

INTERNATIONAL STANDARD

IEC
61996-2

First edition
2006-03

**Maritime navigation and radiocommunication
equipment and systems –
Shipborne voyage data recorder (VDR) –**

**Part 2:
Simplified voyage data recorder (S-VDR) –
Performance requirements, methods of
testing and required test results**

Document Preview

IEC 61996-2:2006

<https://standards.iteh.ai/en/standards/iec/10308f4-48e7-4ab2-957d-6e8889c38791/iec-61996-2-2006>



Reference number
IEC 61996-2:2006(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** (www.iec.ch)

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (www.iec.ch/searchpub) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications (www.iec.ch/online_news/justpub) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: custserv@iec.ch
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

<https://standards.iteh.ai/catalog/standards-iec/60034-48e7-4ab2-957d-6e8889c38791/iec-61996-2-2006>

INTERNATIONAL STANDARD

IEC 61996-2

First edition
2006-03

Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR) –

Part 2: Simplified voyage data recorder (S-VDR) – Performance requirements, methods of testing and required test results

(Information only)
Document Preview

IEC 61996-2:2006

<https://standards.iteh.ai/en/standards/iec/100308f4-48e7-4ab2-957d-6e8889c38791/iec-61996-2-2006>

© IEC 2006 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

XA

For price, see current catalogue

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms, definitions and abbreviations	8
4 Performance requirements	10
4.1 General	10
4.2 Purpose	11
4.3 Operational requirements	11
4.4 Data selection and security	13
4.5 Continuity of operation	14
4.6 Data items to be recorded	15
5 Technical characteristics	18
5.1 Co-relation in date and time	18
5.2 Particular design requirements for the protective capsule.....	18
5.3 Location beacon(s) for the protective capsule.....	19
5.4 Survivability of recorded data.....	20
5.5 Information to be included in the manufacturer's documentation.....	20
5.6 Bridge audio specifications.....	21
5.7 Communications audio.....	22
5.8 Radar data – post-display selection.....	23
6 Methods of testing and required test results.....	24
6.1 General.....	24
6.2 Data items to be recorded.....	31
Annex A (informative) IEC 61162 sentence formats	47
Annex B (informative) Cross-references between VDR and S-VDR.....	48
Annex C (informative) SN/Circ.246 Recommended means for extracting stored data from voyage data recorders (VDRs) and simplified voyage data recorders (S-VDRs) for investigation authorities.....	49
Annex D (informative) Mandatory alarms	50
Annex E (informative) Requirement/test – cross-references	52
Bibliography.....	54
Figure 1 – Test set-up block diagram	39
Figure 2 – Comparison of images	42
Table 1 – Bridge audio, signal to noise measurements	33
Table 2 – Bridge audio, signal to noise and distortion (SINAD) measurements.....	34
Table 3 – Communications audio, signal to no-signal measurements.....	36
Table 4 – Communications audio, signal to noise and distortion (SINAD) measurements	37
Table 5 – Intersection colours of test images 1 and 2.....	41

Table A.1 – References in this standard	47
Table B.1 – Subject list and clauses	48
Table D.1 – IMO instrument: SOLAS Chapter II-1	50
Table D.2 – IMO instrument: SOLAS Chapter II-2	51
Table D.3 – IMO instrument: Resolution A.481	51
Table E.1 – Subject list and clauses	52

Withdrawing

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

IEC 61996-2:2006

<https://standards.iteh.ai/catalog/standards/iec/61996-2-2006>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND RADIOCOMMUNICATION
EQUIPMENT AND SYSTEMS –
SHIPBORNE VOYAGE DATA RECORDER (VDR) –****Part 2: Simplified voyage data recorder (S-VDR) –
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 61996-2 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This standard cancels and replaces IEC PAS 61996-2 published in 2005. This first edition constitutes a technical revision and additionally incorporates new IMO recommendations on means for extracting data from the S-VDR.

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

FDIS	Report on voting
80/430/FDIS	80/439/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.

IEC 61996 consists of the following parts under the general title *Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR)*:

Part 1: Performance requirements, methods of testing and required test results

Part 2: Simplified voyage data recorder (S-VDR) – Performance requirements, methods of testing and required test results.

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.

IEC 61996-2:2006

<https://standards.iteh.ai/standards/iec/100508f4-48e7-4ab2-957d-6e8889c38791/iec-61996-2-2006>

INTRODUCTION

The S-VDR has been introduced by IMO for fitting to existing ships as a simplified alternative to the voyage data recorder (VDR) which is required for all new ships.

This part of IEC 61996 provides information on the testing requirements for S-VDR as defined in IMO performance standard MSC.163(78).

The specification for S-VDR differs significantly from that for VDR in two areas:

- a) the requirements for monitoring certain sensors are reduced when the data is not provided in IEC 61162 format, and
- b) the requirements for the protective S-VDR capsule are different from the VDR capsule, both for the fixed and float-free versions.

Annex B provides a cross-reference between this standard and IEC 61996-1 to aid test houses who may already have test results for VDRs which are being submitted as S-VDRs.

Subsequent to publishing the performance standard for S-VDR, MSC.163(78), in 2004, the IMO sub-committee on Safety of Navigation (NAV) at its fifty-first session in June 2005, discussed the issue of download and playback of information. Recognising that after an accident there is a need for investigators to be able to download the stored data and playback the information from VDRs/S-VDRs without delay, the sub-committee agreed on recommended means for extracting stored data for investigation authorities as SN/Circ.246. This Circular is reproduced as Annex C and its recommendations are referenced in this standard.

(<https://standards.iteh.ai>)
Document Preview

IEC 61996-2:2006

<https://standards.iteh.ai/doc/standards/iec/100508f4-48e7-4ab2-957d-6e8889c38791/iec-61996-2-2006>

WITHDRAWN

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – SHIPBORNE VOYAGE DATA RECORDER (VDR) –

Part 2: Simplified voyage data recorder (S-VDR) – Performance requirements, methods of testing and required test results

1 Scope

This part of IEC 61996 specifies the minimum performance requirements, technical characteristics and methods of testing, and required test results, for simplified shipborne voyage data recorders (S-VDRs) as required by IMO MSC.163(78). It takes into account 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 standard takes precedence.

NOTE All text of this standard, whose wording is identical to that of IMO MSC.163(78) or A.861(20) is printed in *italics*, and the Resolution and associated performance standard paragraph numbers are indicated in brackets.

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 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60268-16:2003, *Sound system equipment – Part 16: Objective rating of speech intelligibility by speech transmission index*

IEC 61672-1:2002, *Electroacoustics – Sound level meters – Part 1: Specifications*

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

IEC 61097-2:2002, *Global maritime distress and safety system (GMDSS) – Part 2: COSPAS SARTS EPIRB – Satellite emergency position-indicating radio beacon operating on 406 MHz – Operational and performance requirements, methods of testing and required test results*

IEC 61097-7:1996, *Global maritime distress and safety system (GMDSS) – Part 7: Shipborne VHF radiotelephone transmitter and receiver – Operational and performance requirements, 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*

IEC 61260:1995, *Electroacoustics – Octave-band and fractional-octave-band filters*

IMO A.658(16): *Use and fitting of retro-reflective materials on life-saving appliances*

IMO A.662(16): *Performance standards for float-free release and activation arrangements for emergency radio equipment*

IMO 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*

IMO A.810(19): *Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz*

IMO A.830(19): *Code on alarms and indicators*

IMO A.861(20): *Performance standards for shipborne voyage data recorders (VDRs)*

IMO MSC.81(70): *Testing of life saving appliances*

IMO MSC.163(78): *Performance standards for shipborne simplified voyage data recorders (S-VDR).*

IMO:1974, *International Convention for the Safety of Life at Sea (SOLAS), as amended*

ITU-R M.633-3:2004, *Transmission characteristics of a satellite emergency position-indicating radiobeacon (satellite EPIRB) system operating through a low polar-orbiting satellite system in the 406 MHz band*

Eurocae: ED56A Amendment 1 – *Minimum operational performance specification (MOPS) for cockpit voice recorder system*

VESA:1996, *Video electronics standards association – Discrete monitor timings standard 1.0, Revision 0.7 (DMT)*

SAE AS 8045:1988, *Engineering Society for advancing mobility land sea air and space – Minimum performance standard for underwater locating devices – acoustic-self-powered*

3 Terms, definitions and abbreviations

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

3.1 Definitions

3.1.1

activation of a suitable alarm

mutable audible alarm and persistent visual indication, given according to the requirements of IMO A.830(19) but with an audible level in the range of 55 dBA to 65 dBA

3.1.2

combined EPIRB/S-VDR capsule

a single unit which meets all the requirements of a satellite EPIRB (as required by the carriage requirements of SOLAS IV) and all the requirements of a S-VDR (as required by the carriage requirements of SOLAS V)

3.1.3**bridge work station**

position at which a person is expected to be when performing one of the normal bridge duties at, for example, the following work stations:

- centre line conning
- bridge wing(s)
- main radar
- chart table
- helms
- communication

3.1.4**data**

any item of information received by the S-VDR for recording, including numerical values, text and audio or radar signals, except where specifically stated or the context dictates otherwise

3.1.5**dedicated reserve power source** (MSC.163(78) 4.5)

secondary battery, with suitable automatic charging arrangements, dedicated solely to the S-VDR, of sufficient capacity to operate it as required by 4.5.3

3.1.6**final recording medium** (MSC.163(78) 4.3)

any item of hardware on which the data is recorded such that access to it would enable the data to be recovered and played back by use of suitable equipment

3.1.7**playback equipment** (MSC.163(78) 4.4)

any equipment, compatible with the recording medium and the format used during recording, employed for recovering the data. It includes also the display or presentation hardware and software that is appropriate to the original data source equipment

3.1.8**recorder (S-VDR)** (MSC.163(78) 4.1)

complete system, including any items required to interface with the sources of input data, for processing and encoding the data, the final recording medium in its capsule, the power supply and dedicated reserve power source

3.1.9**resolution**

smallest detectable increment between two values

3.1.10**sensor** (MSC.163(78) 4.2)

any unit external to the S-VDR to which the S-VDR is connected and from which it obtains data to be recorded

3.2 Abbreviations

AIS	Automatic identification system
ALR	IEC 61162 sentence: Set alarm state
DPT	IEC 61162 sentence: Depth relative to the transducer
DTM	IEC 61162 sentence: Geodetic datum reference
EPFS	Electronic position fixing system
EPIRB	Emergency position-indicating radio beacon

EUT	Equipment under test
GMDSS	Global maritime distress and safety system
GNS	IEC 61162 sentence: GNSS fix data
GNSS	Global navigation satellite system
HDG	IEC 61162 sentence: Magnetic compass heading
HDT	IEC 61162 sentence: True heading
HTC	IEC 61162 sentence: Heading/track control command
HTD	IEC 61162 sentence: Heading/track control data
IMO	International Maritime Organization
INS	Integrated navigation system
ITU	International Telecommunication Union
MWV	IEC 61162 sentence: Wind speed and angle
OOW	Officer of the watch
ROV	Remotely operated vehicle
RPM	IEC 61162 sentence: Revolutions per minute
RSA	IEC 61162 sentence: Rudder sense angle
SAR	Search and rescue
SENC	System electronic navigation chart
SINAD	Signal to noise and distortion
STI	Sound transmission index
TXT	IEC 61162 sentence: Text message
UTC	Coordinated universal time
VDM	IEC 61162 sentence: AIS – VHF data link message
VDO	IEC 61162 sentence: AIS – VHF data link own-vessel message
VHF	Very high frequency
VBW	IEC 61162 sentence: Dual ground water speed
XDR	IEC 61162 sentence: Transducer measurements
ZDA	IEC 61162 sentence: Time and date

NOTE For IEC 61162 sentences, see Annex A.

4 Performance requirements

Performance requirements described in the following clauses are specified, where relevant, by reference to the numbered paragraphs of IMO MSC.163(78), if not otherwise indicated.

4.1 General

Requirements specified in this standard are only relevant to equipment designated as an S-VDR and required to meet IMO MSC.163(78).

For equipment designated as a VDR to IMO Performance standards defined in resolution A.861(20) refer to IEC 61996-1.

A table of cross-references between this standard and IEC 61996-1 is included in Annex B.

4.2 Purpose

(MSC.163(78) 1)

The purpose of a simplified voyage data recorder (S-VDR) is to maintain a store, in a secure and retrievable form, of information concerning the position, movement, physical status, command and control of a vessel over the period leading up to, and following, an incident having an impact thereon. Information contained in a S-VDR shall be made available to both the Administration and the shipowner. This information is for use during any subsequent investigation to identify the cause(s) of the incident.

4.3 Operational requirements

(MSC.163(78) 5)

4.3.1 Design and construction

(MSC.163(78) 5.1.4)

The design and construction, which shall be in accordance with the requirements of resolution A.694(17) and international standards acceptable to the Organization¹, shall take special account of the requirements for data security and continuity of operation as detailed in IMO MSC.163(78) 5.2 and 5.3 and in this standard 4.3, 4.4 and 4.5.

4.3.2 Maintenance of sequential records

(MSC.163(78) 5.1.1)

The S-VDR shall continuously maintain sequential records of pre-selected data items relating to the status and output of the ship's equipment, and command and control of the ship, referred to in 4.6.

4.3.3 Co-relation in date and time

(MSC.163(78) 5.1.2, 5.4.1)

To permit subsequent analysis of factors surrounding an incident, the method of recording shall ensure that the various data items can be co-related in date and time during playback on suitable equipment.

The recording method shall be such that the timing of all other recorded data items can be derived on playback with a resolution sufficient to reconstruct the history of an incident in detail (see 4.6.1).

4.3.4 Protective capsule

4.3.4.1 Final recording medium

(MSC.163(78) 5.1.3)

The final recording medium shall be installed in a protective capsule. The capsule may be designed to remain fixed to the ship in all circumstances. Alternatively, it may be designed to float free automatically if the ship sinks (see 5.2). The fixed capsule may also comply with the requirements of IEC 61996-1.

4.3.4.1.1 Fixed capsule

(MSC.163(78) 5.1.3.2)

The fixed type protective capsule shall comply with the requirements set out in resolution A.861(20) and this standard with the exception of the resulting requirements for withstanding penetration.

¹ Refer to IEC 60945: *Maritime navigation and radiocommunication equipment and systems – General requirements, methods of testing and required test results.*

4.3.4.1.2 Float-free capsule

(MSC.163(78) 5.1.3.3)

In addition to meeting the requirements of this standard, *the float-free type protective capsule* shall:

- a) *be so constructed as to comply with the requirements specified in resolutions A.810(19) and A.662(16);*
- b) *be fitted with means to facilitate grappling and recovery* and be designed with due regard to preventing it from being fouled during release;
- c) *be so constructed as to minimise the risk of loss or damage to the final recording medium during recovery operations; and*
- d) *be capable of transmitting an initial locating signal and a further locating and homing signal for at least 48 hours over a period of not less than 7 days/168 hours.*

4.3.4.2 Access to capsule

(MSC.163(78) 5.1.3.1.1) (See also 5.2)

The capsule shall *be capable of being accessed following an incident but secure against tampering.*

The capsule shall enclose the final recording medium. The final recording medium shall not be accessible by standard operating procedures during normal ship operations.

A means shall be provided to retrieve stored information via an external device without opening the protective capsule.

4.3.4.3 Location and identification

(See also 5.2)

4.3.4.3.1 Location

(MSC.163(78) 5.1.3.1.4) (See also 5.3)

The capsule shall be fitted with an appropriate device to aid location.

4.3.4.3.2 Visibility and marking

(MSC.163(78) 5.1.3.1)

The capsule, together with any outermost shell, shall *be of a highly visible colour, marked with retro-reflective materials* that comply with the relevant requirements of IMO A.658(16) and marked with the legend:

“VOYAGE DATA RECORDER – DO NOT OPEN –
REPORT TO AUTHORITIES”

4.3.5 Assessment of recording medium

Where the storage medium cannot be readily and reliably inspected after an incident, means shall be provided to enable an accident investigator to determine, prior to an attempted replay, whether the storage medium has been subjected to an excessive level of heat, where the survival of the stored data may be in doubt.