**S-98**



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**S-98 Annex A**

**S-100 ECDIS Data Constraints**

**Edition 2.0.0 – October 2025**

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**Document History**

Changes to this Annex are coordinated by the IHO S-100 Working Group. New editions will be made available via the IHO web site. Maintenance of the Specification shall conform to IHO Resolution 2/2007 (as amended).

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1. Overview

This Annex to S-98.

* 1. Introduction

This Annex defines

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* 1. Scope

This Annex is intended for ECDIS and Navigational Systems.

* 1. References

IEC 61174 *Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information system (ECDIS) – Operational and performance requirements, methods of testing and required test results*. International Electrotechnical Commission (IEC), Edition 4.0, 2015.

RFC 2141 *URN Syntax*. Internet Engineering Task Force (IETF), May 1997.

S-52 *Specifications for Chart Content and Display Aspects of ECDIS*, Edition 6.1.1, June 2015.

S-100  *IHO Universal Hydrographic Data Model*, Edition 5.0.0, December 2022.

S-101 *Electronic Navigational Chart (ENC) Product Specification*, Edition 1.1.0, April 2023.

S-102 *Bathymetric Surface Product Specification*, Edition 2.2.0, April 2023.

S-104 *Water Level Information for Surface Navigation Product Specification*, Edition 1.1.0, March 2023.

S-111 *Surface Currents Product Specification*, Edition 1.2.0, March 2023.

S-122 *Marine Protected Areas Product Specification*. Draft Edition 1.0.0, January 2019.

S-123 *Marine Radio Services Product Specification*. Draft Edition 1.0.0, January 2019.

S-129 *Under Keel Clearance Management Product Specification*, Edition 1.0.0, June 2019.

IMO MSC.1/Circ.1512 *Guideline on Software Quality Assurance and Human-Centred Design for e-Navigation*.

IMO MSC 232(82) *Revised Performance Standards for Electronic Chart Display And Information Systems (ECDIS)*, IMO Resolution MSC.232(82), 2006.

ISO 19115-1 ISO 19115-1:2014, *Geographic information – Metadata – Part 1 - Fundamentals*. As amended by Amendment 1, 2018.

ISO 19115-3 ISO/TS 19115-3:2016, *Geographic information - Metadata - XML schema implementation for fundamental concepts*.

XPath *XML Path Language (XPath) 3.1 - W3C Recommendation 21 March 2017* (World-Wide Web Consortium – W3C). URL: <https://www.w3.org/TR/2017/REC-xpath-31-20170321/> (Retrieved 2017-12-08).

NOTE: Plain “S-100” in this document and its Parts, Annexes, or Appendices means S-100 Edition 5.0.0, any clarification.

* 1. Terms, definitions and abbreviations

### Terms and Definitions

### Abbreviations

ARPA Automatic Radar Plotting Aid

AIS Automatic Identification System

AIS ASM AIS Application Specific Messages

CRS Coordinate Reference System

DCEG Data Classification and Encoding Guide

DQ Data Quality

ECDIS Electronic Chart Display and Information System

ECS Electronic Chart System

ENC Electronic Navigational Chart

EPSG European Petroleum Survey Group

FC Feature Catalogue

HCD Human-Centred Design

IEC International Electrotechnical Commission

IC Interoperability Catalogue

IHO International Hydrographic Organization

IMO International Maritime Organization

ISO International Organization for Standardization

GFM General Feature Model

MPA Marine Protected Area

MRN Maritime Resource Name

OEM Original Equipment Manufacturer

OGC Open Geospatial Consortium

PC Portrayal Catalogue

PDC Pre-Defined Combination

PS Product Specification

SENC System Electronic Navigational Chart

SOLAS Safety of Life at Sea (Convention)

SQA Software Quality Assurance

UI User Interface

URI Uniform Resource Identifier

URL Uniform Resource Locator

URN Uniform Resource Name

XML eXtensible Markup Language

XSD XML Schema Definition (a format for formally describing the elements in an XML document)

XSL eXtensible Stylesheet Language

XSLT XSL Transformations

* 1. 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. Description of functionality described.

This Annex contains a set of ECDIS data constraints. These are not focused on implementers, nor do they constitute requirements for S-100 ECDIS. They are mandatory requirements for data which is intended for use on S-100 ECDIS and are pre-requisites for correct operation of such systems.

**Introduction topics?**

* Use of data constraints as references for validation tests
* This Annex contains no requirements for ECDIS OEMs, only for data producers who wish to construct data compatible with S-100 ECDIS ( or, that optimises the use of S-100 ECDIS)
* General requirements for data to be valid against at least 158:100 and 158:98 in order for it to be used on S-100 ECDIS
* Exchange set requirement, digitally signed data (Part 15).

1. GML Coverage formats

GML format description is located here. Can probably remove the Appendix from S-98

1. GML Format [*relates to NIPWG inputs on GML*]

In progress. Trying to get input from tool producers, but this section should contain a profile of the Part 10b allowable geometry elements. Includes

* Where geometry is by reference
* Inline geometry. Allowed primitives which can be used on ECDIS
* Relationships between the two

1. Enhanced Safety Contour and Water Level Adjustment data requirements, datums, validation, safety

* Overlaps between S-102, S-104 and S-101. Overlap sizes
* Behaviour under overlaps is still dealt with by S-98.
* Vertical datum information and where information is located

1. Digital Signature Certificate Information

* Certificate fields includes and certificate role names
* Conformance of CATALOG.XML with dataset?

1. Support File Formats

* Allowable file formats of support files
* Sharing? Persistence of support files.

1. Catalogue Metadata [?]

* TBD.

1. Data Overlaps
2. Scales in data

* Mandatory status of scale fields in data (ENC and non-ENC).
* What happens if scale information is not included.
* Overlapping scale range restrictions (from S-101 PS)

1. Not for Navigation

* Use of NotForNavigation in datasets. Does ECDIS take any notice of this field?