

**THIS CIRCULAR LETTER REQUIRES YOU TO VOTE**

IHB File No. S3/8152

**CIRCULAR LETTER 43/2003  
27 June 2003**

**WEND ISSUES: IHO WORLD ENC**

Ref: 1) IHO Technical Resolutions K2.19 and A3.11  
2) WEND Letter 1/2003 dated 10 March 2003

Dear Hydrographer,

1. WEND Task Group

The 7<sup>th</sup> meeting of the IHO WEND<sup>1</sup> Committee, Lima, Peru, 15-16 May 2003, supported a proposal from Germany that the IHO initiate a comprehensive programme for an "IHO World ENC" with the following objectives:

- ?? Develop and implement measures to complete worldwide ENC coverage and updating.
- ?? Ensure worldwide uniform data quality.
- ?? Facilitate the availability of worldwide, user-friendly and integrated ENC services for the mariner.

The meeting further endorsed Germany's proposal to establish a WEND Task Group to monitor the implementation of this programme, with the following Terms of Reference:

- ?? Assess the result of the evaluation of responses from MS on IHO CL 67/2002 (status of ENC coverage by country),
- ?? Determine, in liaison with Regional Hydrographic Commissions, shipping routes needing ENC coverage, grouped by priority,
- ?? Develop, in liaison with Regional Hydrographic Commissions, a worldwide small scale ENC scheme and determine the Producer HOs,
- ?? Assess the results of the evaluation of responses from MS on IHO CL 54/2002 (requests for, and offers of, ENC Production Assistance) in terms of deficiencies and action needed,
- ?? Develop proposals, in liaison with Regional Commissions, for speeding up ENC production and ensuring uniform ENC quality and consistency across national borders, and for making data available worldwide, including SENC distribution, taking advantage of any offers for production assistance, or other ways of mutual assistance and co-operation,
- ?? Advise MS, where appropriate, on the need, as well as on methods and tools for validating the data, and on any assistance which could be offered by the RENCs.

Mr Horst Hecht (Germany) and Mr Peter Wright (United Kingdom) have been nominated Chairman and Secretary of the WEND Task Group, respectively. It was further agreed that,

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<sup>1</sup> Worldwide Electronic Navigational chart Database

apart from the Chairman and the Secretary, two representatives from the existing RENCs, i.e. IC-ENC and Primar-Stavanger, and an IHB Director (RAdm Kenneth Barbor) would form the 5 core members of this group. In addition, all IHO Regional Hydrographic Commissions will be asked to provide corresponding members for this group. The Task Group will work largely by correspondence and it will involve RHCs as much as possible.

As a result, Chairpersons of RHCs are kindly requested to consider appointing a suitable corresponding member to the WEND Task Group by filling in the response form at **Annex A**, to reach the IHB **no later than 15 September 2003**.

IC-ENC and Primar-Stavanger, to whom this CL is copied, are further invited to communicate the names of their representatives in the WEND Task Group to the Chairman and Secretary, with copy to the IHB. It is understood that the "core" Task Group can start addressing the above listed issues as soon as feasible.

## 2. New WEND Principle

In relation to their proposal for an IHO World ENC, Germany suggested, and this was supported by the 7<sup>th</sup> WEND meeting, that a requirement for user-friendly services be added to the WEND Principles; the agreed recommended wording for the new paragraph is as follows:

*"In order to promote the use of ENCs in ECDIS, Member States should strive for the greatest possible user-friendliness of their services, and facilitate integrated services to the mariner."*

You are requested to approve this new WEND Principle by using the response form at **Annex B**, to reach the IHB **by 15 September 2003**.

## 2. Specification for SENC Distribution

As stated above, one of the objectives of the WEND Task Group will be to "develop proposals ... for making data available world-wide, including SENC distribution, ...". In this regard, the Norwegian Hydrographer, Mr Frode Klepsvik, reported that a Specification for SENC Distribution from Primar-Stavanger had been developed and he offered to make it available to IHO Member States for consideration and possible use as guidelines. The meeting agreed that the IHB would forward this specification to MS. It is attached as **Annex C**.

On behalf of the Directing Committee  
Yours sincerely,

*(original signed)*

Rear Admiral Kenneth BARBOR  
Director

Encl: Annex A – Response Form – RHC corresponding members  
Annex B – Response Form – New WEND Principle  
Annex C – Specification for SENC Distribution (English only)

**IHO WORLD ENC – WEND TASK GROUP**

**RHC Corresponding Members**

**RESPONSE FORM**

*(to be returned to the IHB by 15 September 2003)*

E-Mail: [info@ihb.mc](mailto:info@ihb.mc) - Fax: +377 93 10 81 40

**Note :** This form is to be filled in by the Chairpersons of the IHO Regional Hydrographic Commissions (RHC)<sup>1</sup>.

**RHC:** .....

1. Taking into consideration the Terms of Reference for the new WEND Task Group, as detailed in CL 43/2003, please indicate below the name of a suitable corresponding member to this group, for your Regional Hydrographic Commission.

Name: .....

E-mail: .....

Member State: .....

Comments : .....

.....

Date: ..... Signature: .....

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<sup>1</sup> Nordic Hydrographic Commission (NHC) – Chair: Mr. J. VARONEN (Finland)  
 North Sea Hydrographic Commission (NSHC) – Chair: Mr. G. NORDSTRÖM (Sweden)  
 East Asia Hydrographic Commission (EAHC) – Chair: Mr. ZHANG HEPING (China)  
 US/Canada Hydrographic Commission (USHC) – Chair: Capt. D.B. MACFARLAND (USA-NOAA)  
 Mediterranean and Black Seas Hydrographic Commission (MBSHC) – Chair: IGA Y. DESNOËS (France)  
 Baltic Sea Hydrographic Commission (BSHC) – Chair: Mr. T. PRELA (Estonia)  
 Eastern Atlantic Hydrographic Commission (EAHC) – Chair: VAdm D. da SILVA CARDOSO (Portugal)  
 South-East Pacific Hydrographic Commission (SEPHC) – Chair: Capt. F. MINGRAM (Chile)  
 South-West Pacific Hydrographic Commission (SWPHC) – Chair: Capt. B. KAUFER (Australia)  
 Meso-American–Caribbean Sea Hydrographic Commission (MACHC) – Chair: RAdm T. DONALDSON (USA)  
 Southern Africa and Islands Hydrographic Commission (SAIHC) – Chair: Mr. A. GOVE (Mozambique)  
 ROPME Sea Area Hydrographic Commission (RSAHC) – Chair: Mr. M.R. GHADERI (Iran)  
 IHO Hydrographic Committee on Antarctica (HCA) – Chair (acting): Capt. H. GORZIGLIA (IHB)  
 North Indian Ocean Hydrographic Commission (NIOHC) – Chair: RAdm K.R. SRINIVASAN (India)

**NEW WEND PRINCIPLE**

**RESPONSE FORM**

*(to be returned to the IHB by 15 September 2003)*

E-Mail: [info@ihb.mc](mailto:info@ihb.mc) - Fax:+377 93 10 81 40

**MEMBER STATE:** .....

Do you agree that the following new paragraph be added to IHO Technical Resolution K2.19 "Principles of the Worldwide Electronic Navigational Chart Database (WEND)", as recommended by the WEND Committee?

5.5 *In order to promote the use of ENC's in ECDIS, Member States should strive for the greatest possible user-friendliness of their services, and facilitate integrated services to the mariner.*

YES

NO

Comments : .....  
.....  
.....  
.....  
.....  
.....

Date: .....

Signature: .....

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# TECHNICAL REPORT

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## PRIMAR STAVANGER



**Specification for Distribution of Authorised Navigational Chart Data in SENC Format**

REMARK: SHOM (FRANCE) HAS NOT YET APPROVED THE SPECIFICATION

**REPORT No. 2002-1392**

REVISION No. 02

**DET NORSKE VERITAS**

# TECHNICAL REPORT

Date of first issue: 2002-11-01	Project No.: 37251064
Approved by:  Knut S. Ording Head of Section	Organisational unit: Nautical Safety and Communication Systems
Client: Primar Stavanger	Client ref.: Kjell Birkevold

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Summarv:

Primar Stavanger allows distribution of its authorised electronic navigational chart data in SENC format, under certain conditions. This report defines Primar Stavanger minimum requirements regarding the processes for ensuring the quality of the authorised chart data converted from ENC and distributed to end users in SENC format.

Report No.: 2002-1392	Subject Group:	
Report title: Specification for Distribution of Authorised Navigational Chart Data in SENC Format		
Work carried out by: Arve Lepsø		
Work verified by: Knut S. Ording, Head of Section		
Date of this revision: 2003-05-28	Rev. No.: 02	Number of pages: 10

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## 1 General

### 1.1 Introduction

The IHO Technical Resolution A3.11, in annex-1 approved by the XVIth International Hydrographic Conference, allows for distribution of authorised chart data in SENC format, under the condition that certain principles are adhered to. One of these principles is that the “*Distributor who are to supply the SENC service must operate under the regulations of the issuing authority.*” This specification gives Primar Stavanger’s implementation of the above condition regarding the SENC distributor’s Quality Management system and technical tools.

Compliance with this specification shall be documented by a certificate.

The certificate shall be valid for 5 years.

In order to be authorised for issuing a certificate for SENC distributors in accordance with this specification, the approval body must be a Notified Body for performing both EC type-examination of Navigation Equipment and assessment of the quality system in accordance with COUNCIL DIRECTIVE 96/98/EC (Marine Equipment Directive).

In order to be authorised for performing type approval of the conversion software, the approval body must be a Notified Body for performing EC type-examination of Navigation Equipment in accordance with COUNCIL DIRECTIVE 96/98/EC (Marine Equipment Directive).

The approval body must periodically be invited to, and carry out, audits to make sure that the SENC distributor maintains and applies the quality management system and must provide the SENC distributor with audit reports. Both the time intervals between such audits and the scope of the audits shall be in line with the periodical audits defined in COUNCIL DIRECTIVE 96/98/EC (Marine Equipment Directive).

The commercial as well as specific technical aspects are covered in a separate distribution agreement between Primar Stavanger and the SENC distributor.

### 1.2 Objectives

This specification defines the minimum requirements regarding the processes for ensuring the quality of the authorised navigational chart data converted from ENC and distributed to end users in SENC format.

### 1.3 Application

This specification applies to applicants to be granted status as approved SENC distributors for supplying the SENC service under the authorisation of Primar Stavanger.



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## **2 Normative References**

The following current editions of normative documents contain provisions which, through reference in this text, constitute provisions of this specification:

- IMO Resolution A.817(19) as amended by IMO Resolution MSC.64(67) Annex 5 and by IMO Resolution MSC.86(70) Annex 4 Performance standards for Electronic Chart Display and Information Systems (ECDIS).
- COUNCIL DIRECTIVE 96/98/EC (Marine Equipment Directive).
- IHO Special Publication No. 52, Specifications for Chart Content and Display Aspects of ECDIS.
- IHO Special Publication No. 57, IHO Transfer Standard for Digital Hydrographic Data.
- IHO Special Publication No. 58, Recommended ENC validation checks.
- 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.

## **3 Definitions and Abbreviations**

### **3.1 Definitions**

In the context of this specification, the following definitions apply.

#### **3.1.1 Approval Body**

Body authorized by Primar Stavanger to perform audits of the quality management system of the SENC distributor applying for approval and/ or type approval of conversion software

#### **3.1.2 ENC Data**

A database, standardized as to content, structure and format, issued for use with ECDIS on the authority of government authorized Hydrographic Offices (HOs). It contains all chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g. sailing directions), which may be considered necessary for safe navigation.

#### **3.1.3 SENC**

A database resulting from the transformation of the ENC by ECDIS for appropriate use, updates to the ENC by appropriate means and other data added by the mariner. It is this database that is actually accessed by ECDIS for the display generation and other navigational functions and is equivalent to an up-to-date paper chart. The SENC may also contain information from other sources (IHO S52, Appendix 3).

Primar Stavanger has the following interpretation of conditions for the SENC delivery option:

- Primar Stavanger uses the SENC notion solely as defined in IHO S52 and IMO Resolution A.817(19).
- There is a direct one-to one relationship between the SENC distributed and the SENC directly loaded and accessed by the ECDIS for the display generation and other navigational functions.

#### **3.1.4 SENC Data**

Data files containing SENC base cells or updates to SENC.

#### **3.1.5 SENC service process**

The complete process from acquisition of ENC data from Primar Stavanger to the implementation of the SENC in the ECDIS onboard.

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**3.2 Abbreviations**

EC	European Communities
ECDIS	Electronic Chart Display and Information System
ENC	Electronic Navigational Chart
OEM	Original Equipment Manufacturer
SENC	System Electronic Navigational Chart

**4 Requirements****4.1 General Requirements**

This sub-clause identifies requirements regarding handling of functions that embraces several or all elements of the SENC service process.

**4.1.1 Quality Management**

The SENC distributor must operate a quality management system, based on ISO 9001-2000, which embraces all elements of the SENC service process. The minimum requirements for such quality management system are those defined in this specification.

4.1.1.1 The quality management system must ensure that the SENC service process complies with all relevant requirements of this specification.

4.1.1.2 All the elements, requirements and provisions adopted by the SENC distributor must be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The quality management system must, as a minimum, include an adequate description of;

- the quality objectives and the organisational structure, responsibilities and powers of the management with regard to SENC service quality,
- the techniques, processes and systematic actions that will be used for quality management throughout the SENC service process, ENC to SENC conversion, transport of SENC data and implementation of SENC in the ECDIS onboard,
- the examination and tests that will be carried out before, during and after processes essential for the quality of the SENC, and the frequency with which they will be carried out,
- the quality records, such as inspection reports (see 4.1.1.7) and test data (see 4.2.2 and 4.3.2), qualification reports of personnel concerned (see 4.1.1.6), etc.,
- the means for monitoring the achievement of the required quality of the SENC service (see 4.1.1.5) and the effective operation of the quality management system.

4.1.1.3 Design and development changes shall be identified and records maintained. The changes shall be reviewed, verified and validated, as appropriate, and approved by the approval body before implementation. The review of design and development changes shall include evaluation of the effects of the changes on constituent parts, distribution services and end users of the SENC.

Records of the results of the review of changes and any necessary actions shall be maintained.

The SENC distributor shall ensure that all ENC to SENC conversion workstations in use operate correctly. This shall be verified by appropriate testing. Each workstation used for ENC to SENC conversion shall be identified, and records of the test results shall be maintained.

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If the type approved conversion software is maintained by a third party, the SENC distributor shall ensure that no changes made to the conversion software render the type approval of the conversion software invalid, and shall evaluate the effects of any changes on the end users of the SENC.

4.1.1.4 The SENC distributor shall collect and analyse both internal information and information received from external parties in order to continually improve the SENC service process.

4.1.1.5 The SENC distributor shall ensure that personnel performing work affecting the SENC service process are competent with regard to appropriate education, training, skills and experience. Appropriate records identifying personnel's competence of performing work affecting the SENC service process shall be maintained.

4.1.1.6 The SENC distributor shall conduct internal audits at planned intervals to determine whether the quality management system conforms to the requirements of this specification and is effectively implemented and maintained.

An audit programme shall be planned, taking into consideration the individual process' importance in relation to the SENC service quality, as well as the results of previous audits.

Selection of auditors and conducting of audits shall, as far as practicable, ensure objectivity and impartiality in the audit process.

The responsibility and requirements for planning and conducting audits, and for reporting results and maintaining records shall be defined in a documented procedure.

The SENC distributor shall ensure that actions are taken without undue delay to eliminate detected non-conformities and their causes. Follow-up activities shall include the verification of the actions taken and the reporting of verification results.

#### 4.1.2 Copyrights of Chart Data

The SENC distributor shall ensure, throughout the SENC service process, that the copyright of the ENC data is maintained.

4.1.2.1 The SENC distributor shall ensure, by appropriate means, that any unauthorised use (i.e. unauthorised copying, processing and distributing) of ENC data is avoided.

The SENC data format shall be protected against use by non-registered users.

The SENC distributor must implement internal procedures, or other means, for ensuring that the ENC data is used only in accordance with agreements with Primar Stavanger.

4.1.2.2 The SENC distributor shall, by appropriate means, ensure the integrity and authenticity of the ENC based SENC data.

The method used for ensuring authenticity shall not be inferior to a digital signature.

#### 4.1.3 Registry of SENC service users

The SENC distributor shall maintain a registry of its users.

4.1.3.1 The registry of SENC service users shall include, for each individual user, the following information;

- SENC format
- unique identification of the user, and where possible, kernel and software version
- delivered data, including edition of cells and updates and time of each delivery
- requested method of distribution, both for new editions and updates

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- version of the SENC delivery process

4.1.3.2 The maintenance and correctness of the registry is the responsibility of the SENC distributor. As relevant, appropriate arrangements shall be made with OEM's ensuring that information about changes relevant to the registry are timely received.

#### 4.1.4 Training of the SENC service users

The SENC distributor shall have an acceptable method of ensuring that any unofficial navigational charts included in the provided service cannot be confused with the ENC data when received and used by the end users of the service.

The SENC distributor shall, by providing appropriate training and/ or adequate information, ensure that the SENC service users has a sufficient level of knowledge about the following:

- Relationship between ENC and SENC.
- SENC service interface procedures.

## 4.2 Acquisition and compatibility control of ENC data

### 4.2.1 Ordering procedures

The SENC distributor shall establish methods and procedures as agreed with Primar Stavanger for timely acquisition of newly available ENC data.

### 4.2.2 Initial check of ENC data

The SENC distributor shall check the integrity and authenticity of all ENC data from Primar Stavanger. The SENC distributor shall ensure that its ENC database used as source for SENC conversion is always synchronised with the Primar Stavanger database in accordance with the latest released ENC data.

Any anomalies detected shall be reported to Primar Stavanger.

### 4.2.3 Compatibility control of received ENC data

The SENC distributor shall ensure that their internally implemented interpretation of the ENC product specification is compatible with the implemented ENC product specification of all ENC data received from Primar Stavanger before conversion to SENC.

The methods used for compatibility control shall, as a minimum, include checks of the received ENC data not inferior to S-58, Recommended ENC validation checks. The software used for these checks shall be of a type based on the SENC distributor's internally implemented interpretation of the ENC product specification.

Any incompatibilities detected shall be reported to Primar Stavanger. Detected incompatibilities shall, as far as practicable, be reported to a level of detail enabling determination of corrective actions.

## 4.3 ENC to SENC Conversion

The data integrity shall be maintained through the conversion process.

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**4.3.1 Conversion software**

Conversion from ENC to SENC shall not result in loss of, or degradation to, any information contained in the ENC data. This shall be documented by a type approval certificate for the ENC to SENC conversion software.

Any errors detected during the conversion process shall be duly investigated, and reported to Primar Stavanger as necessary for achieving successful conversion to SENC.

**4.3.2 Control of the SENC after conversion**

In order to ensure that the converted SENC data will be correctly imported and displayed on ECDIS, it shall be checked that the converted SENC data conforms to its own proprietary SENC format specification.

Any errors detected during the SENC control process shall be duly investigated, and reported to Primar Stavanger as necessary for achieving successful conversion to SENC.

**4.4 Distribution of SENC****4.4.1 SENC distribution management**

The SENC distributor shall implement a SENC distribution management ensuring that the arrangements agreed with Primar Stavanger, as well as the SENC service user are complied with.

4.4.1.1 Frequency of delivery of the SENC data shall not be inferior to the distribution of the Primar Stavanger ENC service.

4.4.1.2 The SENC distributor shall on request provide a report on when ENC-data was ordered from Primar Stavanger and when it was made available to the SENC service users.

4.4.1.3 The SENC distributor shall implement methods for efficient communication with all registered SENC service users. The communication methods shall ensure efficient and unambiguous communication on all aspects essential for the SENC service quality, such as ordering of SENC data, reporting of errors during loading into ECDIS etc.

At change of such communication methods, all relevant parties shall be notified in due time prior to the change.

4.4.1.4 The SENC distributor shall ensure that the methods used for transport of SENC data to the SENC service users are suitable and reliable.

For cases where the customer reports unsuccessful transport of SENC data, the SENC distributor shall have implemented routines for resubmitting the relevant SENC data within 3 working days.

4.4.1.5 The SENC distributor shall ensure that the SENC data submitted to customers is compatible with the software installed in the relevant ECDIS.

The SENC distributor shall also ensure that the transport medium used for each submission is compatible with the capabilities of the relevant ECDIS, and complies with the agreements made with the SENC service user.

4.4.1.6 The SENC distributor shall ensure that each submission clearly identifies the SENC data content and authenticity.

Each submission shall identify all SENC cells and/or updates, including their edition number.

Each physical SENC transport medium shall bear a stamp or seal, as agreed with Primar Stavanger, for demonstrating the approval by Primar Stavanger. For electronic transmissions, appropriate means for demonstrating the approval by Primar Stavanger shall be agreed with Primar Stavanger.

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4.4.1.7 The SENC distributor shall have implemented methods for ensuring efficient and timely invoice handling in accordance with the arrangements agreed with the customers.

4.4.1.8 The SENC distributor shall have a system and adequate resources for providing valid sales reports and timely payment to Primar Stavanger.

A sales report shall be submitted to Primar Stavanger quarterly, and shall as a minimum include number of sold cells and updates since previous sales report.

The payment to Primar Stavanger shall be made on a regular basis in accordance with the agreement made with Primar Stavanger.

4.4.1.9 The SENC distributor shall have implemented procedures for handling cases where the SENC service user fails to fulfil the contractual obligations. Such procedure shall ensure that the SENC service is not terminated, unless such termination is assured not to compromise the safety of the relevant vessel(s).

#### 4.4.2 Loading of SENC into ECDIS

4.4.2.1 The SENC distributor shall ensure that the SENC service user's ECDIS responds as appropriate for unsuccessful loading of SENC data. These responses shall not be inferior to those provided by the ECDIS for unsuccessful loading of ENC cells or ENC updates.

4.4.2.2 The SENC distributor shall ensure that the SENC service user's ECDIS correctly updates the chart coverage and chart library after loading of SENC is completed.

### 5 Testing and Audits

#### 5.1 Testing

The following tests are to be performed to demonstrate compliance with the relevant requirements of section 4. Methods, other than those specified in this sub-section, may be used for demonstrating compliance with the relevant requirements of section 4, provided these are approved and recognised as equivalent by the Approval body and Primar Stavanger.

##### 5.1.1 Conversion software

The assessment of the conversion software shall include testing not inferior to relevant functional tests defined in IEC 61174 ed.2. At least the following tests shall be performed using the relevant conversion software (all sub-clause numbers refers to IEC 61174 ed.2):

- a) 6.8.1 Standard display
- b) 6.8.2 Display base
- c) 6.8.3 All other information
- d) 6.8.4 Display priorities
- e) 6.8.5 Additional display functions (only test e))
- f) 6.8.6 Scale and navigation purposes
- g) 6.8.10 Object information

Some or all of the above tests may be waived if it can be documented that the relevant conversion software has been equivalently tested during e.g. ECDIS type approval.

##### 5.1.2 SENC control software

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Tests shall be performed verifying, as far as reasonable and practicable, that the SENC control software performs the checks, as specified by the SENC distributor, for verifying that the converted SENC data conforms to its own proprietary SENC product specification.

These tests may be waived if it can be documented that the relevant SENC control software has been equivalently tested during e.g. testing of SENC conversion software.

### 5.1.3 Methods for electronic transmission of SENC data

If intended used, the methods for electronic transmission of SENC data shall be tested for suitability and reliability.

By using SENC data, relevant for the method (cell and/ or update), that has successfully passed conversion and SENC control, the following test shall be performed:

- a) Transmit the SENC data, using the relevant method, and verify that the SENC data is successfully received and loaded into a type approved ECDIS or simulator fitted with the relevant software. Repeat the test 10 times for each method of electronic transmission.

A realistic “worst case scenario” shall be applied by considering e.g. geographical distances and time of the day.

This test may be waived if the relevant method of transport can be documented as being suitable and reliable through e.g. records of use.

### 5.1.4 Loading SENC into ECDIS

By using a type approved ECDIS or a simulator, fitted with the relevant software, the following tests shall be performed:

SENC Identification:

- a) Verify the source and validity of the SENC identifier on the provided digital media.
- b) Load corrupted SENC identifier from the provided digital media and verify that no loading of official SENC data is possible from that digital media, and that a warning is given as specified in 4.4.2.1.

NOTE – Test a) and b) are equivalent to verifying the source and validity period for a digital certificate.

Authentication and Integrity:

- c) Load correct SENC data (both SENC base and update) and verify its authenticity. Verify that the chart coverage and chart library is updated as specified in 4.4.2.2.
- d) Load correct SENC data (both SENC base and update) with incorrect authentication of specific SENC and verify its authenticity. Verify that the loading of data is terminated with an appropriate warning as specified in 4.4.2.1, and that the chart library and coverage is not updated.
- e) Load corrupt SENC data (both SENC base and update) with correct authentication of specific SENC and verify its authenticity. Verify that the loading of data is terminated with an appropriate warning as specified in 4.4.2.1, and that the chart library and coverage is not updated.
- f) Test the procedures for the replacement of the SENC identifier and repeat tests a), b), c), d) and e).

NOTE – Test c), d), e) and f) are equivalent to verifying the SENC data with a corresponding digital signature.

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Other:

g) Remove SENC data and verify that the chart coverage and chart library is updated as specified in 4.4.2.2.

Some or all of the above tests may be waived if it can be documented that the relevant software has been equivalently tested during e.g. ECDIS type approval.

## 5.2 Audit

An auditing team shall assess the SENC distributors quality management system, with focus on parts specified in section 4 of this specification.

The auditing team shall have personnel with expertise in assessment of the product technology concerned as well as personnel with expertise in assessment of quality management systems.

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### **NEW IHO TECHNICAL RESOLUTION A3.11**

*(Publication M-3, Chapter A, Section 3)*

#### **Technical Resolution A3.11 – ENC/SENC Distribution Option**

It is resolved that SENC distribution can be accepted as an option, in addition to direct ENC distribution, providing that the following principles be adhered to:

1. The HO should ensure that the IHO data (ENC) is always available to any user in the S-57 ENC format.
2. As an option Hydrographic Offices may allow the distribution of their HO data (ENC) in a SENC format.
3. Distributors who are to supply the SENC service must operate under the regulations of the issuing authority. The onshore ENC to SENC conversion must be performed using type approved software.
4. The SENC update mechanism should not be inferior to the ENC – ECDIS update mechanism.
5. The distributor of SENC data should maintain a registry of its users.
6. The copyright of the ENC data should be maintained.

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