

**Global maritime distress and safety system (GMDSS) -
Part 14: AIS Search And Rescue Transmitter (AIS-SART)
- Operational and performance requirements, methods
of testing and required test results**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 61097-14:2010 sisaldab Euroopa standardi EN 61097-14:2010 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 30.04.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 19.03.2010.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 61097-14:2010 consists of the English text of the European standard EN 61097-14:2010.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 30.04.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 19.03.2010.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

ICS 47.020.70

Standardite reprodutseerimis- ja levitamiseõigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:
Aru 10 Tallinn 10317 Eesti; www.evs.ee; Telefon: 605 5050; E-post: info@evs.ee

Right to reproduce and distribute Estonian Standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:
Aru str 10 Tallinn 10317 Estonia; www.evs.ee; Phone: +372 605 5050; E-mail: info@evs.ee

**Global maritime distress and safety system (GMDSS) -
Part 14: AIS Search And Rescue Transmitter (AIS-SART) -
Operational and performance requirements, methods of testing
and required test results
(IEC 61097-14:2010)**

Systeme mondial de détresse
et de sécurité en mer (GMDSS) -
Partie 14: Émetteur de recherche
et sauvetage AIS -
Exigences opérationnelles
et de fonctionnement, méthodes d'essai
et résultats exigibles
(CEI 61097-14:2010)

Weltweites Seenot-
und Sicherheitsfunksystem (GMDSS) -
Teil 14: AIS-Seenotrettungssender
(AIS-SART) -
Betriebs- und Leistungsanforderungen,
Prüfverfahren und geforderte
Prüfergebnisse
(IEC 61097-14:2010)

This European Standard was approved by CENELEC on 2010-03-01. 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, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 80/582/FDIS, future edition 1 of IEC 61097-14, 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 61097-14 on 2010-03-01.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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) 2010-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-03-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61097-14:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61097-1	NOTE Harmonized as EN 61097-1.
IEC 61108-1	NOTE Harmonized as EN 61108-1.
IEC 61108-2	NOTE Harmonized as EN 61108-2.
IEC 61993-2	NOTE Harmonized as EN 61993-2.
IEC 62288	NOTE Harmonized as EN 62288.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

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 60945	-	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results	EN 60945	-
IEC 61108	Series	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS)	EN 61108	Series
ITU-R Recommendation 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	-	-
IMO Resolution MSC.246(83)	-	Performance standards for survival craft AIS search and rescue transmitter (AIS-SART)	-	-

CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references	7
3 Performance requirements	8
3.1 General.....	8
3.2 Operational	8
3.3 Battery	8
3.3.1 General	9
3.3.2 Battery life and expiry date	9
3.3.3 Reverse polarity protection	9
3.4 Unique identifier (user ID)	9
3.5 Environment.....	10
3.6 Range performance.....	10
3.7 Transmission performance	10
3.7.1 Active mode	10
3.7.2 Test Mode	12
3.8 Labelling	12
3.9 Manuals	12
4 Technical requirements	13
4.1 Functional block diagram of an AIS-SART	13
4.1.1 General	13
4.1.2 TDMA transmitter (AIS Tx).....	13
4.1.3 Controller	13
4.1.4 Timing and synchronisation device	13
4.1.5 Battery	14
4.1.6 Electronic position fixing system	14
4.1.7 Activator	14
4.1.8 Indicator	14
4.2 Physical layer requirement	15
4.2.1 Transmitter requirements.....	15
4.3 Link layer requirements	16
4.3.1 General	16
4.3.2 AIS Messages	16
4.3.3 Synchronisation.....	17
4.3.4 VDL access scheme	17
4.3.5 Link sub-layer 1: Medium Access Control (MAC)	18
4.3.6 Link sub-layer 2: Data Link Service (DLS)	18
4.3.7 Link sub-layer 3: Link Management Entity (LME)	18
5 General methods of testing.....	18
5.1 Introduction	18
5.2 General requirements	18
5.2.1 General	18
5.2.2 Performance check.....	19
5.2.3 Performance test	19
5.3 Normal test conditions	19
5.4 Extreme test conditions	19

5.5	Preparation of AIS-SART for type-approval testing	19
5.6	Test signals	19
5.6.1	Standard test signal number 1	19
5.6.2	Standard test signal number 2	19
5.6.3	Standard test signal number 3	20
5.7	Artificial antenna (dummy load)	20
5.8	Facilities for access	20
5.9	Modes of operation of the transmitter	20
5.10	Measurement uncertainties	20
6	Performance tests	21
6.1	Operational tests	21
6.2	Battery	21
6.2.1	Battery capacity test	21
6.2.2	Expiry date indication	22
6.2.3	Reverse polarity protection	22
6.3	Unique identifier	22
6.4	Environment	22
6.5	Range performance	22
6.6	Transmission performance	22
6.7	Labelling	22
6.8	Manuals	23
6.9	Electronic position fixing system	23
6.10	Activator	23
6.11	Indicator	23
7	Physical radio tests	23
7.1	General description	23
7.2	Frequency error	24
7.2.1	Purpose	24
7.2.2	Method of measurement	24
7.2.3	Required results	24
7.3	Conducted power	24
7.3.1	Purpose	24
7.3.2	Method of measurement	24
7.3.3	Required result	25
7.4	Radiated power	25
7.4.1	Purpose	25
7.4.2	Method of measurement	25
7.4.3	Required results	26
7.5	Modulation spectrum slotted transmission	26
7.5.1	Purpose	26
7.5.2	Method of measurement	26
7.5.3	Required results	26
7.6	Transmitter test sequence and modulation accuracy	27
7.6.1	Purpose	27
7.6.2	Method of measurement	27
7.6.3	Required results	28
7.7	Transmitter output power versus time function	28
7.7.1	Definition	28
7.7.2	Method of measurement	29

7.7.3	Required results	30
7.8	Spurious emissions from the transmitter	30
7.8.1	Purpose	30
7.8.2	Method of measurement	30
7.8.3	Required results	30
8	Link layer tests	30
8.1	Tests for synchronisation accuracy	30
8.1.1	Method of measurement	30
8.1.2	Required results	30
8.2	Active mode tests	30
8.2.1	Method of measurement	31
8.2.2	Initialisation period – Required results	31
8.2.3	Message content of Message 1 – Required results	31
8.2.4	Message content of Message 14 – Required results	31
8.2.5	Transmission schedule for Message 1 – Required results	32
8.2.6	Communication state of Message 1 – Required results	32
8.2.7	Transmission schedule of Message 14 – Required results	32
8.2.8	Transmission with lost EPFS – Required results	32
8.3	Test mode tests	33
8.3.1	General	33
8.3.2	Transmission with EPFS data available	33
8.3.3	Transmission without EPFS data available	33
Annex A (informative)	Results of trials to verify the range performance of the AIS-SART	35
Bibliography	39
Figure 1	– Functional block diagram of an AIS-SART	13
Figure 2	– Burst transmissions in active mode	18
Figure 3	– Measurement arrangement	24
Figure 4	– Emission mask	27
Figure 5	– Measurement arrangement for modulation accuracy	27
Figure 6	– Power versus time mask	29
Table 1	– Required parameter settings for an AIS-SART	15
Table 2	– Required settings of physical layer constants	15
Table 3	– Modulation parameters of the physical layer of the AIS-SART	16
Table 4	– Minimum required transmitter characteristics	16
Table 5	– Maximum values of absolute measurement uncertainties	20
Table 6	– Conducted power – Required results	25
Table 7	– Peak frequency deviation versus time	28
Table 8	– Definition of timings	29
Table A.1	– Test results, AIS-SART to vessel (Oban Bay, Scotland) Distances detected in nautical miles (NM)	37
Table A.2	– Test results, AIS-SART to helicopter (Oban Bay, Scotland) Distances detected in nautical miles (NM)	37
Table A.3	– Test results, AIS-SART to aircraft (Key West, Florida) Distances detected in nautical miles (NM)	38

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) –

Part 14: AIS search and rescue transmitter (AIS-SART) – 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, and required test results, for Automatic Identification Systems (AIS) search and rescue transmitters (AIS-SART) which may be carried by ships as a search and rescue locating device as required by Chapters III and IV of the International Convention for Safety of Life at Sea (SOLAS), as amended. It takes account of IMO resolution A.694(17) and is associated with IEC 60945. When a requirement in this standard is different from IEC 60945, the requirement in this part of IEC 61097 takes precedence.

This standard incorporates the applicable parts of the performance standards included in IMO Resolution MSC.246(83) and the applicable technical characteristics included in Recommendation ITU-R M.1371 and is associated with IEC 61993-2 (Class A shipborne AIS).

All the text of this standard, whose wording is identical to that of IMO Resolution MSC.246(83), is printed in *italics*, and the Resolution and associated performance standard paragraph numbers are indicated in brackets.

NOTE IEC 61097-1 specifies the requirements for radar transponders for use in search and rescue operations (SART) which may alternatively be carried by ships as a search and rescue locating device.

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

IEC 61108 (all parts), *Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS)*

IMO Resolution MSC.246(83), *Performance standards for survival craft AIS search and rescue transmitter (AIS-SART)*

ITU-R Recommendation 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*