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ISO TC 8/SC 6

Secretariat: JISC

# Ships and marine technology — Marine echo-sounding equipment

*Navires et technologie maritime — Appareils de sondage par écho*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation and ship operations*.

This fourth edition cancels and replaces the third edition (ISO 9875:2000 and ISO 9875:2000/Cor 1:2006), which has been technically revised. It also incorporates the Technical Corrigendum ISO 9875:2000/Cor 1:2006.

The main changes compared to the previous edition are as follows:

- in Clause 2, replaced IEC 61162 with IEC 61162-1, IEC 61162-2 and IEC 61162-450;, and added IEC 62288, IEC 62923-1, IEC 62923-2 and IMO Resolution MSC.302(87);
- in 5.6 and the test method in 6.8, added the normative references have been updated;
- bridge alert management requirements have been added in 5.6 and the test method in 6.8;
- in 5.9, added interface requirements have been added in 5.9;
- former Annex B has been replaced with a new Annex B on alerts definition, including alert identifiers
- added new Annex C on IEC 61162 interfaces overview.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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## Introduction

The purpose of echo-sounding equipment is to provide reliable information on the depth of water under a ship to aid navigation in particular in shallow water.

This document is aligned with IMO Resolutions, in particular IMO Resolution A.694(17), IMO Resolution A.224(VII), IMO Resolution MSC.74(69) and IMO Resolution MSC.302(87).

Any text in this document which is a citation from the IMO Resolution MSC.74(69), Annex 4, appears in italics. Within these citations, any changes to the original wording of the IMO Resolution MSC.74(69), Annex 4, are written in upright font.

In this document, the following verbal forms are used:

— “shall” indicates a requirement;

— “should” indicates a recommendation;

— “may” indicates a permission;

— “can” indicates a possibility or a capability.

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# Ships and marine technology — Marine echo-sounding equipment

## 1 Scope

This document specifies the minimum operational and performance requirements, methods of testing and test results of marine echo-sounding equipment required to comply with the performance standards adopted by the IMO Resolution A.224(VII) as amended by IMO Resolution MSC.74(69), Annex 4.

In addition, it takes account of This document is intended to be used in conjunction with IMO Resolution A.694(17) and is associated with IEC 60945.

When a requirement in this document differs from IEC 60945, the requirement in this document takes precedence.

For bridge alert management, IMO Resolution MSC.302(87) supersedes IMO Resolution MSC.74(69), Annex 4. Accordingly, this document incorporates references to IEC 62923-1 and IEC 62923-2 which are associated with Resolution MSC.302(87) for requirements and tests where applicable.

[In accordance with IMO Resolution MSC.74(69), Annex 4, Articles 1]The purpose of echo-sounding equipment is to provide reliable information on the depth of water under a ship to aid navigation in particular in shallow water.

[IMO Resolution MSC.74(69), Annex 4, and 2], *the purpose of echo-sounding equipment is to provide reliable information on the depth of water under a ship to aid navigation in particular in shallow water.* This document is *applicable for ship speeds from 0 kn to 30 kn.*

Any text in this document with wording identical to that in IMO Resolution MSC.74(69), Annex 4 is printed in italics and the resolution and paragraph numbers and indicated in brackets.

## 32 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 — 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 61162-2, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 2: Single talker and multiple listeners, high-speed transmission*









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IEC 61162-450, *Maritime navigation and radiocommunication equipment and systems — Digital interfaces — Part 450: Multiple talkers and multiple listeners — Ethernet interconnection*

IEC 62288, *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 62923-1:2018, *Maritime navigation and radiocommunication equipment and systems — Bridge alert management — Part 1: Operational and performance requirements, methods of testing and required test results*

IEC 62923-2, *Maritime navigation and radiocommunication equipment and systems — Bridge alert management — Part 2: Alert and cluster identifiers and other additional features*

IMO Resolution MSC.74(69), *Adoption of New and Amended Performance Standards,* Annex 4, *Amendments to Resolution A.224(VII) — Performance standard for echo sounding equipment*, May 1998

IMO Resolution MSC.302(87), *Adoption of Performance standards for bridge alert management*, May 2010

IMO Resolution A.694(17), *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids.*

## 43 Terms and definitions



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

ISO and IEC maintain terminologicalterminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obphttps://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/https://www.electropedia.org/



**3.1**
**source level**
*S*
maximum root mean square (r.m.s) sound pressure level at a point on the principal axis of the *transducer* (3.65), as measured in the far field but referred to the distance of 1 m

Note 1 to entry: This value is expressed in decibels.

**3.2**
**receiving directivity index**
*D*
ratio of the acoustic power density at a distant point on the principal axis of the *transducer* (3.65), when used as a transmitter, to that of an omnidirectional transducer, with the same total radiated acoustic power

Note 1 to entry: This value is expressed in decibels.

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**3.3**
**receiving bandwidth**
*B*
bandwidth at which the response of the overall system, measured through water, is 3 dB below the maximum response of the system

$$B = 10 \lg(f_1 - f_2) \quad (1)$$

where $f_1$ and $f_2$ are respectively the upper and lower frequencies, expressed in hertz.

Note 1 to entry: This value is expressed in decibels.

**3.4**
**minimum detectable signal-to-noise ratio**
*E*
ratio of the signal level, expressed in decibels, to the background noise level, expressed in decibels, in the bandwidth of the receiver required to give a minimum detectable signal on the display

**3.5**
**transducer**
substance or device, such as a piezoelectric element, that converts an input electrical energy into an acoustic energy and vice versa, installed on the ship's hull and exposed to the sea water

**3.6**
**performance check**
short test to confirm compliance with the essential requirements specified in the equipment standards

Note 1 to entry: In this document, a performance check is a non-quantitative visual check confirming that the system is still operative for the purpose of IEC 60945.

**3.7**
**inspection**
visual check of the equipment or documentation

**3.8**
**pre-conditioning**
treatment of a specimen with the objective of removing or partly counteracting the effects of its previous history

**3.9**
**bridge alert management**
**BAM**
overall concept for management, handling and harmonized presentation of alerts on the bridge

**3.10**
**central alert management**
**CAM**











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functionality for the management of the presentation of alerts on the *central alert management human machine interface (CAM-HMI)* (3.1211), the communication of alert states between CAM-HMI and navigational systems and sensors

[SOURCE: IMO Resolution MSC.302(87), Appendix 1]

Note 1 to entry: The functions can be centralized or partly centralized in subsystems and interconnected via a standardized alert-related communication.

**3.11**
**central alert management HMIhuman machine interface**
**CAM-HMI**
human machine interface for centralized presentation and handling of alerts on the bridge

[SOURCE: IMO Resolution MSC.302(87), Appendix 1]

**3.12**
**central alert management system**
**CAM system**
combined functionality of CAM*central alert management* (3.10) and *central alert management human machine interface* (3.11) and CAM-HMI (3.12)

[SOURCE: IEC 62923-1:2018, 3.1.18]



## 54 Abbreviated terms



| | |
|---|---|
| DPT | Depthdepth |
| ECDIS | electronic chart display and information system |
| ES | echo-sounding equipment |
| EUT | equipment under test |
| BAM | bridge alert management |
| CAM | central alert management |
| CAM-HMI | central alert management human machine interface |
| VDR | voyage data recorder |

## 65 Performance requirements

### 6.15.1 General

Echo-sounding equipment shall comply with IMO Resolution MSC.74(69), Annex 4, the following performance requirements and with the general requirements of IEC 60945, where applicable.

Echo-sounding equipment shall comply with IEC 62288.







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## 6.25.2 Functionality

### 6.2.15.2.1 Range performance

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.1] *Under, under normal propagation and sea bed reflectibility conditions, the equipment* shall *be capable of measuring any clearance under the transducer between 2 m and 200 m.*

### 6.2.25.2.2 Range scales

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.2] *The, the equipment* shall *provide a minimum of two range scales one of which, the shallow range,* shall *cover a range of 20 m, and the other, the deep range,* shall *cover a range of 200 m.*

Where an automatic range is provided, a device to select these ranges manually shall be available to override the automatic range.

Where phased ranges, not starting from zero, are available, an indication shall be provided to show that such a range is in use.

Positive indication of the range in use shall be provided in all cases.

Where depth measurement relative to the sea surface is provided, in addition to measurement of the depth of water under the ship, there shall be a positive indication of ~~an~~a draught value.

### 6.2.35.2.3 Main display

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.3] *The, the primary presentation* shall *be a suitable graphical display which provides the immediate depth and a visible record of soundings.*

*The displayed record* shall *show at least 15 min of soundings* on the deep range scale.

Multi-colour display may be used. In this case, the colour assignment shall be clearly explained in the manual.

### 6.2.45.2.4 Other displays

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.4] *Other, other forms of display may be added, but these* shall *not affect the normal operation of the main display.*

### 6.2.55.2.5 Pulse repetition rate

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.5] *The, the pulse repetition rate* shall *not be slower than 12 pulses per minute on the deep range and 36 pulses per minute on the shallow range.*

### 6.2.65.2.6 Roll and pitch

[In accordance with IMO Resolution MSC.74(69), Annex- 4, Article 5.1.6] *The, the performance of the equipment* shall *be such that it will meet the requirements of* this document *when the ship is rolling ±10° and/or pitching ±5°.*

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