IEC 63269

Edition 1.0 2022-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Maritime navigation and radiocommunication equipment and systems – Maritime survivor locating devices (man overboard devices) – Minimum requirements, methods of testing and required test results

Matériels et systèmes de navigation et de radiocommunication maritimes – Dispositifs de localisation des survivants en mer (dispositifs en cas d'homme à la mer) – Exigences minimales, méthodes d'essai et résultats d'essai exigés

IEC 63269:2022-05(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, …). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 63269

Edition 1.0 2022-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Maritime navigation and radiocommunication equipment and systems – Maritime survivor locating devices (man overboard devices) – Minimum requirements, methods of testing and required test results

Matériels et systèmes de navigation et de radiocommunication maritimes – Dispositifs de localisation des survivants en mer (dispositifs en cas d'homme à la mer) – Exigences minimales, méthodes d'essai et résultats d'essai exigés

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 47.020.99

ISBN 978-2-8322-3701-4

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – MARITIME SURVIVOR LOCATING DEVICES (MAN OVERBOARD DEVICES) – MINIMUM REQUIREMENTS, METHODS OF TESTING AND REQUIRED TEST RESULTS

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63269 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
80/1031/FDIS	80/1040/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – MARITIME SURVIVOR LOCATING DEVICES (MAN OVERBOARD DEVICES) – MINIMUM REQUIREMENTS, METHODS OF TESTING AND REQUIRED TEST RESULTS

1 Scope

This document specifies the minimum requirements for aspects related to operation, construction, documentation, methods of testing and required test results for ITU-R M.2135 AMRD Group A man overboard (MOB) devices intended for alerting and locating purposes, as defined by IMO and in accordance with ITU-R M.493 Class-M. This document consists of three modules where the first module, Module A, covers general requirements and aspects. Further Module B covers AIS technologies and Module C covers DSC technologies that are required within MOB equipment.

This document incorporates the technical characteristics included in applicable ITU recommendations. Where applicable, it also takes into account the ITU Radio Regulations. This document takes into account other associated IEC International Standards and existing national standards, as applicable.

This document defines the requirements for coexistence of AIS and DSC technology incorporated within a single equipment. Only when the equipment complies with the three Modules can it be categorised as AMRD Group A equipment and be entitled to operate on channel AIS 1, channel AIS 2 and channel 70.

2 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 60529, *Degrees of protection provided by enclosures (IP Code)*

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

IEC 61108-1, *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 1: Global positioning system (GPS) – Receiver equipment – Performance standards, methods of testing and required test results*

IEC 61108-2, *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 2: Global navigation satellite system (GLONASS) – Receiver equipment – Performance standards, methods of testing and required test results*

IEC 61108-3, *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 3: Galileo receiver equipment – Performance requirements, methods of testing and required test results*

IEC 61108-5, *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 5: BeiDou navigation satellite system (BDS) – Receiver equipment – Performance equipment – Performance requirements, methods of testing and required test results*

IMO Resolution MSC.81(70), *Revised recommendation on testing of life-saving appliances*

ITU-R M.493-15*, Digital selective-calling system for use in the maritime mobile service*

ITU-R M.1371, *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band*

ITU-T Recommendation O.153, *Basic parameters for the measurement of error performance at bit rates below the primary rate*

Manual of Tests and Criteria, 7th Revised Edition (ST/SG/AC.10/11/Rev.7), as amended, United Nations

3 Terms, definitions and abbreviated terms

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
freshwater
water having a minimum of salts in solution as contrasted to ocean water which is high in salt concentration

3.1.2
activation
initial triggering of the MOB device

Note 1 to entry: The activation is when both parts of the two-step procedure are performed.

3.1.3
active mode
activated mode, when the equipment transmits in an emergency situation

3.1.4
armed
state enabling the equipment to be activated manually or automatically

3.1.5
buoyant lanyard
floating string suitable for attaching the MOB to the user's personal protective equipment

3.1.6
closed loop
individual transmission to own vessel

3.1.7
default
<value> selected by the equipment software in the absence of any operator input

Note 1 to entry: The term "default" can also apply to an action taken.

3.1.8
GNSS data
UTC time, position COG and SOG from the GNSS

3.1.9
open loop
transmitting to all ships (broadcast)

3.1.10
symbol
<DSC sentence> 7 binary bits of a 10 bit DSC word that have the information content

3.2 Abbreviated terms

AIS	Automatic Identification System
BER	Bit Error Ratio
COG	Course Over Ground
CRC	Cyclic Redundancy Check
DSC	Digital Selective Calling
EIRP	Effective Isotropic Radiated Power
EPFS	Electronic Position Fixing System
EUT	Equipment Under Test
FSK	Frequency Shift Keying
GMSK	Gaussian Minimum Shift Keying
GNSS	Global Navigation Satellite System
ID	Identity
IMO	International Maritime Organization
ITU-R	International Telecommunication Union Radiocommunication sector
ITU-T	International Telecommunication Union Telecommunication sector
MMSI	Maritime Mobile Service Identity
MOB	Man OverBoard
NRZI	Non Return to Zero, Inverted
RAIM	Receiver Autonomous Integrity Monitoring
RF	Radio Frequency
SINAD	(Signal+Noise+Distortion) to (Noise+Distortion)
SOG	Speed Over Ground
SOTDMA	Self-Organized Time Division Multiple Access
UTC	Coordinated Universal Time
VDL	VHF Data Link
VHF	Very High Frequency
WGS 84	World Geodetic System 1984

4 Module A – Common requirements and related tests

4.1 Operational requirements

4.1.1 Activation

(See 4.10.2.1.1)

The MOB device shall be:

a) capable of being easily activated by unskilled personnel;

b) fitted with means to prevent inadvertent activation;

c) capable of manual activation and deactivation.

4.1.2 Controls

(See 4.10.2.1.2)

To avoid inadvertent activation, the equipment shall be activated by the use of two simple, but independent mechanical actions, neither of which on its own shall activate the equipment. The second mechanical action may be replaced by an immersion sensor. Where the second action is replaced by an immersion sensor, then the first action shall ensure the equipment is armed for automatic activation when submerged.

After activation, it shall be simple to deactivate the equipment, and the means to deactivate the equipment shall be clearly marked. Means shall be provided to avoid inadvertent deactivation.

NOTE Means for preventing inadvertent deactivation can be for example prolonged push of deactivation button, pressing two buttons simultaneously or a procedure requiring two steps.

All controls necessary for the correct operation of the equipment shall be so designed that personnel wearing appropriately sized neoprene gloves having a thickness of minimum 5 mm can activate or deactivate the equipment.

The switch that operates any self-test function shall be so designed that it returns automatically when released. Activation of the self-test function shall reset automatically after completion of the test including any required transmission.

4.1.3 Indicators

(See 4.10.2.1.3)

The MOB device shall be equipped with a means which is either visual or audible, or both visual and audible, to indicate its operational status.

The equipment shall be provided with a visual and/or audible indication that equipment is activated and that signals are being emitted. The indicator should be sufficiently bright to be seen by the user in bright daylight.

NOTE Bright daylight in this context is considered to be clear sky with the indicator of the MOB device observed in direction away from the sun. Shadowing the indicator from the direct light from sun, for example by hand, is expected.

Any audible indicator should have a distinctive alarm tone with a minimum sound output of 85 dBA when measured 10 cm from the equipment.

The indicator(s) shall clearly distinguish between AIS and DSC transmissions and the following states.

When active:

a) the equipment has been activated;

b) the equipment is transmitting without GNSS data;

c) the equipment is transmitting with GNSS data;

d) equipment has received a DSC acknowledgement and the DSC transmitter has been deactivated remotely;

e) the equipment is inactive.

When self-testing:

f) the equipment is undergoing self-test and is transmitting in self-test mode;

g) the equipment indicates correct reception of the DSC acknowledgement in self-test mode;

h) the equipment has completed a self-test or has been deactivated manually;

i) the equipment cannot complete a DSC test because it has not been programmed with a destination MMSI;

j) the equipment cannot complete a test because it could not obtain a GNSS position.

4.1.4 Water activation function

(See 4.10.2.1.4, 4.10.2.1.5)

If provided, the water activation function shall be protected against inadvertent activation from salt-water spray or rain. The act of dropping the equipment into water, as part of the drop test in IEC 60945, shall not cause the equipment to activate when the equipment has not been armed.

4.1.5 Self-test

(See 4.10.2.1.6)

The equipment shall include a functional self-test that is functional throughout the operating temperature range. Testing of AIS, GNSS and DSC functionality may be combined in one test or as individual test modes.

The equipment shall have self-test pass/fail indicator(s) which shall correctly identify any failure conditions that have been detected by any of the self-test functions. The self-test pass/fail indicator shall also clearly indicate that there is insufficient battery capacity to meet the stated operational lifetime. It shall not be possible for the user to reset this indication.

During self-test, only recognized test messages as defined in the appropriate ITU-R recommendations shall be transmitted.

The means of activating the self-test feature should prevent the test signal from being continuously activated.

4.1.6 Automatic shutdown

(See 4.10.2.1.7)

An automatic transmitter shutdown shall be provided to ensure that transmission does not continue for more than 2 s. This shutdown shall be independent of the operating software.

Even if this function activates, the equipment shall attempt to transmit at the next transmission schedule time.

4.2 Identifier (Self ID)

(See 4.10.2.2)

The equipment shall be capable of transmitting self-identification. The identification shall be pre-programmed into the equipment at the time of manufacture and stored in non-volatile memory. After being programmed, it shall not be possible for user to change the self-identification.

The equipment identifier is described in ITU-R M.585.

Programming Self ID as 97200yyyy shall be available for testing purposes.

The Self ID for equipment shall be 972xxyyyy, where

- xx = manufacturer ID 01 to 99;
- yyyy = the sequence number 0000 to 9999.

Manufacturer IDs are issued by CIRM[1]. Manufacturers shall only use manufacturer IDs that have been issued to them by CIRM, except for testing purposes where the ID xx=00 can be used.

4.3 Construction

(See 4.10.2.3, 4.10.2.4)

The equipment shall:

a) be capable of floating (not necessarily in an operating position) if it is not intended to be fitted to the lifesaving equipment;
b) be equipped with a buoyant lanyard, suitable for use as a tether;
c) be of a highly visible colour on all surfaces where this will assist visual detection;
d) have a smooth external construction to avoid damaging the lifesaving equipment.

The equipment may optionally have a light to assist detection by human eye for search and rescue purposes with an intensity of at least 0,75 cd perpendicular to the face of the light source.

NOTE The optional light can be steady or flashing.

4.4 Environment

(See 4.10.2.5)

The equipment shall meet the environmental condition requirements of IEC 60945 for equipment category "portable".

4.5 Battery

(See 4.10.2.7, 4.10.2.8)

The equipment shall have its own battery or batteries and shall not depend upon any external source of power for its operation when activated. The batteries shall be an integral part of the equipment.

---

1 Comité International Radio-Maritime, www.cirm.org

The life of the battery as defined by its expiry date shall be established by the manufacturer. The expiry date of the battery shall be the battery cell manufacturing date plus no more than half the useful life of the battery. The useful life of the battery is defined as the period of time after the date of battery cell manufacture that the battery will continue to fully operate the equipment at the required radiated power, after allowing for all losses over the useful life of the battery. When calculating the useful life of the battery, the following losses, at a temperature of +20 °C ± 5 °C, shall be included:

a) self-testing, monthly, with GNSS data available where applicable;

b) self-discharge of the battery;

c) stand-by loads.

The manufacturer shall provide evidence to support the above battery life calculations including the time for self-testing and assuming typical GNSS acquisition time where applicable.

The battery of an armed device shall have a minimum useful life of at least two years. The installation date shall be no more than one year from the date of manufacture of the battery. The battery shall be clearly and durably marked with its date of manufacture. The equipment shall be clearly marked with the expiry date of the battery. The calculation shall assume that the device is armed on the date of manufacture.

EXAMPLE A battery that has a useful life of 10 years from the date of manufacture cannot have an expiry date that exceeds 5 years from the date of manufacture and it would have to be capable of providing enough power for 10 years of self-testing, self-discharge and stand-by loads in addition to the operational power requirement of the device.

The battery shall have sufficient capacity to operate for 12 h over the operating temperature range of the equipment, and to provide for testing of the functions on the equipment.

It shall not be possible to connect the battery with the polarity reversed. Where individual battery cells could be fitted, protection for reverse polarity shall be provided within the equipment.

4.6 GNSS position source

(See 4.10.2.9)

An internal GNSS receiver shall be used as the source for equipment position reporting.

The GNSS receiver shall meet the following requirements from at least one of the standards: IEC 61108-1, IEC 61108-2, IEC 61108-3 or IEC 61108-5 as applicable: position accuracy, acquisition, sensitivity and dynamic range, position update, effects of specific interfering signals. The minimum update rate shall be once per minute and provide a resolution of one ten-thousandth of a minute of arc and use WGS 84 datum.

The manufacturer shall provide evidence that an internal GNSS device cold start is forced at every activation of equipment ("cold start" refers to the absence of time dependent or position dependent data in memory, which might affect the acquisition of the GNSS position).

4.7 Labelling

(See 4.10.2.10)

The equipment shall be provided with a label, or labels, permanently affixed to the exterior of the equipment. All labelling shall be resistant to deterioration by prolonged exposure to sunlight, and shall not be unduly affected by seawater or oil, and shall be abrasion resistant. The equipment labelling shall contain the following information:

a) manufacturer serial number;

b) adequate instructions to enable the user to activate or deactivate the equipment;

c) self-test instructions;

d) the name and address of the manufacturer;

e) the equipment model number;

f) regulatory authority markings, if required;

g) a warning to not block the GNSS antenna;

h) the compass safe distance;

i) a warning to the effect that the locating device should not be operated except in an emergency;

j) the date on which the primary battery will need to be replaced. Simple means shall be provided for changing this date when the primary battery is replaced;

k) safety warning and disposal statement, as applicable;

l) the Self ID of the equipment (see 4.2).

4.8 Battery safety

(See 4.10.2.11)

Batteries shall meet the requirements of the United Nations' Manual of Tests and Criteria, Part III, Section 38.3, as amended.

4.9 Documentation

(See 4.10.2.6, 4.10.2.12)

The manufacturer shall provide an operation manual including the following:

a) intended use of an equipment;

b) complete instructions for testing and operating the equipment;

c) general battery information (for example battery replacement instructions, battery type, safety information regarding battery use and disposal);

d) information on when battery replacement is required;

e) minimum operating life time, operating, and stowage temperature ranges;

f) instructions on actions to be taken in the case of inadvertent activation;

g) a warning to the effect that the device should only be activated in an emergency;

h) information on the intended areas of use, i.e. the equipment is intended to be used on sea water and may not automatically activate in freshwater such as rivers and lakes;

i) instructions for fitting/attaching the equipment to the user and for correct operation in the water in an emergency;

j) applicable warning statements;

k) a warning such as the following, "WARNING – This equipment is for use in an emergency only. It is not intended for routine tracking of persons or property.";

l) a warning such as the following, "WARNING – If self-test is performed more frequently than stated in manufacturer's recommendations, then battery life may be reduced.";

m) a warning such as the following. "WARNING – To ensure that the device is fully operational the battery should be replaced by a new battery after activation in an emergency situation.";

n) generic statement on safety hazards.