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colour inside

Global maritime distress and safety system (GMDSS) – Part 12: Survival craft portable two-way VHF radiotelephone apparatus – Operational and performance requirements, methods of testing and required test results

Système mondial de détresse et de sécurité en mer (SMDSM) – Partie 12: Radiotéléphone émetteur-récepteur portable VHF pour embarcation de sauvetage – Exigences d'exploitation et de fonctionnement, méthodes d'essai et résultats d'essai exigés

IEC 61097-12:1996-12+AMD1:2017-07+AMD2:2023-11 CSV(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) – Part 12: Survival craft portable two-way VHF radiotelephone apparatus – Operational and performance requirements, methods of testing and required test results

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IEC 61097-12 edition 1.2 contains the first edition (1996-12) [documents 80/126/FDIS and 80/136/RVD], its amendment 1 (2017-07) [documents 80/829/CDV and 80/843/RVC] and its amendment 2 (2023-11) [documents 80/1069/CDV and 80/1085/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61097-12 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

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

Annex C is for information only.

The committee has decided that the contents of this document and its amendments 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- withdrawn,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 publication 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.

The contents of the corrigendum 1 (2023-11) have been included in this copy.

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) – Part 12: Survival craft portable two-way VHF radiotelephone apparatus – Operational and performance requirements, methods of testing and required test results

1 Scope

This part of IEC 61097 specifies the minimum performance requirements, technical characteristics and methods of testing with required test results of survival craft portable two-way radiotelephone apparatus as required by chapter III of the 1988 amendments to the 1974 International Convention for the Safety of Life at Sea (SOLAS), and which is associated with IEC 60945. When a requirement in this standard is different from IEC 60945, the requirement in this standard shall take precedence.

This standard incorporates the applicable parts of the performance requirements included in IMO Resolution ~~A.809(19) annex 1~~ MSC.515(105) and the technical characteristics included in ITU M.489-2 ~~and ITU-R M.542-1~~, and takes account of the general requirements contained in IMO Resolution A.694(17), and conforms with the ITU Radio Regulations where applicable.

NOTE – All text of this standard, whose wording is identical to that in IMO Resolutions ~~A.809(19)~~ MSC.515(105) and A.694(17) and ITU-R M.489-2 is printed in italics and the Resolution/Recommendation and paragraph numbers are indicated in brackets.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61097. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61097 are encouraged to investigate the possibility of applying the most recent edition of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60945:~~1994~~2002, ~~*Marine navigational*~~ *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IMO International Convention for the Safety of Life At Sea (SOLAS):1974, as amended 1988 (GMDSS) – ~~*Chapter III: Life-saving appliances and arrangements*~~ *Chapter IV: Radiocommunication*

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.809(19):1995, *Performance standards for survival craft two-way VHF radiotelephone apparatus*~~

IMO Resolution MSC.515(105):2022, *Performance standards for survival craft portable two-way VHF radiotelephone apparatus*

ITU Radio Regulations:~~1995~~2020, *Appendix ~~S~~3: Table of maximum permitted spurious emissions power levels*

ITU Radio Regulations:~~1990~~2020, *Appendix 18: Table of transmitting frequencies in the band 156 – 174 MHz for stations in the maritime mobile service*

ITU-R M.489-2:1995, *Technical characteristics of radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz*

~~ITU-R M.542-1:1982, *On-board communications by means of portable radiotelephone equipment*~~

3 Performance requirements

3.1 Introduction

Performance requirements described in this clause are specified by referring to IMO Resolutions and ITU Recommendations. In addition to meeting performance requirements in this clause, the equipment shall comply with the technical characteristics contained in clause 4 of this standard.

3.2 General

3.2.1 (~~A.809(19) 1~~MSC.515(105)/2.1) *The equipment shall be portable and capable of being used for on-scene communication between survival craft, between survival craft and ship and between survival craft and rescue unit. It may also be used for on-board communications when capable of operating on appropriate frequencies.*

3.2.2 (~~A.809(19) 1~~MSC.515(105)/2.3) *The equipment* shall*:*

1) be capable of being operated by unskilled personnel;

2) be capable of being operated by personnel wearing gloves as specified for immersion suits in regulation ~~33~~ 32 of chapter III of the SOLAS 1974 Convention;

3) be capable of single-handed operation except for channel selection;

9) be of small size and light weight;

10) be capable of operating in the ambient noise level likely to be encountered on board ships or survival craft;

11) have provisions for its attachment to the clothing of the user~~, including the immersion suit~~ and also be provided with a wrist or neck strap. For safety reasons, the strap should include a suitable weak link to prevent the bearer from being ensnared; and

12) be resistant to deterioration by prolonged exposure to sunlight.

3.2.3 (~~A.809(19) 1~~MSC.515(105)/2.3.13) *The equipment shall be either of a highly visible yellow/orange colour or marked with a surrounding yellow/orange marking strip.*

3.3 General requirements

3.3.1 Composition

(~~A.809(19) 1~~MSC.515(105)/2.2) *The equipment* shall *comprise at least:*

1) an integral transmitter/receiver including antenna and battery;

2) an integral control unit including a press-to-transmit switch;

3) an internal microphone and loudspeaker.

3.3.2 Controls and indicators

3.3.2.1 (~~A.809(19) 1~~MSC.515(105)/4.1) *An on/off switch shall be provided with positive visual indication that the radiotelephone is switched on.*

3.3.2.2 (~~A.809(19) 1~~MSC.515(105)/4.2) *The receiver shall be provided with a manual volume control by which the audio output may be varied.*

3.3.2.3 (~~A.809(19) 1~~MSC.515(105)/4.3) *A squelch (mute) control and channel selection switch shall be provided.*

3.3.2.4 (~~A.809(19) 1~~MSC.515(105)/4.4) *Channel selection shall be easily performed and the channels shall be clearly discernible.*

3.3.2.5 (~~A.809(19) 1~~MSC.515(105)/4.5) *Channel indication shall be in accordance with appendix 18 of the Radio Regulations.*

3.3.2.6 (~~A.809(19) 1~~MSC.515(105)/4.6) *It shall be possible to determine that channel 16 has been selected in all ambient light conditions.*

3.3.3 Antenna

(~~A.809(19) 1~~MSC.515(105)/9) *The antenna shall be vertically polarized and, as far as practicable, be omnidirectional in the horizontal plane. The antenna shall be suitable for efficient radiation and reception of signals at the operating frequency.*

3.3.4 Safety precautions

3.3.4.1 (~~A.809(19) 1~~MSC.515(105)/6) *The equipment shall not be damaged by the effect of open-circuiting or short-circuiting the antenna.*

3.3.4.2 (~~A.809(19) 1~~MSC.515(105)/2.3.8) *The equipment shall have no sharp projections which could damage survival craft.*

3.3.5 Frequency bands and channels

3.3.5.1 (~~A.809(19) 1~~MSC.515(105)/3.1) *The two-way radiotelephone shall be capable of operation on the frequency 156,800 MHz (VHF CH 16) and on at least one additional channel.*

3.3.5.2 (~~A.809(19) 1~~MSC.515(105)/3.2) *All channels fitted shall be for single-frequency voice communication only.*

3.3.5.3 (~~A.809(19) 1~~MSC.515(105)/3.3) *The class of emission shall ~~be G3E to~~ comply with ~~appendix 19 of the Radio Regulations~~ Recommendation ITU-R M.489-2.*

3.3.6 Marking and identification

(~~A.809(19) 1~~MSC.515(105)/13.1) *In addition to the ~~items~~ general requirements specified in resolution A.694(17) ~~on general requirements~~, as detailed in IEC 60945, the following shall be clearly indicated on the exterior of the equipment:*

1) *brief operating instructions;*
2) *expiry date for the primary batteries; and*
3) *original equipment manufacturer.*

(MSC.515(105)/13.2) *The expiry date of the primary battery shall use the date of manufacture of the cells within the battery as its starting point and be calculated as follows:*

expiry date = date of manufacture + shelf life,

where:

4) *the shelf life is the period after which a battery that has not yet been used (i.e. seal unbroken) can still be installed and meet its rated "service life". This is determined by the original equipment manufacturer, taking into consideration the losses incurred during storage at the ambient environmental conditions defined in IEC 60945; and*
5) *the service life is the period for which the battery is operational after its use has been initiated by switching on the radio in accordance with 3.3.8.4.*

(MSC.515(105)/13.3) *The original equipment manufacturer shall, in original and indelible print, clearly mark the date of manufacture and expiry date on the battery such that it is visible on the exterior of the equipment. The label and its printed data shall meet the relevant environmental clauses of IEC 60945:2002, Table 3.*

(MSC.515(105)/13.4) *The battery shall also display a warning that a broken non-replaceable seal will cause the indicated expiry date to be void.*

3.3.7 Warming-up period

(~~A.809(19) 1~~MSC.515(105)/5) *The equipment shall be operational within 5 s of switching on.*

3.3.8 Power supply

3.3.8.1 (~~A.809(19) 1~~MSC.515(105)/12.1) *The source of energy shall be integrated in the equipment and may be replaceable by the user. In addition, provision may be made to operate the equipment using an external source of electrical energy.*

3.3.8.2 (~~A.809(19) 1~~MSC.515(105)/12.2) *Equipment intended for the source of energy to be user replaceable shall be provided with a dedicated primary battery for use in the event of a distress situation. This battery shall be equipped with a non-replaceable seal to indicate that it has not been used.*

3.3.8.3 (~~A.809(19) 1~~MSC.515(105)/12.3) *Equipment intended for the source of energy to be non-user-replaceable shall be provided with a primary battery. The portable two-way radiotelephone equipment shall be equipped with a non-replaceable seal to indicate that it has not been used.*

3.3.8.4 (~~A.809(19) 1~~MSC.515(105)/12.4) *The primary battery shall have sufficient capacity to ensure 8 h operation at its highest rated power with a duty cycle of 1: 9. The duty cycle is defined as 6 s transmission, 6 s reception above squelch opening level and 48 s reception below squelch opening level.*

3.3.8.5 (~~A.809(19) 1~~MSC.515(105)/12.5) *Primary batteries shall have a shelf life of at least 2 years and if intended to be user replaceable shall be of a colour or marking as defined in 3.2.3.*

3.3.8.6 (~~A.809(19) 1~~MSC.515(105)/12.6) *Primary or secondary batteries not intended for the use in the event of a distress situation shall be of a colour or marking so that they cannot be confused with batteries intended for such use.*

3.4 Environmental requirements

3.4.1 (~~A.809(19) 1~~MSC.515(105)/11) *The equipment shall be so designed as to operate over the temperature range –20 °C to +55 °C. It shall not be damaged in stowage throughout the temperature range –30 °C to + 70 °C.*

3.4.2 (~~A.809(19) 1~~MSC.515(105)/2.3.4) *The equipment shall withstand drops on to a hard surface from a height of 1 m.*

3.4.3 (~~A.809(19) 1~~MSC.515(105)/2.3.5) *The equipment shall be watertight to a depth of 1 m for at least 5 min.*

3.4.4 (~~A.809(19) 1~~MSC.515(105)/2.3.6) *The equipment shall maintain watertightness when subjected to a thermal shock of 45 °C under conditions of immersion.*

3.4.5 (~~A.809(19) 1~~MSC.515(105)/2.3.7) *The equipment shall not be unduly affected by seawater or oil or both.*

3.5 Electromagnetic compatibility

The equipment shall comply with the EMC requirements specified in resolution A.694(17), as detailed in IEC 60945.

4 Technical characteristics

4.1 General

The equipment shall be designed to operate satisfactorily with a channel separation of 25 kHz in accordance with appendix 18 of the Radio Regulations.

4.2 Class of emission and modulation characteristics

4.2.1 (M.489-2/1.1.1 and .3) *The class of emission shall be G3E (frequency modulation with a pre-emphasis characteristic of 6 dB/Octave).*

4.2.2 (M.489-2/1.1.2) *The necessary bandwidth shall be 16 kHz.*

4.3 Transmitter

4.3.1 (M.489-2/1.2.1) *The frequency tolerance for ship station transmitters* shall *not exceed 10 parts in* 10^6*.* For practical reasons, the frequency error shall be within ±1,5 kHz.

4.3.2 (~~A.809(19) 1~~MSC.515(105)/7) *The effective radiated power* shall *be a minimum of 0,25 W. Where the effective radiated power exceeds 1 W, a power reduction switch to reduce the power to 1 W or less is required. When this equipment provides for on-board communications, the output power* shall *not exceed 1 W on these frequencies.*

4.3.3 *The frequency deviation corresponding to 100% modulation shall approach ±5 kHz as nearly as practicable.*

4.3.4 (M.489-2/1.2.5) *The upper limit of the audiofrequency band shall not exceed 3 kHz.*

4.3.5 (M.489-2/1.2.2) *Spurious emissions on discrete frequencies, when measured in a non-reactive load equal to the nominal output impedance of the transmitter shall be in accordance with the provisions of Appendix ~~8~~ 3 of the Radio Regulations. The power of any conducted spurious emission on any discrete frequency shall not exceed 0,25* μ*W.*

4.3.6 (M.489-2/1.2.6) *The cabinet radiated power shall not exceed 25* μ*W. In some radio environments, lower values may be required. The equipment shall meet the requirements of IEC 60945 for radiated interference.*

4.4 Receiver

4.4.1 (~~A.809(19) 1~~MSC.515(105)/8.1) *The sensitivity of the receiver shall be equal to or better than 2* μ*V e.m.f. for a SINAD ratio of 12 dB at the output.*

4.4.2 (~~A.809(19) 1~~MSC.515(105)/8.2) *The immunity to interference of the receiver shall be such that the wanted signal is not seriously affected by unwanted signals.*

4.4.3 (~~A.809(19) 1~~MSC.515(105)/10.1) *The audio output shall be sufficient to be heard in the ambient noise level likely to be encountered on board ships or in a survival craft.*

4.4.4 (~~A.809(19) 1~~MSC.515(105)/10.2) *In the transmit condition the output of the receiver shall be muted.*

4.4.5 (M.489-2/1.3.2) *The adjacent channel selectivity shall be at least 70 dB.*

4.4.6 (M.489-2/1.3.3) *The spurious response rejection ratio shall be at least 70 dB.*

4.4.7 (M.489-2/1.3.4) *The radio frequency intermodulation response ratio shall be at least 65 dB.*

4.4.8 (M.489-2/1.3.5) *The power of any conducted spurious emission measured at the antenna terminals shall not exceed 2,0 nW at any discrete frequency.*

5 Methods of testing and required test results

Environmental tests shall be carried out before tests to verify whether the equipment under test (EUT) meets all technical requirements. Where electrical tests are required, these shall be done using the normal test voltage as specified in IEC 60945 unless otherwise stated.

In each test item indicated below, the related requirement can be identified by referring to the text with subclause number in brackets.

5.1 Test conditions

For field measurements and performance checks to this standard, the EUT shall be operational on channel 17.

5.1.1 Normal and extreme test conditions

Tests shall be made under normal test conditions and also, where stated, under extreme test conditions as specified in IEC 60945, of dry heat and the upper limit of supply voltage applied simultaneously and low temperature and the lower limit of supply voltage applied simultaneously.

5.1.2 Test power source

During each test the EUT shall be supplied from a test power source, capable of producing normal and extreme test voltages. For the purpose of tests, the voltage of the power source shall be measured at the input terminals of the EUT. During tests, the power supply voltages shall be maintained within ±3 % relative to the voltage level at the beginning of each test.

The test power source shall only be used in measurements where the use of the test power source is mutually agreed between manufacturer and test house. In the event of any discrepancy, results obtained using the batteries shall take precedence over results obtained using the test power source.

5.1.3 Procedure for tests at extreme temperatures

For tests at low temperature, the EUT shall be placed in the test chamber and left until thermal equilibrium is reached and shall then be switched to stand-by or receive position for 5 s after which the EUT shall meet the requirements of this standard.

5.1.4 Performance check

5.1.4.1 Definition

The performance check means a shortened form of the test required by the relevant standard under normal test conditions, such as could normally be carried out in no more than 15 min.