ISO 639-3 | | | | (S) TE | 0,1 | |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | | | (S) TE | 1,1 | |
| Vessel Measurements | | | |  | |  | | | C | | | 0,\* |
| Comparison Operator | | | |  | | 1: greater than  2: greater than or equal to  3: less than  4: less than or equal to  5: equal to  6: not equal to | | |  | | | 1 |
| Vessel Characteristics | | | |  | |  | | |  | | | 1,1 |
| Vessel Characteristics Value | | | |  | |  | | | RE | | | 1,1 |
| Vessel Characteristics Units | | | |  | |  | | | EN | | | 1,1 |
| **Information associations** | | | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | | | | **Multiplicity** |
| Additional Information |  | | Supports | | Marine Protected Area, Marine Service, Restricted Area | | | | | | | 0,\* |
| Additional Information |  | | Supported by | | Ship report | | | | | | | 0,\* |
| Additional Information |  | | Supported by | | **Restrictions, Regulations, Recommendations, Nautical Information** | | | | | | 0,\* | |
|  |  | |  | |  | | | | | | |  |
| INT 1 Reference:  Remarks:   * Vessel characteristics are specified as follows:   BALAST: The vessel is ballasted as described by this attribute.  VSLMSM: The vessel or cargo matches the attribute value (for multi-valued attributes, matches at least one of the values).  ICECAP, UKCLRN, PRFMNC attributes: The vessel matches the specified requirement. Absent attributes or null values are ignored.  LOGCON states whether “all” or “at least one” of the specifications must be met.  CATREL indicates the relationship between matching vessels and the associated information object or feature.  Example:  With one instance of APPLIC:  VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=greater than, VSLVAL=50], CATVSL=3 (tanker), LOGCON=1 (and), CATREL=5 (required); associated to a PILBOP object: tankers with LOA > 50.0 m must use the PILBOP  PRFMNC="Vessels with thrusters", MBRSHP=2; associated to a REGLTS object: Vessels with thrusters are exempted from the regulation.  If VSLMSM becomes repeatable:  VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=(>), VSLVAL=50], VSLMSM [VSLCAR=length, VSLUNT=metre, COMPOP=(<), VSLVAL=90], CATDHC=19, LOGCON=1 (and), MBRSHP=1 (included);  associated with **Regulations**: the regulation applies to vessels with LOA with more than 50.0 and less than 90.0 m. carrying MARPOL Class 8 corrosive substances.  Same situation as above with one instance of VSLMSM:  VSLMSM [[VSLCAR=length; VSLUNT=metre, VSLVAL=50; COMPOP=(>)],[VSLCAR=length; VSLUNT=metre, VSLVAL=90; COMPOP=(<)]], CATVSL=3 (tanker), LOGCON=1 (and), MBRSHP=1 (included);  associated with a REGLTS: the regulation applies to vessels with LOA with more than 50.0 and less than 90.0 m. carrying MARPOL Class 8 corrosive substances.   * Multiple values of **Category of Cargo** and of **Category of Dangerous Or Hazardous Cargo** should be treated as “inclusive OR” (i.e., if **Category of Cargo** =1 and 2, then it means vessels with either bulk or container cargo or both).   Distinction: | | | | | | | | | | | | |

## Regulations

See principle structure at section 9.11

## Restrictions

See principle structure at section 9.11

## Recommendations

See principle structure at section 9.11

## Nautical Information

See principle structure at section

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **NAUTICAL INFORMATION** Nautical information about a related area or facility. | | | | | | | | | | | |
| **S-122 Information Feature: Nautical information** | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | *ECDIS Symbol* | | | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | **Allowable Encoding Value** | | **Type** | | | **Multiplicity** |
| Category of Authority | | | |  | | 1 : customs  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 | | | EN | 0,1 | |
| Fixed date range | | | |  | |  | | | C | 0,1 | |
| Date end | | | | (DATEND) | |  | | | (S) DA | 0,1 | |
| Date start | | | | (DATSTA) | |  | | | (S) DA | 0,1 | |
| Feature name | | | |  | |  | | | C | 0,\* | |
| Display name | | | |  | |  | | | (S) BO | 0,1 | |
| Language | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | | (S) TE | 1,1 | |
| Periodic date range | | | |  | |  | | | C | 0,\* | |
| Date end | | | | *(PEREND)* | | ISO 8601: 2004 | | | (S) DA | 1,1 | |
| Date start | | | | *(PERSTA)* | | ISO 8601: 2004 | | | (S) DA | 1,1 | |
| Source Indication | | | | (SORIND) | |  | | | (S) TE | 0,1 | |
| Source Type | | | |  | |  | | |  | 0,1 | |
| Source | | | |  | |  | | | (S)TE | 0,1 | |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | | |  | 0,1 | |
| Country | | | |  | | ISO3166-1-alpha2 | | |  | 0,1 | |
| Category of Authority | | | | (CATAUT) | |  | | | EN | 0,1 | |
| Feature name | | | |  | |  | | | C | 0,\* | |
| Display name | | | |  | |  | | | (S) BO | 0,1 | |
| Language | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | | (S) TE | 1,1 | |
| Textual Content | | | |  | |  | | | C | 1,\* | |
| Category of Text | | | |  | | 1: Abstract or summary  2: Extract  3: Full text | | | EN | 0,1 | |
|  | | | |  | |  | | |  |  | |
| Language | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | |
| File reference | | | | *(TXTDSC) (NTXTDS)* | |  | | | (S) TE | 1,1 | |
| Information | | | |  | |  | | | C | 1,\* | |
| Language | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | |
| Text | | | | *(INFORM) (NINFOM)* | |  | | | (S) TE | 1,1 | |
| File Reference | | | | *(TXTDSC)*  *(NTXTDS)* | |  | | | S (TE) | 0,1 | |
| File Locator | | | |  | |  | | | S (TE) | 0,1 | |
| Headline | | | |  | |  | | | S (TE) | 0,1 | |
| Source Indication | | | | (SORIND) | |  | | | (S) TE | 0,1 | |
| Source Type | | | |  | |  | | |  | 0,1 | |
| Source | | | |  | |  | | | (S)TE | 0,1 | |
| Reported Date | | | |  | | (((S-100 truncated Date)))) | | |  | 0,1 | |
| Country | | | |  | | ISO3166-1-alpha2 | | |  | 0,1 | |
| Category of Authority | | | | (CATAUT) | |  | | | EN | 0,1 | |
| Feature name | | | |  | |  | | | C | 0,\* | |
| Display name | | | |  | |  | | | (S) BO | 0,1 | |
| Language | | | |  | | ISO 639-3 | | | (S) TE | 0,1 | |
| Name | | | | *(OBJNAM) (NOBJNM)* | |  | | | (S) TE | 1,1 | |
| Online Resource | | | |  | |  | | | C | 0,1 | |
| Linkage | | | |  | | ISO 19115-1:2014 | | | URL |  | |
| Protocol | | | |  | | ISO 19115 | | | (S) TE | 0,1 | |
| Application Profile | | | |  | | ISO 19115 | | | (S) TE | 0,1 | |
| Name of Resource | | | |  | | ISO 19115 | | | (S) TE | 0,1 | |
| Description | | | |  | | ISO 19115 | | | (S) TE | 0,1 | |
| Online function | | | |  | | 1: download  2: information  3: offline access  4: order  5: search  6: complete metadata  7: browse graphic  8: upload  9: email service  10: browsing  11: file access | | | EN | 0,1 | |
| Protocol Request | | | |  | | ISO 19115 | | | (S) TE | 0,1 | |
| **Information associations** | | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | **Features** | | | | | | **Multiplicity** |
| Additional Information |  | | Provides for | | **Each Feature Type** or **Information Area** | | | | |  | |
| Additional Information |  | | Supported by | | Applicability | | | | | | 0,\* |
| INT 1 Reference:  Remarks:  Distinction: **Regulations, Recommendations, Restrictions, Supplementary information** | | | | | | | | | | | |

# Association Class

## Permission Type

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **PERMISSION TYPE** ?????????????????????????????? | | | | | | | | | | | | | | | |
| **S-122 Information Feature: Permission Type** | | | | | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | | | | | |
| *Real World* | | | *Paper Chart Symbol* | | | | | | | *ECDIS Symbol* | | | | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | | | | **Type** | | **Multiplicity** | |
| Category of Relationship | | | | |  | | | 1 : prohibited  2 : not recommended  3 : permitted  4 : recommended  5 : required | | | | EN | | 0,1 | |
| **Information associations** | | | | | | | | | | | | | | | |
| **Type** | **Association Name** | **Class** | | | | **Role** | | | **Mult.** | | **Class** | | **Role** | | **Mult.** |
|  |  |  | | | |  | | |  | |  | |  | |  |
| Asso | Permission Information |  | | | | Permission | | |  | |  | | Ship report | |  |
|  |  |  | | | |  | | |  | |  | |  | |  |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | | | | | | | | | | |

## Inclusion Type

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IHO Definition: **INCLUSION TYPE** ?????????????????????????????? | | | | | | | | | | | |
| **S-122 Information Feature: Inclusion Type** | | | | | | | | | | | |
| **Primitives: None** | | | | | | | | | | | |
| *Real World* | | *Paper Chart Symbol* | | | | | | | *ECDIS Symbol* | | |
| **S-122 Attribute** | | | | **S-57 Acronym** | | | **Allowable Encoding Value** | | | **Type** | **Multiplicity** |
| Membership | | | | |  | | | 1 : included  2 : excluded | | EN | 0,1 |
| **Information associations** | | | | | | | | | | | |
| **Role Type** | **Association Name** | | **Role** | | | **Features** | | | | | **Multiplicity** |
| If applicable to |  | | Permission | | |  | | | | |  |
|  |  | |  | | |  | | | | |  |
| INT 1 Reference:  Remarks:  Distinction: | | | | | | | | | | | |

# Geo Feature Attribute and Enumerate Descriptions

## Geo Feature Attribute and Enumerate Descriptions derived from S-101 (version 1.0)

# Associations

## Association names

### Additional information

|  |  |  |  |
| --- | --- | --- | --- |
| **Additional information:** IHO Definition: An information association for the binding between at least one instance of a geo feature and an instance of an information type.  Remarks:   * A single information feature instance may be associated with more than one geo feature instance. | | | |
| **Role Type** | **Role** | **Features** | **Multiplicity** |
| Association | Provided by | All Geo Features | 0,\* |
| Provides | **Supplementary Information** | 0,1 |

### ??????????

|  |  |  |  |
| --- | --- | --- | --- |
| **?????????????:** IHO Definition: ????????????????????????????.  Remarks:   * No remarks. | | | |
| **Role Type** | **Role** | **Features** | **Multiplicity** |
| Association | Component of |  |  |
| Consists of |  |  |

## Association Roles

### Component of

|  |
| --- |
| **Component of:** IHO Definition: A pointer to a part in a whole-part relationship. |

### Consists of

|  |
| --- |
| **Consists of:** IHO Definition: A pointer to the aggregate in a whole-part relationship. |

### Identifies

|  |
| --- |
| **Identifies:** IHO Definition: A pointer to a specific feature(s). |

### Positions

|  |
| --- |
| **Positions:** IHO Definition: A pointer to a specific cartographically positioned location for text. |

### Provided by

|  |
| --- |
| **Provided by:** IHO Definition: A pointer to a specific feature(s) for which further information is required. |

### Provides

|  |
| --- |
| **Provides:** IHO Definition: Acts as the authority and provider of a specified service. |

### Supported by

|  |
| --- |
| **Supported by:** IHO Definition: A pointer to the master feature that equipment feature(s) are supported by. |

### Supports

|  |
| --- |
| **Supports:** IHO Definition: A pointer to the equipment feature(s) supported by a master feature. |

### Updates

|  |
| --- |
| **Updates:** IHO Definition: A pointer to a feature that has been updated. |

# Meta Feature and Spatial Attribute and Enumerate Descriptions

## Meta Features and Spatial Attributes and Enumerate Descriptions derived from S-101 (version 1.0)

# Complex Attributes

## Complex Attributes derived from S-101 (version 1.0)

# ECDIS System (Portrayal) Attributes

## ECDIS System (Portrayal) Attributes derived from S-101 (version 1.0)

# Updating (see S-4 – B-600)