INTERNATIONAL STANDARD

IEC 61097-1

Second edition
2007-06

Global maritime distress and safety system (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE P

For price, see current catalogue

CONTENTS

FOREWORD 4

1 Scope 6
2 Normative references 6
3 Performance requirements 7
3.1 General 7
3.2 Operational 7
3.3 Battery 7
3.4 Environment (temperature) 8
3.5 Antenna height 8
3.6 Antenna characteristics 8
3.7 Range performance 8
4 Labelling 8
5 Technical characteristics 8
5.1 Frequency 8
5.2 Polarisation 8
5.3 Sweep rate 8
5.4 Response signal 8
5.5 Form of sweep (sawtooth) 9
5.6 Pulse emission 9
5.7 E.i.r.p. 9
5.8 Effective receiver sensitivity 9
5.9 Duration of operation 9
5.10 Temperature range: 9
5.11 Recovery time following excitation 9
5.12 Effective antenna height 9
5.13 Delay between receipt of radar signal and start of transmission 9
5.14 Antenna vertical beamwidth 9
5.15 Antenna azimuthal beamwidth 9
6 Methods of testing and required test results 10
6.1 General 10
6.2 Operational requirements 10
6.3 Battery capacity 11
6.3.1 Method of measurement 11
6.3.2 Results required 11
6.4 Environment (temperature) 11
6.4.1 Dry heat cycle 11
6.4.2 Low temperature cycle 11
6.5 Antenna height 11
6.6 Antenna characteristics 11
6.6.1 Azimuthal and vertical beamwidths 12
6.6.2 Polarisation 12
6.7 Range performance 12
6.7.1 Method of measurement 12
6.7.2 Results required 12
6.7.3 Alternative method of measurement 12

6.7.4 Results required 12
6.8 Labelling 12
6.9 Technical characteristics 12
6.9.1 General 12
6.9.2 Functional test signals 13
6.9.3 Receiver sensitivity 13
6.9.4 Sweep characteristics 13
6.9.5 Radiated power 13
6.9.6 Antenna characteristics 14
6.9.7 Recovery time following excitation 14
6.9.8 Delay – Receipt of radar interrogation and SART transmission 14
6.9.9 Receiver front end protection 14

Figure 1 – Possible test set-up 15

INTERNATIONAL ELECTROTECHNICAL COMMISSION

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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.

International Standard IEC 61097-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition cancels and replaces the first edition published in 1992. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

– some amendments to bring the standard up to date with newer IMO resolutions and ITU recommendations. In particular, in 1995, the IMO adopted new performance standards for the SART in resolution A.802(19) which replaced those of resolution A.697(17). This new resolution introduced a new requirement for the SART to be provided with a pole

arrangement. In 2006, the ITU-R revised recommendation M.628 to permit the optional use of circular polarisation with the SART;

– the Introduction has been deleted as it was of historical interest only;

– Annex A, which contained details of the parts of the IEC 61097 series of standards, has been deleted as this information is now available from this Foreword;

– Annex B which contained a Bibliography has been deleted and the information moved into the normative references.

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

FDIS	Report on voting
80/479/FDIS	80/485/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 2.

A list of all parts of IEC 61097 series, published under the general title *Global maritime distress and safety system (GMDSS),* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

A bilingual version of this publication may be issued at a later date.

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 1: Radar transponder – Marine search and rescue (SART) – Operational and performance requirements, methods of testing and required test results

1 Scope

This part of IEC 61097 specifies the performance standards and type testing of marine radar transponders used in search and rescue operations at sea (SART), as required by Regulation 6.2.2 of Chapter III, and 7.1.3 and 8.3.1 of Chapter IV of the 1988 amendments to the 1974 International Convention for Safety of Life at Sea (SOLAS), and which is associated with IEC 60936 (Shipborne radar) and IEC 60945 (General requirements).

This standard incorporates the performance standards of IMO Resolutions A.530 (13) and A.802 (19) (Survival craft radar transponders for use in search and rescue operations) and the technical characteristics for such transponders contained in ITU-R Recommendation M.628-4, and takes account of the general requirements contained in IMO Resolution A.694 (17).

NOTE 1 The categories of SART operation which are applicable to the stated SOLAS Regulations, IMO Resolutions and ITU-R Recommendation are:

a) integral with a survival craft;
b) portable and capable of floating;
c) as part of an EPIRB.

NOTE 2 This standard does not include non-SOLAS options for instance those envisaged in ITU-R Recommendation 628-4 - Considering (b).

All text whose meaning is identical to that in IMO Resolutions A.530 (13), A.694 (17), A.802 (19) and ITU-R Recommendation M.628-4 is printed in italics.

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 60936-1, *Shipborne radar – Operational and performance requirements – Methods of tests and required test results*

IEC 60945, *Marine navigational equipment – General requirements – Methods of testing and required test results.*

IMO Resolution A.222 (VII): *Performance standards for navigational radar equipment.*

IMO Resolution A.477 (XII): *Performance standards for radar equipment.*

IMO Resolution A.530 (13): *Use of radar transponders for search and rescue purposes.*

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

IMO Resolution A.802 (19): *Peformance standards for survival craft radar transponders for use in search and rescue operations.*

Safety of Life at Sea (SOLAS) Convention (1974) – *Amendments concerning Radiocommunications for the Global maritime distress and safety system (GMDSS) (1988)*

ITU-R Recommendation M.628-4: *Technical characteristics for search and rescue radar transponders.*

ITU-R Report 1036-1: *Frequencies for homing and locating in the global maritime distress and safety system (GMDSS).*