

DIN EN 62376

ICS 47.020.70

**Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt –
Elektronisches Kartensystem (ECS) –
Betriebs- und Leistungsanforderungen, Prüfverfahren und geforderte Prüfergebnisse (IEC 62376:2010);
Englische Fassung EN 62376:2011**

Maritime navigation and radiocommunication equipment and systems –
Electronic chart system (ECS) –
Operational and performance requirements, methods of testing and required test results
(IEC 62376:2010);
English version EN 62376:2011

Matériels et systèmes de navigation et de radiocommunication maritimes –
Système constitué par les cartes électroniques (ECS) –
Exigences d'exploitation et de fonctionnement, méthodes d'essai et résultats d'essai
exigés (CEI 62376:2010);
Version anglaise EN 62376:2011

Gesamtumfang 41 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE
Normenstelle Schiffs- und Meerestechnik (NSMT) im DIN

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2011-01-02 angenommene Europäische Norm als DIN-Norm ist 2011-08-01.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN IEC 62376:2009-11.

Für diese Norm ist das nationale Arbeitsgremium K 738 „Elektronische Navigationsinstrumente“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (www.dke.de) zuständig.

Die enthaltene IEC-Publikation wurde vom TC 80 „Maritime navigation and radiocommunication equipment and systems“ erarbeitet.

Das IEC-Komitee hat entschieden, dass der Inhalt dieser Publikation bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu dieser Publikation angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees die Publikation

- bestätigt,
- zurückgezogen,
- durch eine Folgeausgabe ersetzt oder
- geändert.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die englische Fassung der IEC 62376 veröffentlicht. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. In Folge von Festlegungen zum DIN-Präsidialbeschluss 1/1978 werden im Abschnitt 3 (*Terms, definitions and abbreviations*) der englischen Sprachfassung gelistete Begriffe ins Deutsche übersetzt (siehe informativer Anhang NA). Die deutschen Übersetzungen haben nur Empfehlungscharakter und können nur die ungefähre Begrifflichkeit in Deutsch wiedergeben. Unter Experten wird empfohlen, ausschließlich die englischen Fachbegriffe zu verwenden. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf eine Norm ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils neueste gültige Ausgabe der in Bezug genommenen Norm.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe der Norm.

Der Zusammenhang der zitierten Normen mit den entsprechenden Deutschen Normen ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Nationaler Anhang NA (informativ)

NA.1 Begriffe

Für das vorliegende Dokument gelten nachfolgend im Einzelnen aufgelistete Synonyme zu den im Abschnitt 3 (*Terms, definitions and abbreviations*) der englischen Sprachfassung dieser Norm aufgelisteten Begriffen.

Die deutschen Übersetzungen haben Empfehlungscharakter und können nur die ungefähre Begrifflichkeit in Deutsch wiedergeben. Unter Experten wird empfohlen, ausschließlich die englischen Fachbegriffe zu verwenden, um die Gefahr von Missverständnissen zu reduzieren.

NA.1.1 Deutsche Synonyme

Automatisches Identifikationssystem [en: automatic identification system]

ECDIS-Darstellungsgrundlage [en: ECDIS display base]

ECDIS-Standarddarstellung [en: ECDIS standard display]

Elektronische Binnennavigationskarte [en: inland electronic navigational chart (inland ENC)]

Elektronische Kartendatenbank [en: electronic chart database]

Elektronische Seekarte [en: electronic navigational chart (ENC)]

Elektronische Systemseekarte [en: system electronic navigational chart (SENC)]

Elektronisches Kartensystem [en: electronic chart system (ECS)]

Elektronisches Positionsbestimmungssystem [en: electronic position fixing system (EPFS)]

Konsistenter einheitlicher Bezugspunkt [en: consistent common reference point]

Nachrichten für Seefahrer (NfS) [en: notice to mariners (NtM)]

Radar [en: radar]

Raster-Seekarte [en: raster navigational chart (RNC)]

Seekarte und/oder nautische Veröffentlichung [en: nautical chart and/or nautical publication]

SENC-Distributionsoption oder **SENC-Vertriebsoption** [en: SENC distribution option]

– Leerseite –

Maritime navigation and radiocommunication equipment and systems –
Electronic chart system (ECS) –
Operational and performance requirements, methods of testing and
required test results
(IEC 62376:2010)

Matériels et systèmes de navigation et de
radiocommunication maritimes –
Système constitué par les
cartes électroniques (ECS) –
Exigences d'exploitation et de fonctionnement,
méthodes d'essai et résultats d'essai exigés
(CEI 62376:2010)

Navigations- und Funkkommunikationsgeräte und
-systeme für die Seeschifffahrt –
Elektronisches Kartensystem (ECS) –
Betriebs- und Leistungsanforderungen, Prüfverfahren
und geforderte Prüfergebnisse
(IEC 62376:2010)

This European Standard was approved by CENELEC on 2011-01-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 80/598/FDIS, future edition 1 of IEC 62376, prepared by IEC/TC 80, Maritime navigation and radiocommunication equipment and systems, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62376 on 2011-01-02.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2011-10-02 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2014-01-02 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62376:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61162 series	NOTE	Harmonized in EN 61162 series (not modified).
IEC 61162-2	NOTE	Harmonized as EN 61162-2.
IEC 61993-2:2002	NOTE	Harmonized as EN 61993-2:2002 (not modified).
IEC 62252:2004	NOTE	Harmonized as EN 62252:2004 (not modified).
IEC 62287-1:2006	NOTE	Harmonized as EN 62287-1:2006 (not modified).
ISO 9241-12:1998	NOTE	Harmonized as EN ISO 9241-12:1998 (not modified).

CONTENTS

1	Scope	4
2	Normative references	4
3	Terms and definitions	5
4	General requirements	7
4.1	Application of IEC 60945	7
4.1.1	Requirements	7
4.1.2	Methods of test and required results	9
4.2	Application of IEC 62288	12
4.2.1	Requirements	12
4.2.2	Methods of test and required results	17
5	Operational and performance requirements	18
5.1	Chart information	18
5.1.1	Provision of chart information	18
5.1.2	Replacing an electronic chart database	18
5.1.3	Automatically updating an electronic chart database	18
5.1.4	Displaying the electronic chart database	19
5.1.5	Displaying metadata	20
5.1.6	Adjusting for differences in horizontal datum	20
5.2	Position monitoring	21
5.2.1	Deriving own ship's position	21
5.2.2	Displaying own ship's position	21
5.2.3	Displaying own ship's past track	22
5.3	Voyage related operation	22
5.3.1	Route planning	22
5.3.2	Route monitoring	23
5.3.3	Voyage recording	25
5.3.4	Distance and azimuth	25
5.4	Connections with other equipment	26
5.4.1	General	26
5.4.2	Electronic position-fixing system	26
5.4.3	Heading sensor	27
5.4.4	Speed and distance measuring equipment	28
5.4.5	Echosounding equipment	28
5.4.6	Radar target tracking system	29
5.4.7	Automatic identification system	29
	Annex A (informative) Guidance for testing	31
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	38
	Bibliography	34
	Table 1 – IEC 60945 requirements	7
	Table 2 – IEC 60945 methods of testing	9
	Table 3 – IEC 62288 requirements	12

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –

Electronic chart system (ECS) – Operational and performance requirements, methods of testing and required test results

1 Scope

This International Standard specifies the minimum operational and performance requirements and methods of testing for ECS. ECSs are designed or adapted for use as navigation information systems on vessels not required to comply with Chapter V of the International Convention for the Safety of Life at Sea (SOLAS).

Different types of vessels, for example, a non-SOLAS passenger vessel, a small fishing vessel or a recreational vessel, which operate in different environments, need to be equipped with navigational systems providing functionality to meet their needs. If the full functionality of ECDIS according to IEC 61174 is considered to be unnecessary, ECS may be suitable for a navigation information system for these vessels. Governments may consider requiring the carriage of ECS for these vessels under local arrangements.

In order to provide a standard that can be used to apply different levels of navigational functionality, three classes of ECS are defined.

- Class “A” ECS are designed or adapted for use as a primary navigation information system.
- Class “B” ECS are designed or adapted for use as a navigation information system where less navigational functionality is required than Class “A”.
- Class “C” ECS are designed or adapted for use as a navigation information system with minimal functionality intended to plot and monitor a vessel’s position.

Within this International Standard, the beginning of each paragraph indicates the applicability to ECS Class(es). Paragraphs marked “(A B C)” apply to all Classes; paragraphs marked “(A B)” or “(B C)” apply only to those specific combinations of Classes; and paragraphs marked “(A)”, “(B)” or “(C)” apply only to those individual Classes.

For a Class “A” and Class “B” ECS, adequate back-up arrangements may be required to ensure safe navigation in the event of an ECS failure. For a Class “A” ECS, an additional Class “A” ECS may be used as the back-up. Alternatively, Class “B” ECS are intended to meet the minimum requirements for adequate back-up arrangements for Class “A” ECS. For a Class “B” ECS, an additional Class “B” ECS may be used as the back-up. Class “C” ECS are not intended to meet the minimum requirements for adequate back-up arrangements for Class “A” or Class “B” ECS.

Guidance for testing ECS is given in Annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945:2002, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-1, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

IEC 61162-3, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 3: Serial data instrument network*

IEC 61174:2008, *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*

IEC 62288:2008, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation related information on shipborne navigational displays – General requirements, methods of testing and required test results*

IEC 62388:2007, *Maritime navigation and radiocommunication equipment and systems – Shipborne radar – Performance requirements, methods of testing and required test results*

IHO S-52 Annex A:2008, *IHO ECDIS Presentation Library*

IHO S-60:2003 (as amended through 2008), *User's handbook on datum transformation involving WGS 84*

IHO S-61:1999, *Product specification for raster navigational charts*

3 Terms and definitions

For the purposes of this document the following terms and definitions apply.

3.1

automatic identification system

AIS

system which complies with the requirements set forth in Annex 3 to IMO resolution MSC.74(69) and further specified in IEC 61993-2 (i.e. for AIS Class-A) or IEC 62287-1 (i.e. for AIS Class-B “CS”)

3.2

consistent common reference point

CCRP

location on own ship to which measurements such as own ship position, heading, attitude, and target range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA) are referenced, typically the conning position of the ship

NOTE An alternative location (or multiple locations) may be used as necessary where clearly indicated or distinctively obvious, for example, the origin of the reference axis of the ship.

3.3

electronic chart display and information system

ECDIS

navigation information system which, with adequate back-up arrangements, can be accepted as complying with the up-to-date chart required by regulations V/19 and V/27 of the 1974 SOLAS Convention, as amended, by displaying selected information from a system electronic navigational chart (SENC) with positional information from navigation sensors to assist the mariner in route planning and route monitoring, and, if required, display additional navigation-related information as set forth in IMO resolution MSC.232(82) and further specified in IEC 61174

3.4

ECDIS display base

level of information which cannot be removed from the ECDIS display, consisting of information which is required at all times in all geographic areas and all circumstances

NOTE It is not intended to be sufficient for safe navigation.

3.5

ECDIS standard display

level of information that should be shown when a chart is first displayed on ECDIS

NOTE The level of the information it provides for route planning or route monitoring may be modified by the user according to the user's needs.

3.6

electronic chart system

ECS

navigation information system which complies with the requirements specified in this standard but does not comply with all of the requirements specified for ECDIS

3.7

electronic chart database

standards-compliant electronic chart database derived from Nautical Charts and Nautical Publications (for example, ENC, RNCs, and ISO 19379 ECS databases)

3.8

electronic navigational chart

ENC

database standardised as to content, structure and format according to IHO S-57 Appendix B.1 and issued by, or on the authority of, a government

3.9

electronic position fixing system

EPFS

receiver for a radio navigation system capable of automatically and continuously updating own ship's position

3.10

inland electronic navigational chart

inland ENC

database standardised as to content, structure and format according to IHO S-57 Appendix B.1 and further specified in the Product Specification for Inland ENC published by the Inland ENC Harmonization Group (IEHG) and issued by, or on the authority of, a government for use onboard vessels transiting inland waterways

3.11

nautical chart and/or nautical publication

special-purpose map or book, or a specially compiled database from which such a map or book is derived, issued by, or on the authority of, a government and designed to meet the requirements of marine navigation

3.12

notice to mariners

NtM

periodic publication, issued by, or on the authority of, a government, providing information used to update nautical charts and/or nautical publications

3.13

radar

system which complies with the requirements set forth in IMO resolution MSC.192(79) and further specified in IEC 62388; or as specified in IEC 62252 (i.e. for non SOLAS radars)

3.14

raster navigational chart

RNC

facsimile of a single paper chart or a collection of paper charts produced as raster format electronic chart database, standardized as to content, issued by or on the authority of, a government and conforming to relevant IHO standards (e.g. IHO S-61), and designed to meet the requirements of marine navigation

3.15

system electronic navigational chart

SENC

ENC, converted to a manufacturer's internal format, resulting from the lossless transformation of the ENC and its updates

NOTE The SENC may also contain information added by the mariner and information from other sources.

3.16

SENC distribution option

distribution option where a government may allow the distribution of their ENC data in a SENC format

4 General requirements

4.1 Application of IEC 60945

4.1.1 Requirements

4.1.1.1 General requirements for electronic navigational aids

(A B C) The ECS shall meet the applicable general requirements for electronic navigational aids specified in IEC 60945 as identified in Table 1 and clarified by 4.1.1.2 through 4.1.1.8 and 5.4.

Table 1 – IEC 60945 requirements

IEC 60945, Clause/Subclause		ECS class		
		A	B	C
4	Minimum performance requirements			
4.1	General			
4.1.1	Introduction			
4.1.2	General requirements	X	X	X
4.2	Design and operation			
4.2.1	Ergonomics and HMI (Human machine interface)			
4.2.1.1	General	X	X	X
4.2.1.2	Arrangement	X	-	-
4.2.1.3	Operation	X	X	-
4.2.1.4	Identification (See also 4.1.1.2)	X	-	-
4.2.1.5	Screen displays and indications (See also 4.1.1.3)	X	X	-
4.2.1.6	Voice announcement (See also 4.1.1.4)	-	-	-
4.2.1.7	Safety of operation	X	X	X

IEC 60945, Clause/Subclause		ECS class		
		A	B	C
4.2.1.8	Distress alert (See also 4.1.1.5.)	N/A	N/A	N/A
4.2.2	Hardware			
4.2.2.1	General	X	X	-
4.2.2.2	Alarms and indicators (See also 4.1.1.6)	X	X	-
4.2.2.3	Illumination	X	X	-
4.2.3	Software			
4.2.3.1	General	X	X	X
4.2.3.2	Safety of operation	X	X	-
4.2.3.3	Monitoring	X	X	-
4.2.3.4	Operation	X	X	-
4.2.4	Inter-unit connection (See also 5.4)	X	X	X
4.3	Power supply			
4.3.1	Extreme power supply	X	X	X
4.3.2	Excessive conditions	X	X	X
4.3.3	Power supply short-term variation and power supply failure (See also 4.1.1.7)	X	X	-
4.4	Durability and resistance to environmental conditions	X	X	-
4.5	Interference			
4.5.1	Electromagnetic compatibility	X	X	X
4.5.2	Acoustic noise	X	X	X
4.5.3	Compass safe distance	X	X	X
4.6	Safety precautions			
4.6.1	Protection against accidental access to dangerous voltages	X	X	X
4.6.2	Electromagnetic radio frequency radiation	X	X	X
4.6.3	X-radiation	X	X	-
4.7	Maintenance			
4.7.1	Maintenance of hardware	X	X	-
4.7.2	Maintenance of software	X	X	-
4.8	Equipment manuals (See also 4.1.1.8)	X	X	X
4.9	Marking and identification	X	X	-
Legend: “X” denotes a required capability (as clarified by 4.1.1.2 through 4.1.1.8 and 5.4). “-” denotes a capability that is not required but may be implemented, and if implemented shall be implemented as if it is a required capability. NOTE Where screen size and/or resolution are issues, the presentation may be adjusted. “N/A” denotes a capability that does not apply and shall not be implemented.				

4.1.1.2 Identification

(C) The requirements in IEC 60945 regarding use of the English language do not apply.

4.1.1.3 Screen displays and indications

(C) The requirements in IEC 60945 regarding use of the English language do not apply.

4.1.1.4 Voice announcement

(C) The requirements in IEC 60945 regarding use of the English language do not apply.

4.1.1.5 Distress alert

(A B C) The ECS shall not provide the distress alert and dedicated distress button specified in IEC 60945, 4.2.1.8.

4.1.1.6 Alarms and indicators

(B C) The ECS may provide the capability to adjust its audible alarm signals below the acoustic level specified in IEC 60945, 4.2.2.2.

4.1.1.7 Power supply short-term variation and power supply failure

(A B) When power is restored to the ECS after an interruption, the ECS shall resume operation and return to the most recently selected settings for display without requiring user intervention.

4.1.1.8 Equipment manuals

(C) The user manual, instructions and reference guides may be exclusively available in any language determined by the manufacturer.

4.1.2 Methods of test and required results

4.1.2.1 General requirements for electronic navigational aids

(A B C) Verify that the ECS meets the applicable general requirements for electronic navigational aids specified in IEC 60945 as identified in Table 1 and clarified by 4.1.1.2 through 4.1.1.8 and 5.4 using the methods of testing specified in IEC 60945 as identified in Table 2 and clarified by 4.1.2.2 through 4.1.2.10.

Table 2 – IEC 60945 methods of testing

IEC 60945, Clause/Subclause		ECS class		
		A	B	C
5	Methods of testing and required test results			
5.1	General	X	X	X
5.2	Test conditions			
5.2.1	Normal test conditions	X	X	X
5.2.2	Extreme test conditions	X	X	-
5.2.3	Excessive conditions	X	X	-
5.3	Test results	X	X	X
6	Operational checks			
6.1	Ergonomics and HMI (Human machine interface)			
6.1.1	General	X	X	X
6.1.2	Arrangement	X	-	-
6.1.3	Operation	X	X	-
6.1.4	Identification (See also 4.1.2.2)	X	-	-
6.1.5	Screen display and indicators (See also 4.1.2.3)	X	X	-
6.1.6	Voice announcement (if provided) (See also 4.1.2.4)	-	-	-
6.1.7	Safety of operation	X	X	X