S-128

Annex A

Data Classification and Encoding Guide

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IHO

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Document History

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

Version Number	Date	Approved By	Purpose
1.0.0	11 Mar 2022	NIPWG	Release 1.0.0
1.0.0	May 2022	HSSC	Initial published version for evaluation and testing.

1 Overview

1.1 Preface

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

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

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

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

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

Title: The International Hydrographic Organization Catalogue of Nautical Products Specification, Annex A – Data Classification and Encoding Guide

Version: 1.0.0

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

1.3 Terms, definitions and abbreviations

1.3.1 Terms and definitions

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

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

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

attribute
named property of an entity

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

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

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

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

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

feature
Abstraction of real world phenomena

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

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

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

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

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

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

point
0-dimensional geometric primitive, representing a position

NOTE: The **boundary** of a point is the empty set

pointset
definition required

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

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

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

1.3.2 Abbreviations

ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigational Chart
GML	Geography Markup Language
GNSS	Global Navigation Satellite System
HO	Hydrographic Office

IHO	International Hydrographic Organization
IMO	International Maritime Organization
ISO	International Organization for Standardization
SENC	System Electronic Navigational Chart
SOLAS	Safety of Life at Sea
TSMAD	Transfer Standard Maintenance and Application Development Working Group
UNCLOS	United Nations Convention on the Law of the Sea

1.4 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.

1.5 Maintenance

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

2 General

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

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

2.1 Feature types

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

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

S-128 makes use of the following feature types:

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

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

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

Meta feature type – contains information about other features.

2.2 Geometric primitives

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

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

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

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

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

2.3 Information types

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

2.4 Attributes

Attributes may be simple type or complex type. Complex (C) attributes are aggregates of other attributes that can be simple type or complex type. Simple attributes are assigned to one of 8 types.

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

2.4.1 Multiplicity

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

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

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

2.4.2 Simple attribute types

Each simple attribute is assigned to one of 9 types:

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

CL Codelist: An open enumeration, or the identifier of a vocabulary (mapping between codes, labels and definitions).

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

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

Examples: 23.501, -0.0001234, -23.0, 3.141296

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

Examples: 29, -65547

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

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

Example: 19980918 (YYYYMMDD)

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

Time zone according to UTC is optional.

Example: 183059 or 183059+0100 or 183059Z

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

Geneva: 152746+0100

New York: 152746-0500

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

Example: 19850412T101530

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

2.4.3 Mandatory and conditional attributes

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

- They are required to support correct portrayal;
- Certain features make no logical sense without specific attributes;
- Some attributes are required for safety of navigation.

Within this document, mandatory attributes (multiplicity 1,1; 1,n (n>1); or 1,*) are identified in the description of each feature type. For easy reference, Table 2.2 below summarises the mandatory attributes for each feature type (note that mandatory sub-attributes of complex attributes are not included in this table):

2.4.4 Missing attribute values

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

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

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

2.4.5 Textual information

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

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

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

3 Geo Features

3.1 Catalogue of Nautical Product

IHO Definition: The availability of paper charts, ENCs and other nautical products, applications for navigational purposes, online services and e-Navigation services.		
S-128 Geo Feature: Catalogue of Nautical Product		
Super Type:		
Primitives: noGeometry		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-128 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Edition Number			IN	1, 1
Issue Date			DA	1, 1
Marine Resource Name			UN	0, 1
Feature Name			C	1, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name			(S) TE	1, 1
Graphic			C	0, *
Pictorial Representation			(S) TE	1, *
Picture Caption			(S) TE	0, 1
Picture Information			(S) TE	0, *
Source Date			(S) DA	0, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
association	Issuing Authority				**ProductionDetails, DistributionDetails**	theAuthority	0, *
association	Price of Nautical Product				**PriceInformation**	theCatalogueOfNauticalProduct	0, *
Asso	Product Package	**CatalogueOfNauticalProduct**	elementContainer	1, 1	**CatalogueElements**	theCatalogueElements	1, *

3.2 Catalogue Elements

IHO Definition:				
S-128 Geo Feature: Catalogue Elements				
Super Type:				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-128 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Time Interval of Product			C	0, 1
Issue Date			(S) DA	1, 1
Expiration Date			(S) DA	0, 1
Time Reference		1 : localTime 2 : UTC	(S) EN	1, 1
Issuance Cycle			(S) C	0, 1
Time Interval of Cycle			(S) C	0, 1
Type of Time Interval Unit		1 : time 2 : day 3 : month 4 : year	(S) EN	1, 1
Value of Time			(S) IN	1, 1
Periodic Date Range			(S) C	0, 1
Start Date			(S) DA	1, 1
End Date			(S) DA	1, 1
Classification			TE	0, 1
Copyright			TE	1, 1
Edition Date			DA	1, 1
Edition Number			IN	1, 1
Horizontal Datum Reference			TE	0, 1
Issue Date			DA	1, 1
Marine Resource Name			UN	0, 1
Maximum Display Scale			IN	0, 1
Minimum Display Scale			IN	0, 1
Product Type		1 : paper nautical chart 2 : ENC 3 : raster nautical chart 4 : INT Chart 5 : nautical publication 6 : S-100 compliant product 7 : electronic application for safety navigation 8 : special purpose charts 9 : e-Navigation service 10 : others	EN	1, 1
Purpose		1 : new dataset 2 : new edition	EN	0, 1

		3 : update 4 : re-issue 5 : cancellation		
Sounding Datum		1 : mean low water springs 2 : mean lower low water springs 3 : mean sea level 4 : lowest low water 5 : mean low water 6 : lowest low water springs 7 : approximate mean low water springs 8 : Indian spring low water 9 : low water springs 10 : approximate lowest astronomical tide 11 : nearly lowest low water 12 : mean lower low water 13 : low water 14 : approximate mean low water 15 : approximate mean lower low water 16 : mean high water 17 : mean high water springs 18 : high water 19 : approximate mean sea level 20 : high water springs 21 : mean higher high water 22 : equinoctial spring low water 23 : lowest astronomical tide 24 : local datum 25 : international great lakes datum 1985 26 : mean water level 27 : lower low water large tide 28 : Higher High Water Large Tide 29 : nearly highest high water 30 : highest Astronomical Tide 44 : Baltic Sea Chart Datum 2000	EN	0, 1
Update Date			DA	0, 1
Update Number			IN	0, 1
Vertical Datum	(VERDAT)	1 : mean low water springs 2 : mean lower low water springs 3 : mean sea level 4 : lowest low water 5 : mean low water	EN	0, 1

		6 : lowest low water springs 7 : approximate mean low water springs 8 : Indian spring low water 9 : low water springs 10 : approximate lowest astronomical tide 11 : nearly lowest low water 12 : mean lower low water 13 : low water 14 : approximate mean low water 15 : approximate mean lower low water 16 : mean high water 17 : mean high water springs 18 : high water 19 : approximate mean sea level 20 : high water springs 21 : mean higher high water 22 : equinoctial spring low water 23 : lowest astronomical tide 24 : local datum 25 : international great lakes datum 1985 26 : mean water level 27 : lower low water large tide 28 : Higher High Water Large Tide 29 : nearly highest high water 30 : highest Astronomical Tide 44 : baltic Sea Chart Datum 2000		
Feature Name			C	0, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name			(S) TE	1, 1
Graphic			C	0, *
Pictorial Representation			(S) TE	1, *
Picture Caption			(S) TE	0, 1
Picture Information			(S) TE	0, *
Source Date			(S) DA	0, 1
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference			(S) TE	0, 1
Headline			(S) TE	1, 1

Language			(S) TE	1, 1
Text			(S) TE	0, *
Payment			C	0, *
Currency			(S) TE	1, 1
Price			(S) RE	1, 1
Contract Period			(S) TE	1, 1
Producing Agency			C	0, 1
Contact Address			(S) C	1, *
Administrative Division			(S) TE	0, 1
City Name			(S) TE	1, 1
Country			(S) TE	1, 1
Delivery Point			(S) TE	0, *
Postal Code			(S) TE	0, 1
Individual Name			(S) TE	1, 1
Online Resource			(S) C	0, *
Application Profile			(S) TE	0, 1
Linkage			(S) UL	1, 1
Name Of Resource			(S) TE	0, 1
Online Description			(S) TE	0, 1
Protocol			(S) TE	0, 1
Protocol Request			(S) TE	0, 1
Organization Name			(S) TE	1, 1
Position Name			(S) TE	0, 1
Telecommunications			(S) C	0, *
Category of Comm Pref		1 : preferred calling 2 : alternate calling 3 : preferred working 4 : alternate working	(S) EN	1, 1
Contact Instructions			(S) TE	0, *
Telecommunication Carrier			(S) TE	0, *
Telecommunication Identifier			(S) TE	0, *
Telecommunication Services		1 : voice 2 : facsimile 3 : sms 4 : data 5 : streamed data 6 : telex 7 : telegraph 8 : email	(S) EN	0, *
Schedule by Day of Week			(S) C	0, 1
Time Intervals by Day of Week			(S) C	1, *
Time Reference		1 : localTime 2 : UTC	(S) EN	1, 1
Time of Day Start			(S) TI	1, * (ordered)
Time of Day End			(S) TI	1, * (ordered)

Day of Week is Range			(S) BO	0, 1
Day of Week		1 : sunday 2 : monday 3 : tuesday 4 : wednesday 5 : thursday 6 : friday 7 : saturday	(S) EN	0, 7 (ordered)
Category of Schedule		1 : normal operation 2 : closure 3 : unmanned operation	(S) EN	1, 1
Source Indication			C	0, 1
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 16 : hydrographic office 17 : RENC 18 : VARs	(S) EN	1, *
Country			(S) TE	0, 1
Reported Date			(S) DA	1, 1
Source			(S) TE	1, 1
Source Type		1 : law or regulation 2 : official publication 7 : mariner report, confirmed 8 : mariner report, not confirmed 9 : industry publications and reports 10 : remotely sensed images 11 : photographs 12 : products issued by HO service 13 : news media 14 : traffic data	(S) EN	1, 1
Feature Name			(S) C	0, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name			(S) TE	1, 1
Support File			C	0, *
File Name			(S) TE	1, 1
File Location			(S) TE	1, 1
Support File Purpose		1 : new 2 : replacement	(S) EN	1, 1

		3 : deletion		
Edition Number			(S) IN	0, 1
Issue Date			(S) DA	0, 1
Support File Specification			(S) C	1, 1
Date			(S) DA	1, 1
Version			(S) TE	1, 1
Name			(S) TE	1, 1
Support File Format		1 : ASCII 2 : JPEG2000 3 : HTML 4 : XML 5 : XSLT 6 : VIDEO 7 : TIFF 8 : PDF/A or U/A 9 : LUA 10 : other	(S) EN	1, 1
Other Data Type Description			(S) TE	0, 1
Comment			(S) TE	0, 1
Digital Signature		1 : dsa	(S) EN	1, 1
Digital Signature Value			(S) TE	0, 1
Default Locale			(S) C	1, 1
Language			(S) TE	1, 1
Character Encoding			(S) TE	0, 1
Country			(S) TE	1, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	**Role**	**Mult**	**Class**	**Role**	**Mult**
Asso	Product Package	**CatalogueElements**	theCatalogue Elements	1, *	**CatalogueOfNauticalProduct**	elementContainer	1, 1

3.3 Abstract Chart Products

IHO Definition: This will be improve in S-128 PS Package v1.1.

S-128 Geo Feature: Abstract Chart Products

Super Type: CatalogueElements

Primitives: surface

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-128 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Chart Number			TE	1, 1
Compilation Scale			TE	1, *
Distribution Status		1 : production 2 : withdrawn	EN	0, 1
Original Chart Number			TE	0, 1
Producer Code			TE	1, 1
Producer Nation			TE	0, 1
Specific Usage		1 : overview 2 : general 3 : coastal 4 : approach 5 : harbour 6 : berthing	EN	0, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

3.4 Electronic Chart

IHO Definition: Nautical charts made in electronic form.		
S-128 Geo Feature: Electronic Chart		
Super Type: AbstractChartProducts		
Primitives: surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-128 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Dataset Name			TE	0, *
Tnp Update			BO	0, 1
Type Of Product Format	()	1 : GML 2 : ISO/IEC 8211 3 : PDF 4 : HTML 5 : ePub 6 : paper 7 : HDF-5 8 : other	EN	1, 1
Product Specification			C	0, 1
Date			(S) DA	1, 1
ISSN			(S) TE	0, 1
Name			(S) TE	1, 1
Version			(S) TE	1, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
Asso	Insert Association	**ElectronicChart**	boundary	0, 1	**ElectronicChart**	boundary	0, 1
Asso	Insert Association	**ElectronicChart**	boundary	0, 1	**ElectronicChart**	insert	0, *

3.5 Paper Chart

IHO Definition: Nautical product in drawing format printed on paper.		
S-128 Geo Feature: Paper Chart		
Super Type: AbstractChartProducts		
Primitives: surface		
Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-128 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Frame Dimension			TE	0, 1
Main Panel			BO	1, 1
Type Of Paper			TE	0, 1
Print Information			C	0, 1
Print Agency			(S) TE	0, 1
Print Nation			(S) TE	0, 1
Print Size		1 : A0 2 : A1 3 : A2 4 : A3 5 : A4 6 : A5 7 : A6 8 : A7	(S) EN	1, 1
Print Week			(S) IN	0, 1
Print Year			(S) TE	0, 1
Re Print Edition			(S) TE	0, 1
Re Print Nation			(S) TE	0, 1
Reference To NM			C	0, 1
Week			(S) IN	1, 1
Year			(S) IN	1, 1
ISBN			TE	0, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

Feature/Information associations

Type	Association Name	Association Ends					
		Class	Role	Mult	Class	Role	Mult
Asso	Insert Association	**PaperChart**	boundary	0, 1	**PaperChart**	boundary	0, 1

Asso	Insert Association	**PaperChart**	boundary	0, 1	**PaperChart**	insert	0, *

3.6 Nautical Product

IHO Definition: All nautical products other than charts made in the form of drawings.				
S-128 Geo Feature: Nautical Product				
Super Type: CatalogueElements				
Primitives: surface				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-128 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Dataset Name			TE	0, 1
ISBN			TE	0, 1
Keyword			TE	0, 1
Publication Number			TE	1, 1
Service Design			TE	0, 1
Service Status		1 : provisional 2 : released 3 : deprecated 4 : deleted	EN	0, 1
Type Of Product Format	()	1 : GML 2 : ISO/IEC 8211 3 : PDF 4 : HTML 5 : ePub 6 : paper 7 : HDF-5 8 : other	EN	1, 1
Version			TE	0, 1
Online Resource			C	0, 1
Application Profile			(S) TE	0, 1
Linkage			(S) UL	1, 1
Name Of Resource			(S) TE	0, 1
Online Description			(S) TE	0, 1
Protocol			(S) TE	0, 1
Protocol Request			(S) TE	0, 1
Product Specification			C	0, 1
Date			(S) DA	1, 1
ISSN			(S) TE	0, 1
Name			(S) TE	1, 1
Version			(S) TE	1, 1
Service Specification			C	0, 1
Date			(S) DA	1, 1
Name			(S) TE	1, 1
Version			(S) TE	1, 1
Text Content			C	0, *
Category Of Text		1 : abstract or summary	(S) EN	1, 1

		2 : extract 3 : full text		
Information			(S) C	0, *
File Locator			(S) TE	0, 1
File Reference			(S) TE	0, 1
Headline			(S) TE	1, 1
Language			(S) TE	1, 1
Text			(S) TE	0, *
Online Resource			(S) C	0, 1
Application Profile			(S) TE	0, 1
Linkage			(S) UL	1, 1
Name Of Resource			(S) TE	0, 1
Online Description			(S) TE	0, 1
Protocol			(S) TE	0, 1
Protocol Request			(S) TE	0, 1
Source Indication			(S) C	0, 1
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 16 : hydrographic office 17 : RENC 18 : VARs	(S) EN	1, *
Country			(S) TE	0, 1
Reported Date			(S) DA	1, 1
Source			(S) TE	1, 1
Source Type		1 : law or regulation 2 : official publication 7 : mariner report, confirmed 8 : mariner report, not confirmed 9 : industry publications and reports 10 : remotely sensed images 11 : photographs 12 : products issued by HO service 13 : news media 14 : traffic data	(S) EN	1, 1
Feature Name			(S) C	0, *

Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name			(S) TE	1, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

4 Information types

4.1 Contact Details

IHO Definition: Contact information of nautical product suppliers.				
S-128 Information Type: ContactDetails				
Super Type:				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-128 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
Contact Address			C	1, *
Administrative Division			(S) TE	0, 1
City Name			(S) TE	1, 1
Country			(S) TE	1, 1
Delivery Point			(S) TE	0, *
Postal Code			(S) TE	0, 1
Information			C	0, *
File Locator			(S) TE	0, 1
File Reference			(S) TE	0, 1
Headline			(S) TE	1, 1
Language			(S) TE	1, 1
Text			(S) TE	0, *
Online Resource			C	0, *
Application Profile			(S) TE	0, 1
Linkage			(S) UL	1, 1
Name Of Resource			(S) TE	0, 1
Online Description			(S) TE	0, 1
Protocol			(S) TE	0, 1
Protocol Request			(S) TE	0, 1
Source Indication			C	0, *
Category of Authority		1 : 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 16 : hydrographic office 17 : RENC	(S) EN	1, *

		18 : VARs		
Country			(S) TE	0, 1
Reported Date			(S) DA	1, 1
Source			(S) TE	1, 1
Source Type		1 : law or regulation 2 : official publication 7 : mariner report, confirmed 8 : mariner report, not confirmed 9 : industry publications and reports 10 : remotely sensed images 11 : photographs 12 : products issued by HO service 13 : news media 14 : traffic data	(S) EN	1, 1
Feature Name			(S) C	0, *
Display Name			(S) BO	0, 1
Language			(S) TE	0, 1
Name			(S) TE	1, 1
Telecommunications			C	0, *
Category of Comm Pref		1 : preferred calling 2 : alternate calling 3 : preferred working 4 : alternate working	(S) EN	1, 1
Contact Instructions			(S) TE	0, *
Telecommunication Carrier			(S) TE	0, *
Telecommunication Identifier			(S) TE	0, *
Telecommunication Services		1 : voice 2 : facsimile 3 : sms 4 : data 5 : streamed data 6 : telex 7 : telegraph 8 : email	(S) EN	0, *
Schedule by Day of Week			(S) C	0, 1
Time Intervals by Day of Week			(S) C	1, *
Time Reference		1 : local time 2 : UTC	(S) EN	1, 1
Time of Day Start			(S) TI	1, * (ordered)
Time of Day End			(S) TI	1, * (ordered)
Day of Week is Range			(S) BO	0, 1
Day of Week		1 : sunday 2 : monday 3 : tuesday 4 : wednesday 5 : thursday 6 : friday 7 : saturday	(S) EN	0, 7 (ordered)

Category of Schedule		1 : normal operation 2 : closure 3 : unmanned operation	(S) EN	1, 1
Contact Instructions			TE	1, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

4.2 Production Details

IHO Definition: Contact information of nautical product publishing organizations.				
S-128 Information Type: ProductionDetails				
Super Type: ContactDetails				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-128 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
INT 1 Reference: Remarks: This will be improved in S-128 PS Package v1.1. Distinction:				

4.3 Distribution Details

IHO Definition: Contact information of nautical product suppliers.				
S-128 Information Type: DistributionDetails				
Super Type: ContactDetails				
Primitives: None				
Real World	*Paper Chart Symbol*	*ECDIS Symbol*		
S-128 Attribute	**S-57 Acronym**	**Allowable Encoding Value**	**Type**	**Multiplicity**
INT 1 Reference: Remarks: This will be improved in S-128 PS Package v1.1. Distinction:				

4.4 Price Information

IHO Definition: Pricing information of nautical product.

S-128 Information Type: PriceInformation

Super Type:

Primitives: None

Real World	*Paper Chart Symbol*	*ECDIS Symbol*

S-128 Attribute	S-57 Acronym	Allowable Encoding Value	Type	Multiplicity
Payment			C	1, 1
Currency			(S) TE	1, 1
Price			(S) RE	1, 1
Contract Period			(S) TE	1, 1

INT 1 Reference:

Remarks:
This will be improved in S-128 PS Package v1.1.

Distinction:

5 Association Names

5.1 Issuing Authority

IHO Definition: In ECDIS, the official agency which issues nautical chart and updates including ENCs and ENC updates.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	The Contact Details	**Catalogue of Nautical Product**	
	The Authority		0, *

5.2 Price of Nautical Product

IHO Definition: The price of nautical product.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	The Price Information	**Catalogue of Nautical Product**	
	The Catalogue of Nautical Product		0, *

5.3 Product Package

IHO Definition: Package of the various substances which are transported, stored or exploited.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	The Catalogue of Element	**Catalogue Elements**	1, *
	Element Container	**Catalogue of Nautical Product**	1, 1

5.4 Insert Association

IHO Definition: IHO Definition: This will be improve in S-128 PS Package v1.1.

Remarks:

• No remarks.

Role Type	Role	Associated With	Multiplicity
Association	Boundary		0, 1
	Insert	**Electronic Chart, Paper Chart**	

6 Association Roles

6.1 The Authority

IHO Definition: A person or organisation having political or administrative power and control.

6.2 The Contact Details

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

6.3 Element Container

IHO Definition: Container of element.

6.4 The Catalogue of Element

IHO Definition: Catalogue of Elements.

6.5 The Price Information

IHO Definition: Information of price.

6.6 The Catalogue of Nautical Product

IHO Definition: Types of nautical products.

6.7 Insert

IHO Definition: This will be improved in S-128 PS Package v1.1.

6.8 Boundary

IHO Definition: This will be improve in S-128 PS Package v1.1.

7 Attribute and Enumerate Descriptions

7.1 Telecommunication Identifier

IHO Definition: An identifier, such as words, numbers, letters, symbols, or any combination of those used to establish a contact to a particular person, organisation or service.

Remarks:

• No remarks.

7.2 Telecommunication Carrier

IHO Definition: The name of a provider or type of carrier for a telecommunication service. This service may include land line based, shore based or satellite based radio connections.

Remarks:

• No remarks.

7.3 Comment

IHO Definition: Comment regarding an entity obvious from context.

Remarks:

• No remarks.

7.4 Other Data Type Description

IHO Definition: The description of other data type.

Remarks:

• No remarks.

7.5 File Location

IHO Definition: The location of a fragment of text or other information in a support file.

Remarks:

• No remarks.

7.6 File Name

IHO Definition: The name of an entity of data.

Remarks:

• No remarks.

7.7 Reported Date

IHO Definition: The date that the item was observed, done, or investigated.

Remarks:

• No remarks.

7.8 Source

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

7.9 ISSN

IHO Definition: International Standard Serial Number.
Remarks:
• No remarks.

7.10 Character Encoding

IHO Definition: Encoding an element of a code set used for representing information.
Remarks:
• No remarks.

7.11 Time of Day Start

IHO Definition: The time corresponding to the start of an active period.
Remarks:
• No remarks.

7.12 Time of Day End

IHO Definition: The time corresponding to the end of an active period.
Remarks:
• No remarks.

7.13 Day of Week is Range

IHO Definition: A statement expressing if the days of the week identified define a range or not.
Remarks:
• No remarks.

7.14 Digital Signature Value

IHO Definition: It means electronic signature value.
Remarks:
• No remarks.

7.15 Digital Signature

IHO Definition: Information in an electronic form attached to or logically combined with an electronic document to indicate that the signer has signed the electronic document.
1) **dsa**

IHO Definition: American digital signature standards.

Remarks:

• No remarks.

7.16 Telecommunication Services

IHO Definition: Classification of methods of communication over a distance by electrical, electronic, or electromagnetic means.

1) **voice**

   IHO Definition: The transfer or exchange of information by using sounds that are being made by mouth and throat when speaking.

2) **facsimile**

   IHO Definition: Sometimes called telecopying or telefax (the latter short for telefacsimile), is the telephonic transmission of scanned printed material (both text and images), normally to a telephone number connected to a printer or other output device.

3) **sms**

   IHO Definition: Short Message Service is a form of text messaging communication on phones and mobile phones.

4) **data**

   IHO Definition: Materials that serve as the basis for initiation.

5) **streamed data**

   IHO Definition: Data that is constantly received by and presented to an end-user while being delivered by a provider.

6) **telex**

   IHO Definition: A system of communication in which messages are sent over long distances by using a telephone system and are printed by using a special machine (called a teletypewriter).

7) **telegraph**

   IHO Definition: An apparatus, system or process for communication at a distance by electric transmission over wire.

8) **email**

   IHO Definition: Messages and other data exchanged between individuals using computers in a network.

Remarks:

• No remarks.

7.17 Support File Purpose

IHO Definition: Purpose of the file to be described in addition to the nautical product data.

1) **new**

   IHO Definition: New support file purpose.

2) **replacement**

   IHO Definition: The act of furnishing an equivalent person or thing in the place of another.

3) **deletion**

   IHO Definition: Item in the process of being removed or deleted.

Remarks:

• No remarks.

7.18 Support File Format

IHO Definition: File format to describe in addition to nautical product data.

1) **ASCII**

   IHO Definition: American Standard Code for Information Interchange. American character standard code system established in 1968.

2) **JPEG2000**

   IHO Definition: Raster image compression technology based on wavelet transformation.

3) **HTML**

   IHO Definition: Hypertext Markup Language. A type of basic web language used to create web documents.

4) **XML**

   IHO Definition: Extensible Markup Language. A language created by remarkably improving HTML to create Internet web pages.

5) **XSLT**

   IHO Definition: Extensible Stylesheet Language Transformations. XML-based language used to convert XML documents into **other** XML documents.

6) **VIDEO**

   IHO Definition: A digital recording of an image or set of images (such as a movie or animation).

7) **TIFF**

   IHO Definition: Tagged Image File Format.

8) **PDF/A or U/A**

   IHO Definition: ISO-standardized version of the Portable Document Format (PDF) specialized for use in the archiving and long-term preservation of electronic documents or U/A.

9) **LUA**

   IHO Definition: A lightweight, extensible programming language.

10) **other**

   IHO Definition: Other support file purpose.

Remarks:

• No remarks.

7.19 Category of Authority

IHO Definition: The type of person, government agency or organisation granted powers of managing or controlling access to and/or activity in an area.

1) **customs**

   IHO Definition: The agency or establishment for collecting duties, tolls.

2) **border control**

   IHO Definition: The administration to prevent or detect and prosecute violations of rules and regulations at international boundaries.

3) **police**

   IHO Definition: The department of government, or civil force, charged with maintaining public order.

4) **port**

   IHO Definition: Person or corporation, owners of, or entrusted with or invested with the power of managing a port. May be called a Harbour Board, Port Trust, Port Commission, Harbour Commission, Marine Department.

5) **immigration**

   IHO Definition: The authority controlling people entering a country.

6) **health**

IHO Definition: The authority with responsibility for checking the validity of the health declaration of a vessel and for declaring free pratique.

7) **coast guard**

IHO Definition: Organization keeping watch on shipping and coastal waters according to governmental law; normally the authority with responsibility for search and rescue.

8) **agricultural**

IHO Definition: The authority with responsibility for preventing infection of the agriculture of a country and for the protection of the agricultural interests of a country.

9) **military**

IHO Definition: A military authority which provides control of access to or approval for transit through designated areas or airspace.

10) **private company**

IHO Definition: A private or publicly owned company or commercial enterprise which exercises control of facilities, for example a calibration area.

11) **maritime police**

IHO Definition: A governmental or military force with jurisdiction in territorial waters. Examples could include Gendarmerie Maritime, Carabinierie, and Guardia Civil.

12) **environmental**

IHO Definition: An authority with responsibility for the protection of the environment.

13) **fishery**

IHO Definition: An authority with responsibility for the control of fisheries.

14) **finance**

IHO Definition: An authority with responsibility for the control and movement of money.

15) **maritime**

IHO Definition: A national or regional authority charged with administration of maritime affairs.

16) **hydrographic office**

IHO Definition: State agency in charge of marine surveys.

17) **RENC**

IHO Definition: Regional ENC Coordination Centre Entities set up by the IHO.

18) **VARs**

IHO Definition: Value Added Resellers (VARs), who are able to offer comprehensive end-use services that bring together various navigational products into one package.

Remarks:

• No remarks.

7.20 Day of Week

IHO Definition: Any one of seven days in a week.

1) **monday**

IHO Definition: The second day of the week.

2) **tuesday**

IHO Definition: The third day of the week.

3) **wednesday**

IHO Definition: The fourth day of the week.

4) **thursday**

IHO Definition: The fifth day of the week.

5) **friday**

IHO Definition: The sixth day of the week.

6) **saturday**

IHO Definition: The sixth day of the week.

7) **sunday**

IHO Definition: The first day of the week.

Remarks:

• No remarks.

7.21 Organization Name

IHO Definition: Name of international organization in charge of nautical products.

Remarks:

• No remarks.

7.22 Time Reference

IHO Definition: Information about time reference.

1) **localTime**

IHO Definition: The official time in a local region.

2) **UTC**

IHO Definition: Greenwich Mean Time updated with leap seconds.

Remarks:

• No remarks.

7.23 Category of Comm Pref

IHO Definition: Category of preferred communication method.

1) **preferred calling**

IHO Definition: The first choice channel or frequency to be used when calling a radio station.

2) **alternate calling**

IHO Definition: A channel or frequency to be used for calling a radio station when the preferred channel or frequency is busy or is suffering from interference.

3) **preferred working**

IHO Definition: The first choice channel or frequency to be used when working with a radio station.

4) **alternate working**

IHO Definition: A channel or frequency to be used for working with a radio station when the preferred working channel or frequency is busy or is suffering from interference.

Remarks:

• No remarks.

7.24 Category of Schedule

IHO Definition: Kinds of operation method.

1) **normal operation**

IHO Definition: The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.

2) **closure**

IHO Definition: The service, office, or area is closed.

3) **unmanned operation**

IHO Definition: The service is available but not manned.

Remarks:
• No remarks.

7.25 Source Type

IHO Definition: Type of the source.

1) **law or regulation**
   IHO Definition: Treaty, convention, or international agreement; law or regulation issued by a national or other authority.
2) **official publication**
   IHO Definition: Publication not having the force of law, issued by an international organisation or a national or local administration.
7) **mariner report, confirmed**
   IHO Definition: Reported by mariner(s) and confirmed by another source.
8) **mariner report, not confirmed**
   IHO Definition: Reported by mariner(s) but not confirmed.
9) **industry publications and reports**
   IHO Definition: Shipping and other industry publications, including graphics, charts and web sites.
10) **remotely sensed images**
    IHO Definition: Information obtained from satellite images.
11) **photographs**
    IHO Definition: Information obtained from photographs.
12) **products issued by HO service**
    IHO Definition: Information obtained from products issued by Hydrographic Offices.
13) **news media**
    IHO Definition: Information obtained from news media.
14) **traffic data**
    IHO Definition: Information obtained from the analysis of traffic data.

Remarks:
• No remarks.

7.26 Administrative Division

IHO Definition: A generic term for an administrative region within a country at a level below that of the sovereign state.

Remarks:
• No remarks.

7.27 Application Profile

IHO Definition: Name of an application profile that can be used with the online resource.

Remarks:
• No remarks.

7.28 Category Of Text

IHO Definition: Classification of completeness of textual information in relation to the source material from which it is derived.

1) **abstract or summary**
   IHO Definition: A statement summarizing the important points of a text.
2) **extract**
   IHO Definition: An excerpt or excerpts from a text.
3) **full text**
   IHO Definition: The whole text.

Remarks:
• No remarks.

7.29 Chart Number

IHO Definition: Number of chart.
Remarks:
• No remarks.

7.30 City Name

IHO Definition: The name of a town or city.
Remarks:
• No remarks.

7.31 Classification

IHO Definition: The act of distributing things into classes or categories of the same type.
Remarks:
•No remarks.

7.32 Compilation Scale

IHO Definition: The scale of something that is compiled.
Remarks:
• No remarks.

7.33 Contact Instructions

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

7.34 Copyright

IHO Definition: A document granting exclusive right to publish and sell literary or musical or artistic work.
Remarks:
• No remarks.

7.35 Country

IHO Definition: The name of a nation.

Remarks:

• No remarks.

7.36 Currency

IHO Definition: The metal or paper medium of exchange that is presently used.

Remarks:

• No remarks.

7.37 Dataset Name

IHO Definition: A logical entity of data consisting of several elements (fields) grouped under one criterion.

Remarks:

• No remarks.

7.38 Date

IHO Definition: The specified day of the month.

Remarks:

• No remarks.

7.39 Delivery Point

IHO Definition: Details of where post can be delivered such as the apartment, name and/or number of a street, building or PO Box.

Remarks:

• No remarks.

7.40 Display Name

IHO Definition: A statement expressing if a feature name is to be displayed in certain system display settings or not.

Remarks:

• Where it is allowable to encode multiple instances of feature name for a single feature instance, only one feature name instance can indicate that the name is to be displayed (display name set to True).

7.41 Distribution Status

IHO Definition: Supply status of nautical products.

1) **production**

   IHO Definition: The act or process of producing something.

2) **withdrawn**

   IHO Definition: The action to withdraw a time stamp (Used when a time stamp has been reported incorrectly).

Remarks:
• No remarks.

7.42 Edition Date

IHO Definition: Edition date of the voyage product data.
Remarks:
• No remarks.

7.43 Edition Number

IHO Definition: Edition number of nautical product data.
Remarks:
• No remarks.

7.44 File Locator

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

7.45 File Reference

IHO Definition: The file name of an externally referenced text file.
Remarks:
• No remarks.

7.46 Frame Dimension

IHO Definition: The magnitude of something in a particular direction of frame.
Remarks:
• No remarks.

7.47 Headline

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

7.48 Horizontal Datum Reference

IHO Definition: Reference of geodetic points such as the longitude and latitude of the earth indicating horizontal position
Remarks:

• No remarks.

7.49 Individual Name

IHO Definition: Name of the person in charge.
Remarks:
• No remarks.

7.50 ISBN

IHO Definition: International Standard Book Number.
Remarks:
• No remarks.

7.51 Issue Date

IHO Definition: Creation date of nautical product data
Remarks:
• No remarks.

7.52 Expiration Date

IHO Definition: Expiration date of nautical product data
Remarks:
• No remarks.

7.53 Start Date

IHO Definition: Start date of nautical product data's payment
Remarks:
• No remarks.

7.54 End Date

IHO Definition: End date of nautical product data's payment
Remarks:
• No remarks.

7.55 Keyword

IHO Definition: The words that is used as a pattern to decode an encrypted message.
Remarks:
• No remarks.

7.56 Language

IHO Definition: The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.

Remarks:

• The language is encoded by a 3 character code following ISO 639-2/T.

7.57 Linkage

IHO Definition: Location (address) for on-line access using a URL/URI address or similar addressing scheme.

Remarks:

• No remarks.

7.58 Main Panel

IHO Definition: Panel showing the default chart.

Remarks:

• No remarks.

7.59 Marine Resource Name

IHO Definition: Name of marine resource.

Remarks:

•No remarks.

7.60 Maximum Display Scale

IHO Definition: The largest intended viewing scale for the data.

Remarks:

• No remarks.

7.61 Minimum Display Scale

IHO Definition: The smallest intended viewing scale for the data.

Remarks:

• No remarks.

7.62 Name

IHO Definition: The individual name of a feature.

Remarks:

• No remarks.

7.63 Name Of Resource

IHO Definition: Name of the online resource.

Remarks:

• No remarks.

7.64 Online Description

IHO Definition: Description of online resources.
Remarks:
• No remarks.

7.65 Original Chart Number

IHO Definition: A chart which has been drawn up as a result of direct survey.
Remarks:
• No remarks.

7.66 Pictorial Representation

IHO Definition: Indicates whether a pictorial representation of the feature is available.
Remarks:
• The 'pictorial representation' could be a drawing or a photo. The string encodes the file name of an external graphic file (pixel/vector).

7.67 Picture Caption

IHO Definition: Short description of the purpose of the image.
Remarks:
• No remarks.

7.68 Picture Information

IHO Definition: A set of information to provide credits to picture creator, copyright owner etc.
Remarks:
• No remarks.

7.69 Position Name

IHO Definition: Title of person in charge.
Remarks:
• No remarks.

7.70 Postal Code

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

7.71 Price

IHO Definition: The property of having material worth.
Remarks:
• No remarks.

7.72 Print Agency

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

7.73 Contract Period

IHO Definition: This will be improved in S-128 PS Package v1.1.
Remarks:
• No remarks.

7.74 Print Nation

IHO Definition: Country with printed nautical paper chart.
Remarks:
• No remarks.

7.75 Value of Time

IHO Definition: This will be improved in S-128 PS Package v1.1.
Remarks:
• No remarks.

7.76 Type of Time Interval Unit

IHO Definition: Type of Time Interval Unit.
1) **time**
   IHO Definition:
2) **day**
   IHO Definition:
3) **month**
   IHO Definition:
4) **year**
   IHO Definition:
Remarks:
• No remarks.

7.77 Print Size

IHO Definition: Size of nautical paper charts.
1) **A0**

IHO Definition: The first size as output size on nautical paper chart.

2) **A1**
IHO Definition: The second size as output size on nautical paper chart.

3) **A2**
IHO Definition: The third size as output size on nautical paper chart.

4) **A3**
IHO Definition: The fourth size as output size on nautical paper chart.

5) **A4**
IHO Definition: The fifth size as output size on nautical paper chart.

6) **A5**
IHO Definition: The sixth size as output size on nautical paper chart.

7) **A6**
IHO Definition: The seventh size as output size on nautical paper chart.

8) **A7**
IHO Definition: The eighth size as output size on nautical paper chart.

Remarks:
• No remarks.

7.78 Print Week

IHO Definition: The week in which nautical paper charts were published.
Remarks:
• No remarks.

7.79 Print Year

IHO Definition: Publication year of the nautical paper chart.
Remarks:
• No remarks.

7.80 Producer Code

IHO Definition: It means the publishing agency code, which is managed by the International Hydrographic Organization(IHO).
Remarks:
• No remarks.

7.81 Producer Nation

IHO Definition: Country of publication of nautical products.
Remarks:
• No remarks.

7.82 Product Type

IHO Definition: Types of nautical products such as paper charts for navigation, electronic charts, and raster charts.

1) **paper nautical chart**

IHO Definition: Nautical chart printed on paper.

2) **ENC**

IHO Definition: All information related to the sailing of the ship.

3) **raster nautical chart**

IHO Definition: Raster information which is displayed visually.

4) **INT Chart**

IHO Definition: A nautical chart with limits and scale in conformity with an internationally agreed scheme of such charts; carries the INT number of that sheet; conforms to the Chart Specifications of the IHO.

5) **nautical publication**

IHO Definition: Used to relate additional nautical information or publications to the data.

6) **S-100 compliant product**

IHO Definition: Data produced according to S-100-based product standards.

7) **electronic application for safety navigation**

IHO Definition: Electronic applications or products for safe navigation.

8) **special purpose charts**

IHO Definition: Nautical charts designed for special purposes.

9) **e-Navigation service**

IHO Definition: Intelligent navigation support service developed according to the IMO marine service technology standard.

10) **others**

IHO Definition: Other nautical products.

Remarks:

• No remarks.

7.83 Protocol

IHO Definition: Connection protocol to be used. Example: ftp, http get KVP, http POST, etc.

Remarks:

• No remarks.

7.84 Protocol Request

IHO Definition: Request used to access the resource. Structure and content depend on the protocol and standard used by the online resource, such as Web Feature Service standard.

Remarks:

• No remarks.

7.85 Publication Number

IHO Definition: Publication number of the nautical product.

Remarks:

• No remarks.

7.86 Purpose

IHO Definition: Types related to publication, such as new publication and **update** of nautical products.

1) **new dataset**

IHO Definition: Dataset having no previous example.

2) **new edition**

IHO Definition: Edition having no previous example.

3) update

IHO Definition: News that updates your information.

4) **re-issue**

IHO Definition: New base data that combines updates to base data.

5) **cancellation**

IHO Definition: The data of cancelling.

Remarks:

• No remarks.

7.87 Re Print Edition

IHO Definition: Reprinted version of nautical paper chart.

Remarks:

• No remarks.

7.88 Re Print Nation

IHO Definition: Reprinted country name of nautical paper chart.

Remarks:

• No remarks.

7.89 Service Design

IHO Definition: Information on the design of nautical services.

Remarks:

• No remarks.

7.90 Service Status

IHO Definition: Types of status of nautical services.

1) **provisional**

IHO Definition: Under terms not final or fully worked out or agreed upon.

2) **released**

IHO Definition: Merchandise issued for sale or public showing.

3) **deprecated**

IHO Definition: Data that is deprecated in importance and is no longer used and will disappear in the future.

4) **deleted**

IHO Definition: Item that has been removed or deleted.

Remarks:

• No remarks.

7.91 Sounding Datum

IHO Definition: Geodetic points for measuring the depth from the sea level to the sea floor.

1) **mean low water springs**

IHO Definition: (MLWS) - The average height of the low waters of spring tides.

2) **mean lower low water springs**

IHO Definition: (MLLWS) - The average height of lower low water springs at a place.

3) **mean sea level**

IHO Definition: (MSL) - The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level.

4) **lowest low water**

IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or some what lower.

5) **mean low water**

IHO Definition: (MLW) - The average height of all low waters at a place over a 19-year period.

6) **lowest low water springs**

IHO Definition: an arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years.

7) **approximate mean low water springs**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean low water springs (MLWS).

8) **indian spring low water**

IHO Definition: (ISLW) - An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides.

9) **low water springs**

IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS).

10) **approximate lowest astronomical tide**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of lowest astronomical tide (LAT).

11) **nearly lowest low water**

IHO Definition: An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian spring low water (ISLW).

12) **mean lower low water**

IHO Definition: (MLLW) - The average height of the lower low waters at a place over a 19-year period.

13) **low water**

IHO Definition: An approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date.

14) **approximate mean low water**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean low water (MLW).

15) **approximate mean lower low water**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean lower low water (MLLW).

16) **mean high water**

IHO Definition: (MHW) - The average height of all high waters at a place over a 19-year period.

17) **mean high water springs**

IHO Definition: (MHWS) - The average height of the high waters of spring tides.

18) **high water**

IHO Definition: The highest level reached at a place by the water surface in one tidal cycle.

19) **approximate mean sea level**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean sea level (MSL).

20) **high water springs**

IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS).

21) **mean higher high water**

IHO Definition: (MHHW) - The average height of higher high waters at a place over a 19-year period.

22) **equinoctial spring low water**

IHO Definition: The level of low water springs near the time of an equinox.

23) **lowest astronomical tide**

IHO Definition: (LAT) - The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

24) **local datum**

IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority.

25) **international great lakes datum 1985**

IHO Definition: (IGLD 1985) - A vertical reference system with its zero based on the **mean water level** at Rimouski/Pointe-au-Pere, Quebec, over the period 1970 to 1988.

26) **mean water level**

IHO Definition: The average of all hourly water levels over the available period of record.

27) **lower low water large tide**

IHO Definition: (LLWLT) - The average of the lowest low waters, one from each of 19 years of observations.

28) **higher high water large tide**

IHO Definition: The average of the highest high waters, one from each of 19 years of observations.

29) **nearly highest high water**

IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.

30) **highest astronomical tide**

IHO Definition: The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

44) **baltic sea chart datum 2000**

IHO Definition: (BSCD2000) - The datum refers to each Baltic country's realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).

Remarks:

• No remarks.

7.92 Source Date

IHO Definition: The production date of the source; for example the date of measurement.

Remarks:

• No remarks.

7.93 Specific Usage

IHO Definition: Scale range divided according to the purpose of navigation in nautical charts such as paper charts and electronic charts.

1) **overview**

IHO Definition: A **general** summary of a subject.

2) **general**

IHO Definition: Break bulk cargo normally loaded by crane.

3) **coastal**

IHO Definition: A place located on or near or bordering on a coast.

4) **approach**
IHO Definition: Ideas or actions intended to deal with a problem or situation.
5) **harbour**
IHO Definition: A reporting point of a harbour.
6) **berthing**
IHO Definition: A signal station for the control of vessels when berthing.

Remarks:

• No remarks.

7.94 Text

IHO Definition: A non-formatted digital text string.

Remarks:

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

7.95 Tnp Update

IHO Definition: Information on update of nautical notification.

Remarks:

• No remarks.

7.96 Type Of Product Format

IHO Definition: Types of product format.

1) **GML**
IHO Definition: Geography Markup Language. An XML-based geographic information encoding language developed by the Open GIS Consortium (OGC) to enhance the interoperability of geographic information.
2) **ISO/IEC 8211**
IHO Definition: Specification for a data descriptive file for information interchange.
3) **PDF**
IHO Definition: Portable Document Format. A file format developed by Adobe in 1993 to present documents, including text formatting and images, in a manner independent of application software, hardware, and operating systems.
4) **HTML**
IHO Definition: Hypertext Markup Language. A type of basic web language used to create web documents.
5) **ePub**
IHO Definition: E-book file format.
6) **paper**
IHO Definition: For printing hydrographic charts, heavyweight, single layer paper is used. Such paper is generally made wholly or partly from rags and simulates hand-made paper. It is strong, moisture resistant and manufactured to withstand surface erasure.
7) **HDF-5**
IHO Definition: Grid file format.
8) **other**
IHO Definition: Other type of nautical product.

Remarks:
• No remarks.

7.97 Type Of Paper

IHO Definition: Types of paper chart.
Remarks:
• No remarks.

7.98 Update Date

IHO Definition: Update date information.
Remarks:
• No remarks.

7.99 Update Number

IHO Definition: Update number of nautical product data.
Remarks:
• No remarks.

7.100 Version

IHO Definition: An interpretation of a matter from a particular viewpoint.
Remarks:
• No remarks.

7.101 Vertical Datum

IHO Definition: The reference level used for expressing the vertical measurements of points on the earth's surface. Also called datum level, reference plane, levelling datum, datum for sounding reduction, datum for heights.

1) **mean low water springs**
   IHO Definition: (MLWS) - The average height of the low waters of spring tides.
2) **mean lower low water springs**
   IHO Definition: (MLLWS) - The average height of lower low water springs at a place.
3) **mean sea level**
   IHO Definition: (MSL) - The average height of the surface of the sea at a tide station for all stages of the tide over a 19-year period, usually determined from hourly height readings measured from a fixed predetermined reference level.
4) **lowest low water**
   IHO Definition: An arbitrary level conforming to the lowest tide observed at a place, or some what lower.
5) **mean low water**
   IHO Definition: (MLW) - The average height of all low waters at a place over a 19-year period.
6) **lowest low water springs**
   IHO Definition: an arbitrary level conforming to the lowest water level observed at a place at spring tides during a period of time shorter than 19 years.
7) **approximate mean low water springs**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean low water springs (MLWS).

8) **indian spring low water**

IHO Definition: (ISLW) - An arbitrary tidal datum approximating the level of the mean of the lower low water at spring tides.

9) **low water springs**

IHO Definition: An arbitrary level, approximating that of mean low water springs (MLWS).

10) **approximate lowest astronomical tide**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of lowest astronomical tide (LAT).

11) **nearly lowest low water**

IHO Definition: An arbitrary level approximating the lowest water level observed at a place, usually equivalent to the Indian spring low water (ISLW).

12) **mean lower low water**

IHO Definition: (MLLW) - The average height of the lower low waters at a place over a 19-year period.

13) **low water**

IHO Definition: An approximation of mean low water adopted as the reference level for a limited area, irrespective of better determinations at a later date.

14) **approximate mean low water**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean low water (MLW).

15) **approximate mean lower low water**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean lower low water (MLLW).

16) **mean high water**

IHO Definition: (MHW) - The average height of all high waters at a place over a 19-year period.

17) **mean high water springs**

IHO Definition: (MHWS) - The average height of the high waters of spring tides.

18) **high water**

IHO Definition: The highest level reached at a place by the water surface in one tidal cycle.

19) **approximate mean sea level**

IHO Definition: An arbitrary level, usually within ' 0.3m from that of mean sea level (MSL).

20) **high water springs**

IHO Definition: An arbitrary level, approximating that of mean high water springs (MHWS).

21) **mean higher high water**

IHO Definition: (MHHW) - The average height of higher high waters at a place over a 19-year period.

22) **equinoctial spring low water**

IHO Definition: The level of low water springs near the time of an equinox.

23) **lowest astronomical tide**

IHO Definition: (LAT) - The lowest tide level which can be predicted to occur under average meterological conditions and under any combination of astronomical conditions.

24) **local datum**

IHO Definition: An arbitrary datum defined by a local harbour authority, from which levels and tidal heights are measured by this authority.

25) **international great lakes datum 1985**

IHO Definition: (IGLD 1985) - A vertical reference system with its zero based on the **mean water level** at Rimouski/Pointe-au-Pere, Quebec, over the period 1970 to 1988.

26) **mean water level**

IHO Definition: The average of all hourly water levels over the available period of record.

27) **lower low water large tide**

IHO Definition: (LLWLT) - The average of the lowest low waters, one from each of 19 years of observations.

28) **higher high water large tide**

IHO Definition: The average of the highest high waters, one from each of 19 years of observations.

29) **nearly highest high water**

IHO Definition: An arbitrary level approximating the highest water level observed at a place, usually equivalent to the high water springs.

30) **highest astronomical tide**

IHO Definition: The highest tidal level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

44) **baltic Sea Chart Datum 2000**

IHO Definition: (BSCD2000) - The datum refers to each Baltic country's realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).

Remarks:

• When the vertical datum is unknown, such as water areas above locks, the value 'local datum' is to be used, and further details may be encoded using 'INFORM'. The +0.3m approximation quoted in the 'approximate' levels is somehow arbitrary and follows the British example of their definition for 'approximate LAT'.

7.102 Week

IHO Definition: Any period of seven consecutive days.

Remarks:

• No remarks.

7.103 Year

IHO Definition: A period of one revolution of the earth around the sun.

Remarks:

• No remarks.

8 Complex Attributes

8.1 Issuance Cycle

IHO Definition: This will be improved in S-128 PS Package v1.1
Sub-attributes:
Time Interval of Cycle (see clause 8.3)
Periodic Date Range (see clause 8.2)
Remarks:
• No remarks.

8.2 Periodic Date Range

IHO Definition: This will be improved in S-128 PS Package v1.1
Sub-attributes:
Start Date (see clause 7.53)
End Date (see clause 7.54)
Remarks:
• No remarks.

8.3 Time Interval of Cycle

IHO Definition: This will be improved in S-128 PS Package v1.1
Sub-attributes:
Type of Time Interval Unit (see clause 7.76)
Value of Time (see clause 7.75)
Remarks:
• No remarks.

8.4 Time Interval of Product

IHO Definition: This will be improved in S-128 PS Package v1.1
Sub-attributes:
Issue Date (see clause 7.51)
Expiration Date (see clause 7.52)
Time Reference (see clause 7.22)
Issuance Cycle (see clause 8.1)
Remarks:
• No remarks.

8.5 Time Intervals by Day of Week

IHO Definition: The regular weekly operation times of a service or schedule.
Sub-attributes:
Time Reference (see clause 7.22)
Time of Day Start (see clause 7.11)
Time of Day End (see clause 7.12)
Day of Week is Range (see clause 7.13)

Day of Week (see clause 7.20)

Remarks:

• No remarks.

8.6 Support File Specification

IHO Definition: Specification of information on additional files used in addition to nautical products.

Sub-attributes:

Date (see clause 7.38)

Version (see clause 7.100)

Name (see clause 7.62)

Remarks:

• No remarks.

8.7 Schedule by Day of Week

IHO Definition: The nature and timings of a daily schedule by days of the week.

Sub-attributes:

Time Intervals by Day of Week (see clause 8.5)

Category of Schedule (see clause 7.24)

Remarks:

• No remarks.

8.8 Default Locale

IHO Definition: Locale of an option that is selected automatically unless an alternative is specified.

Sub-attributes:

Language (see clause 7.56)

Character Encoding (see clause 7.10)

Country (see clause 7.35)

Remarks:

• No remarks.

8.9 Contact Address

IHO Definition: Direction or superscription of a letter, package, etc., specifying the name of the place to which it is directed, and optionally a contact person or organisation who should receive it.

Sub-attributes:

Administrative Division (see clause 7.26)

City Name (see clause 7.30)

Country (see clause 7.35)

Delivery Point (see clause 7.39)

Postal Code (see clause 7.70)

Remarks:

• No remarks.

8.10 Feature Name

IHO Definition: Provides the name of an entity, defines the national language of the name, and provides the option to display the name at various system display settings.

Sub-attributes:

Display Name (see clause 7.40)

Language (see clause 7.56)

Name (see clause 7.62)

Remarks:

• No remarks.

8.11 Graphic

IHO Definition: Pictorial information such as a photograph, sketch or other graphic, optionally accompanied by descriptive information about the graphic and the location relative to its subject from which it was made.

Sub-attributes:

Pictorial Representation (see clause 7.66)

Picture Caption (see clause 7.67)

Picture Information (see clause 7.68)

Source Date (see clause 7.92)

Remarks:

• No remarks.

8.12 Information

IHO Definition: Textual information about the feature. The information may be provided as a string of text or as a file name of a single external text file that contains the text.

Sub-attributes:

File Locator (see clause 7.44)

File Reference (see clause 7.45)

Headline (see clause 7.47)

Language (see clause 7.56)

Text (see clause 7.94)

Remarks:

• At least one of the sub-attributes file reference or text must be populated. The sub-attribute file reference is generally used for long text strings or those that require formatting, however, there is no restriction on the type of text (except for lexical level) that can be held in files referenced by sub-attribute file reference.

8.13 Online Resource

IHO Definition: Information about online sources from which a resource or data can be obtained.

Sub-attributes:

Application Profile (see clause 7.27)

Linkage (see clause 7.57)

Name Of Resource (see clause 7.63)

Online Description (see clause 7.64)

Protocol (see clause 7.83)

Protocol Request (see clause 7.84)

Remarks:

• No remarks.

8.14 Payment

IHO Definition: A sum of money paid or a claim discharged.

Sub-attributes:

Currency (see clause 7.36)

Price (see clause 7.71)

Contract Period (see clause 7.73)

Remarks:

• No remarks.

8.15 Print Information

IHO Definition: Information on the printing of nautical paper charts.

Sub-attributes:

Print Agency (see clause 7.72)

Print Nation (see clause 7.74)

Print Size (see clause 7.77)

Print Week (see clause 7.78)

Print Year (see clause 7.79)

Re Print Edition (see clause 7.87)

Re Print Nation (see clause 7.88)

Remarks:

• No remarks.

8.16 Producing Agency

IHO Definition: Publishing agency of nautical products.

Sub-attributes:

Contact Address (see clause 8.9)

Individual Name (see clause 7.49)

Online Resource (see clause 8.13)

Organization Name (see clause 7.21)

Position Name (see clause 7.69)

Telecommunications (see clause 8.22)

Remarks:

• No remarks.

8.17 Product Specification

IHO Definition: Product standard name referenced when manufacturing nautical products.

Sub-attributes:

Date (see clause 7.38)

ISSN (see clause 7.9)

Name (see clause 7.62)
Version (see clause 7.100)
Remarks:
• No remarks.

8.18 Reference To NM

IHO Definition: Reference information of notice to mariners.
Sub-attributes:
Week (see clause 7.102)
Year (see clause 7.103)
Remarks:
• No remarks.

8.19 Service Specification

IHO Definition: Product standard name referenced when developing nautical product service.
Sub-attributes:
Date (see clause 7.38)
Name (see clause 7.62)
Version (see clause 7.100)
Remarks:
• No remarks.

8.20 Source Indication

IHO Definition: Information about the source document, publication, or reference from which object data or textual material included or referenced in a dataset are derived.
Sub-attributes:
Category of Authority (see clause 7.19)
Country (see clause 7.35)
Reported Date (see clause 7.7)
Source (see clause 7.8)
Source Type (see clause 7.25)
Feature Name (see clause 8.10)
Remarks:
• Content of featureName is source authority name.

8.21 Support File

IHO Definition: Information on additional files used in addition to nautical products.
Sub-attributes:
File Name (see clause 7.6)
File Location (see clause 7.5)
Support File Purpose (see clause 7.17)
Edition Number (see clause 7.43)
Issue Date (see clause 7.51)
Support File Specification (see clause 8.6)

Support File Format (see clause 7.18)
Other Data Type Description (see clause 7.4)
Comment (see clause 7.3)
Digital Signature (see clause 7.15)
Digital Signature Value (see clause 7.14)
Default Locale (see clause 8.8)

Remarks:

• No remarks.

8.22 Telecommunications

IHO Definition: Any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems.

Sub-attributes:

Category of Comm Pref (see clause 7.23)
Contact Instructions (see clause 7.33)
Telecommunication Carrier (see clause 7.2)
Telecommunication Identifier (see clause 7.1)
Telecommunication Services (see clause 7.16)
Schedule by Day of Week (see clause 8.7)

Remarks:

• No remarks.

8.23 Text Content

IHO Definition: Textual material, or a pointer to a resource providing textual material. May be accompanied by basic information about its source and relationship to the source.

Sub-attributes:

Category Of Text (see clause 7.28)
Information (see clause 8.12)
Online Resource (see clause 8.13)
Source Indication (see clause 8.20)

Remarks:

• Exactly one of sub-attributes onlineResource or information must be completed in one instance of textContent. Product specifications may restrict the use or content of onlineResource for security. For example, a product specification may forbid populating onlineResource. Product specification authors must consider whether applications using the data product may be prevented from accessing off-system resources by security policies.

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