
Maritime navigation and radiocommunication equipment and systems - Radar - Part 1: Shipborne radar - Performance requirements - Methods of testing and required test results (IEC 60936-1:1999)

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English version

**Maritime navigation and radiocommunication
equipment and systems - Radar
Part 1: Shipborne radar - Performance requirements
Methods of testing and required test results
(IEC 60936-1:1999)**

Matériels et systèmes de navigation et
de radiocommunication maritimes
Radars
Partie 1: Radars de navire - Exigences
de fonctionnement - Méthodes d'essai
et résultats d'essai exigés
(CEI 60936-1:1999)

Navigations- und
Funkkommunikationsgeräte und
-systeme für die Seeschifffahrt - Radar
Teil 1: Radar für die Seeschifffahrt
Leistungsanforderungen - Prüfverfahren
und geforderte Prüfergebnisse
(IEC 60936-1:1999)

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This European Standard was approved by CENELEC on 2000-01-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Foreword

The text of document 80/235/FDIS, future edition 1 of IEC 60936-1, 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 60936-1 on 2000-01-01.

The EN 60936 series supersedes EN 60936:1993.

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) 2000-10-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2003-01-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B, C, D and ZA are normative and annex E is informative.

Annex ZA has been added by CENELEC.

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Endorsement notice
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The text of the International Standard IEC 60936-1:1999 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications
with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60872-1	1998	Maritime navigation and radiocommunication equipment and systems Radar plotting aids Part 1: Automatic radar plotting aids (ARPA) Methods of testing and required test results	EN 60872-1	1998
IEC 60872-2	1999	Part 2: Automatic tracking aids (ATA) Methods of testing and required test results	EN 60872-2	1999
IEC 60872-3	¹⁾	Part 3: Electronic plotting aid (EPA)	-	-
IEC 60936-3	¹⁾	Maritime navigation and radiocommunication equipment and systems Radar Part 3: Shipborne radar with chart facilities Methods of testing and required test results	-	-
IEC 60945	1996	Maritime navigation and radiocommunication equipment and systems General requirements - Methods of testing and required test results	EN 60945	1997
IEC 61023	1999	Maritime navigation and radiocommunication equipment and systems Marine speed and distance measuring equipment (SDME) - Performance requirements - Methods of testing and required test results	EN 61023	1999
IEC 61162	series	Maritime navigation and radiocommunication equipment and systems Digital interfaces	EN 61162	series

1) To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61174	1998	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	1998
IEC 61209	1999	Maritime navigation and radiocommunication equipment and systems Integrated bridge systems (IBS) Operational and performance requirements, methods of testing and required test results	EN 61209	1999
IEC 61996	2)	Maritime navigation and radiocommunication equipment and systems Shipborne voyage data recorder (VDR) Performance requirements - Methods of testing and required test results	-	-
ISO 9000	series	Quality management and quality assurance standards	EN ISO 9000	series
IMO A.477	1981	Performance standards for radar equipment	-	-
IMO A.694	1991	General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids	-	-
IMO A.823	1995	Performance standards for automatic radar plotting aids (ARPAs)	-	-
IMO A.824	1995	Performance standards for devices to indicate speed and distance	-	-
IMO A.861	1997	Performance standards for shipborne voyage data recorders (VDRs)	-	-
IMO MSC.64(67)	1996	Annex 4 - Recommendation on performance standards for radar equipment	-	-
IMO MSC SN/Circular 197	1997	Operation of marine radar for (SART) detection	-	-
IMO	1997	International Convention for the Safety of Life at Sea (SOLAS)	-	-
ITU	1997	Radio regulations	-	-

2) To be published.

<u>Publication</u>	<u>Année</u>	<u>Titre</u>	<u>EN/HD</u>	<u>Année</u>
ITU-R M.628-3	1994	Technical characteristics for search and rescue radar transponders	-	-
ITU-R M.824-2	1995	Technical parameters of radar beacons (RACONS)	-	-
ITU-R M.1177-1	1997	Techniques for measurement of spurious emissions of radar systems	-	-
IHO S-52 appendix 2	1997	Colour and symbol specifications for ECDIS	-	-

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IEC 60936-1

First edition
1999-12

Maritime navigation and radiocommunication equipment and systems – Radar –

Part 1: Shipborne radar – Performance requirements – Methods of testing and required test results

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*Matériels et systèmes de navigation et de
radiocommunication maritimes – Radars –*

*Partie 1:
Radars de navire – Exigences de fonctionnement –
Méthodes d'essai et résultats d'essai exigés*

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT
AND SYSTEMS – RADAR –**

**Part 1: Shipborne radar – Performance requirements –
Methods of testing and required test results**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60936-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The IEC 60936 series, of which this is part 1, replaces IEC 60936 published in 1988, in order to reflect the new requirements of the International Maritime Organization (IMO). This part of the series contains some of the IMO specific requirements.

The text of this standard is based on the following documents:

FDIS	Report on voting
80/235/FDIS	80/249/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B, C and D form an integral part of this standard.

Annex E is for information only.

A bilingual version of this standard may be published at a later date.

The committee has decided that this publication remains valid until 2003.

At this date, in accordance with the committee's decision, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

NOTE Annex C.5.2.2 of this standard contains symbols for the display of AIS-targets. Due to the fact that AIS is a new navigation system, the process of the evaluation of different proposals for the presentation of AIS information on the bridge is still ongoing. A final decision about AIS presentation can only be drawn after functional and operational evaluation of related research projects. In this respect the symbols for AIS targets given in Annex C.5.2.2 No. 2.3, 2.4, 2.5 are provisional and subject of future decision.

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – RADAR –

Part 1: Shipborne radar – Performance requirements – Methods of testing and required test results

1 Scope

This International Standard specifies the minimum performance requirements, methods of testing and required test results for conformance to performance standards not inferior to those required by IMO resolution MSC.64 (67), Annex 4. In addition, it takes account of IMO resolution A.694 and is associated with IEC 60945. When a requirement of this standard is different from that of IEC 60945, the requirement in this standard shall take precedence.

This standard does not include the optional performance requirements for superimposition of selected parts of SENC information. These are specified in IEC 60936-3.

All text in this standard whose wording is identical to that in IMO resolution MSC.64 (67), Annex 4 is printed in *italics*, and the resolution (abbreviated to – A4) and paragraph numbers are indicated in brackets, for example (A4/3.3).

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2 Normative references (standards.iteh.ai)

The following normative documents contain provisions¹⁾ which, through reference in this text, constitute provisions of this part of IEC 60936-1. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60936 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative documents referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

IEC 60872-1:1998, *Maritime navigation and radiocommunication equipment and systems – Radar plotting – Part 1: Automatic radar plotting aids (ARPA) – Methods of testing and required test results*

IEC 60872-2:1999, *Maritime navigation and radiocommunication equipment and systems – Radar plotting – Part 2: Automatic tracking aids (ATA) – Methods of testing and required test results*

IEC 60872-3, *Maritime navigation and radiocommunication equipment and systems – Radar plotting – Part 3: Electronic plotting aid (EPA)¹⁾*

IEC 60936-3, *Maritime navigation and radiocommunication equipment and systems – Radar – Part 3: Shipborne radar with chart facilities – Methods of testing and required test results¹⁾*

IEC 60945:1996, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61023:1999, *Maritime navigation and radiocommunication equipment and systems – Marine speed and distance measuring equipment (SDME). Performance requirements – Methods of testing and required test results*

¹⁾ To be published.

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

IEC 61174:1998, *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 61209:1999, *Maritime navigation and radiocommunication equipment and systems – Integrated bridge systems (IBS) – Operational and performance requirements, methods of testing and required test results*

IEC 61996, *Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR) – Performance requirements – Methods of testing and required test results¹⁾*

ISO 9000 (all parts), *Quality management and quality assurance standards*

IMO A.477:1981, *Performance standards for radar equipment*

IMO A.694:1991, *General requirements for shipborne radio equipment forming part of the Global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO A.823:1995, *Performance standards for automatic radar plotting aids*

IMO A.824:1995, *Performance standards for devices to indicate speed and distance*

IMO A.861:1997, *Performance standards for shipborne voyage data recorders (VDRs)*

IMO MSC.64 (67):1996, *Annex 4 Recommendation on performance standards for radar equipment*

IMO MSC/SN/Circular 197:1997, *Operation of marine radar for SART detection*

IMO:1997, *International Convention for the Safety of Life at Sea (SOLAS) Consolidated edition*

ITU:1997, *Radio Regulations*

ITU-R M.628-3:1994, *Technical characteristics for search and rescue radar transponders*

ITU-R M.824-2:1995, *Technical parameters of radar beacons (RACONS)*

ITU-R M.1177-1:1997, *Techniques for measurement of spurious emissions of radar systems*

IHO S-52 appendix 2:1997, *Colour and symbol specifications for ECDIS*

3 Performance requirements

The radio frequency of operation of the equipment shall at all times be within the limits defined in the ITU Radio Regulations.

At the World Radio Conference in 1997, the ITU modified Appendix S3 of the Radio Regulations to include maximum permitted spurious emission power levels for radiodetermination services. This Appendix S3 references ITU-R M.1177, a recommendation on measurement methods for spurious emissions of radar systems, as guidance for the measurement of the required levels.

¹⁾ To be published.