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Marin navigerings- och radiokommunikationsutrustning – Fartygsradar – Tekniska och operationella fordringar – Provningsmetoder och erforderliga provningsresultat

Maritime navigation and radiocommunication equipment and systems – Shipborne radar – Performance requirements, methods of testing and required test results

Som svensk standard gäller europastandarden EN 62388:2008. Den svenska standarden innehåller den officiella engelska språkversionen av EN 62388:2008.

Nationellt förord

Europastandarden EN 62388:2008

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC

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

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd standard SS-EN 60872-1, utgåva 1, 2000, SS-EN 60872-2, utgåva 1, 2000, SS-EN 60872-3, utgåva 1, 2001, SS-EN 60936-1, utgåva 1, 2000, SS-EN 60936-1/A1, utgåva 1, 2003, SS-EN 60936-2, utgåva 1, 1999 och SS-EN 60936-3, utgåva 1, 2003, gäller ej fr o m 2011-02-01.

ICS 47.020.70

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English version

Maritime navigation and radiocommunication equipment and systems - Shipborne radar - Performance requirements, methods of testing and required test results

(IEC 62388:2007)

Equipements et systèmes de navigation et de radio-communications maritimes - Radars embarqués - Exigences de performance, méthodes de test et résultats attendus (CEI 62388:2007)

Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt - Radar für Schiffe - Leistungsanforderungen, Prüfverfahren und geforderte Prüfergebnisse (IEC 62388:2007)

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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SEK Svensk Elstandard

Foreword

The text of document 80/494/FDIS, future edition 1 of IEC 62388, 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 62388 on 2008-02-01.

This European Standard supersedes EN 60936 series (radar) and EN 60872 series (plotting).

Contents from the previous radar series (EN 60936-1, EN 60936-2 and EN 60936-3) and plotting series (EN 60872-1, EN 60872-2 and EN 60872-3) of standards have been included, as appropriate.

EN 62388:2008 supports the new IMO performance standards for shipborne radar, Resolution MSC.192(79) adopted by the IMO in December 2004. Resolution MSC.192(79) supersedes all previous IMO resolutions relating to radar and plotting, including IMO Resolutions A.278(VIII), A.477(XII) and MSC 64(67) Annex 4.

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)	2008-11-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62388:2007 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60945	-[1)]	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results	EN 60945	2002[2)]
IEC 61162	Series	Maritime navigation and radiocommunication equipment and systems - Digital interfaces	EN 61162	Series
IEC 61174	-[1)]	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	EN 61174	2001[2)]
IEC 61966-4	-[1)]	Multimedia systems and equipment - Colour measurement and management - Part 4: Equipment using liquid crystal display panels	EN 61966-4	2000[2)]
IEC 61996	Series	Maritime navigation and radiocommunication equipment and systems - Shipborne voyage data recorder (VDR)	-	-
ISO 9000	-[1)]	Quality management systems - Fundamentals and vocabulary	EN ISO 9000	2005[2)]
ISO 9241-8	-[1)]	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 8: Requirements for displayed colours	EN ISO 9241-8	1997[2)]
ISO 9241-12	-[1)]	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 12: Presentation of information	EN ISO 9241-12	1998[2)]
ISO 13406-2	-[1)]	Ergonomic requirements for work with visual displays based on flat panels - Part 2: Ergonomic requirements for flat panel displays	EN ISO 13406-2	2001[2)]
ISO 80416-4	-[1)]	Basic principles for graphical symbols for use on equipment - Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)	-	-
ITU-R Recommendation M.628-4	2006	Technical characteristics for search and rescue radar transponders	-	-

[1)] Undated reference.

[2)] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
ITU-R Recommendation M.824-3	2007	Technical parameters of radar beacons (racons)	-	-
ITU-R Recommendation M.1176	1995	Technical parameters of radar target enhancers	-	-
IHO S-52	1996	Specifications for chart content and display aspects of ECDIS	-	-
IHO S-52 Appendix 1	1996	Guidance on updating the ENC	-	-
IHO S-52 Appendix 2	2004	Colour and symbol specifications for ECDIS	-	-
IMO SOLAS	1974	Convention for Safety Of Life At Sea (SOLAS)	-	-
IMO Resolution A.694 (17)	1991	General requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids	-	-
IMO Resolution A.817(19)	1995	Performance standards for Electronic Chart Display and Information Systems (ECDIS)	-	-
IMO Resolution MSC.96(72)	-[1)]	Performance standards for devices to measure and indicate speed and distance	-	-
IMO Resolution MSC.112(73)	-[1)]	Performance standards for shipborne Global Positioning System (GPS) receiver equipment	-	-
IMO Resolution MSC.191(79)	2004	Performance standards for the presentation of navigation-related information on shipborne navigational displays	-	-
IMO Resolution MSC.192(72)	2004	Revised performance standards for radar equipment	-	-
IMO SN/Circ.243	2004	Guidelines for the presentation of navigation related symbols, terms and abbreviation	-	-
CIE 15	2004	Colorimetry	-	-
VESA-2001-6	2001	Flat Panel Display Measurements (FPDM)	-	-

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –

Shipborne radar – Performance requirements, methods of testing and required test results

1 Scope

This International Standard specifies the minimum operational and performance requirements, methods of testing and required test results conforming to performance standards not inferior to those adopted by the IMO in Resolution MSC.192(79).

(MSC.192/2) *The radar installation, in addition to meeting the general requirements as set out in resolution A.694(17) and the related general standard,* IEC 60945*, should comply with the performance standards of* MSC.192(79). When a requirement of this standard is different from IEC 60945 the requirement in this standard takes precedence.

All text in this standard with wording identical to that in IMO resolution MSC.192(79) is printed in italics. Reference to MSC.192(79) is by the relevant requirement clause as indicated in brackets, for example (MSC.192/4.2.3). Some clauses from Resolution MSC.192(79) may be split and the requirements in this case are addressed separately.

(MSC.192/5) *The design and performance of the radar should be based on user requirements and up-to-date navigational technology. It should provide effective target detection within the safety-relevant environment surrounding own ship and should permit fast and easy situation evaluation.*

(MSC.192/1) *The radar equipment should assist in safe navigation and in avoiding collision by providing an indication, in relation to own ship, of the position of other surface craft, obstructions and hazards, navigation objects and shorelines. For this purpose, radar should provide the integration and display of radar video, target tracking information, positional data derived from own ship's position (EPFS) and geo referenced data.*

The integration and display of AIS information should be provided to complement radar. The capability of displaying selected parts of Electronic Navigation Charts (ENC) and other vector chart information may also be provided to aid navigation and for position monitoring. Radar is a technology that should be applied together with other sensor information applicable for the task in hand.

NOTE Radar is a system and its performance is a factor of all of its component parts. The type test should include the radar sensor, ancillary units and display, complete with its processing and presentation display. All of these component parts contribute to the requirements and approval to these radar standards. Other navigational systems and equipment that provide radar and/or target tracking functions, should comply with the relevant clauses of this standard according to the guidelines in Annex A. A navigation display or INS may be approved as part of a radar system when tested with the specific radar sensor and relevant ancillary units. Where the intended application for a navigation system is for collision avoidance, as a minimum requirement, the radar image should always be presented, together with the relevant functionality and performance as described in Annex A.

1.1 Purpose

(MSC.192/1) *The radar, when combined with other sensor, or reported information (for example AIS), should improve the safety of navigation by assisting in the efficient navigation of ships and protection of the environment by satisfying the following functional requirements:*

– *in coastal navigation and harbour approaches, by giving a clear indication of land and other fixed hazards;*

– *as a means to provide an enhanced traffic image and improved situation awareness;*

– *in a ship-to-ship mode for aiding collision avoidance of both detected and reported hazards;*

– *in the detection of small floating and fixed hazards, for collision avoidance and the safety of own ship; and*

– *in the detection of floating and fixed aids to navigation.*

1.2 Application of these standards

(MSC.192/2) *The Performance Standards defined by MSC.192(79)* shall *apply to all shipborne radar installations used in any configuration mandated by SOLAS independent of the type of ship, frequency band in use and the type of display, providing that no special requirements are specified in* Table 1 *and that additional requirements for specific classes of ship (in accordance with SOLAS Chapters V and X) are met.*

(MSC.192/2) *Close interaction between different navigation equipment and systems makes it essential to consider this standard in association with other relevant IMO* and IEC *standards.*

This standard applies to radar systems, navigation systems and navigation equipment which have the task of target detection and collision avoidance. Any equipment which combines these tasks and meets all of the requirements in this standard is regarded as a radar system. In support of the Collision Regulations, all available means shall be used to enhance the role of radar for safe navigation and collision avoidance. The usage of other sensors shall, where practical, observe the requirements of the standards associated with those sensors. This standard also provides guidelines and requirements for radar functionality on all navigational displays supporting the tasks of target detection, collision avoidance, general navigation and position referencing on the bridge of a ship.

The successful integration of radar with AIS, charts, databases and other sensors demands that the radar equipment is correctly set up with special attention to the critical alignment of heading(s), system index delay(s), CCRP offsets and gyro. Failure to align these parameters may cause unacceptable registration with other information and may detract from the purpose of integration. This standard has mandated requirements to provide for these alignments.

NOTE While X-band radar systems remain compatible with radar beacons, SARTs and radar enhancers, S-band systems are permitted to harness new radar technology which may not be compatible with those devices. All tests (or their equivalent) in this standard apply to both non-coherent (for example conventional-based radar) and coherent radar systems (for example pulse compression radar).

1.3 Equipment categories

This standard covers the testing of all SOLAS shipborne radar equipment. Individual equipment may be tested for a specific category of vessel. Table 1 provides a summary of the categories and basic differential capabilities for each category. The category should be indicated on the type label of the main radar electronics unit and on the related Certification of Test. Equipment approved for high speed applications should include a suffix H (for example CAT 1H) and equipment approved with a chart option should include a suffix C (for example CAT 1HC).

(MSC.192/5.3.1.1) *Recognising the high relative speeds possible between own ship and target, the equipment* should *be specified and approved as being suitable for classes of ship having normal (≤30 kn) or high (>30 kn) own ship speeds (100 kn and 140 kn relative speeds respectively).*

The additional characteristics for equipment qualified to be approved for HSC and/or for chart radar are identified in this standard. For example, HSC equipment should be compatible with own ship speeds of up to 70 kn, should be capable of tracking targets with a 140 kn relative speed and should operate between latitudes of 70 °N and 70 °S.

A chart radar should conform to all the requirements of Clause 11 in this standard. References are made to IEC 61174 (ECDIS) for specific and standalone chart functionality.

Table 1 – Performance requirements for categories of ship/craft for SOLAS V

	Category of ship/craft		
	CAT 3	**CAT 2**	**CAT 1**
Size of ship/craft	<500 gt	500 gt to <10 000 gt and HSC<10 000 gt	All ships/craft ≥10 000 gt
Minimum operational display area diameter	180 mm	250 mm	320 mm
Minimum display area	195 mm x 195 mm	270 mm x 270 mm	340 mm x 340 mm
Auto acquisition of targets	-	-	Yes
Minimum acquired radar target capacity	20	30	40
Minimum activated AIS target capacity	20	30	40
Minimum sleeping AIS target capacity	100	150	200
Trial manoeuvre	-	-	Yes
NOTE The processing capacity of AIS information should be in accordance with 10.5.2.			

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

IEC 61162 (all parts), *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*

IEC 61174, *Maritime navigation and radiocommunication equipment and systems – Electronic chart display and information systems (ECDIS) – Operational and performance requirements, methods of testing and required test results*

IEC 61966-4, *Multimedia systems and equipment – Colour measurement and management – Part 4: Equipment using liquid crystal display panels*

IEC 61996 (all parts), *Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR) – Performance requirements – Methods of testing and required test results*

ISO 9000, *Quality management systems – Fundamentals and vocabulary*

ISO 9241-8, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 8: Requirements for displayed colours*

ISO 9241-12, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 12: Presentation of information*

ISO 13406-2, *Ergonomic requirements for work with visual displays based on flat panels – Part 2: Ergonomic requirements for flat panel displays*

ISO 80416-4, *Basic principles for graphical symbols for use on equipment – Part 4: Guidelines for the adaptation of graphical symbols for use on screens and displays (icons)*