

INTERNATIONAL STANDARD

**Maritime navigation and radiocommunication equipment and systems –
Shipborne voyage data recorder (VDR) –
Part 1: Voyage data recorder (VDR) – Performance requirements, methods of
testing and required test results**

IEC 61996-1:2007

<https://standards.iteh.ai/catalog/standards/iec/78d5710f-18bb-4bb6-9320-cc4e2ba66ecb/iec-61996-1-2007>



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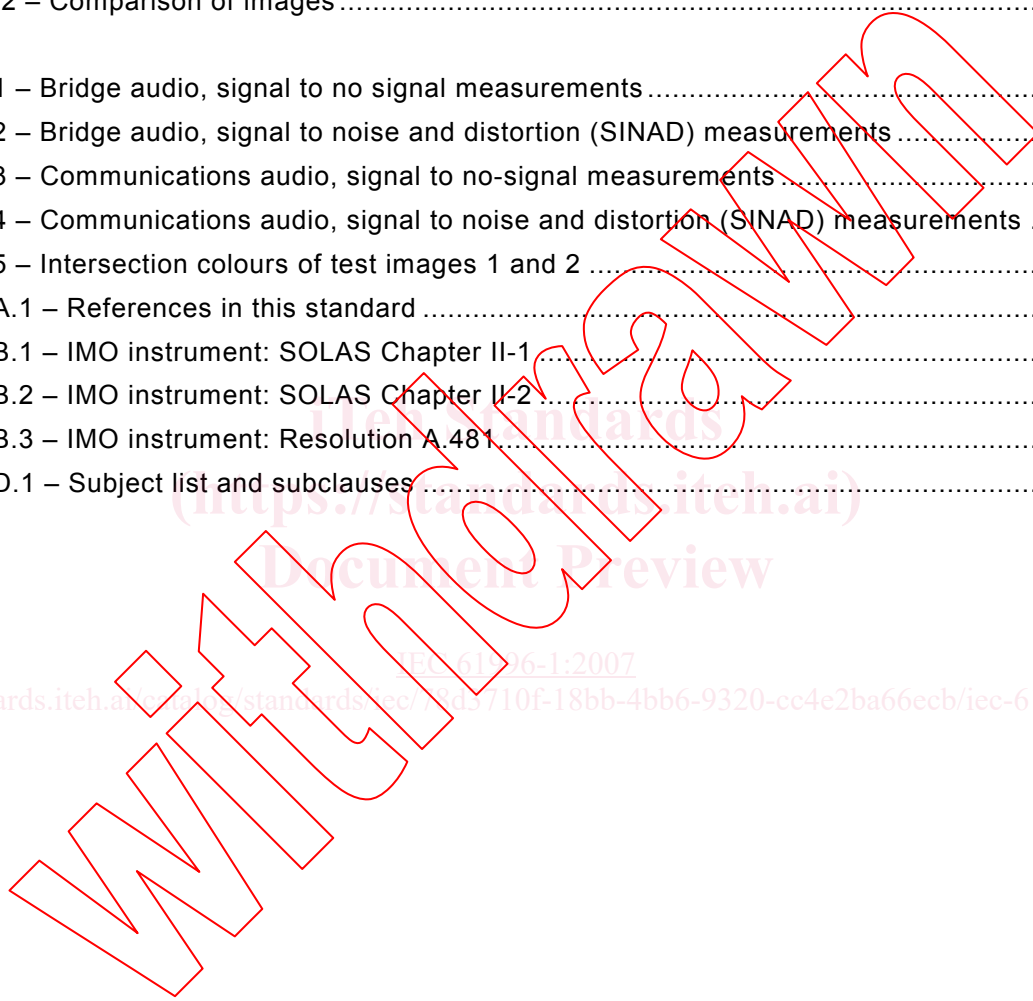
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CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references.....	7
3 Terms, definitions and abbreviations.....	8
3.1 Definitions.....	8
3.2 Abbreviations.....	9
4 Performance requirements.....	10
4.1 General.....	10
4.2 Purpose.....	10
4.3 Operational requirements.....	10
4.3.1 Design and construction.....	10
4.3.2 Maintenance of sequential records.....	11
4.3.3 Co-relation in date and time.....	11
4.3.4 Protective capsule.....	11
4.3.5 Interfaces.....	12
4.4 Data selection and security.....	12
4.4.1 Selection of data items.....	13
4.4.2 Configuration data.....	13
4.4.3 Resistance to tampering.....	13
4.4.4 Recording integrity.....	13
4.5 Operation.....	14
4.5.1 Recording and saving of data.....	14
4.5.2 Power source.....	14
4.5.3 Dedicated reserve power source.....	14
4.5.4 Recording period and duration.....	14
4.6 Data items to be recorded.....	15
4.6.1 Date and time.....	15
4.6.2 Ship's position.....	15
4.6.3 Speed.....	15
4.6.4 Heading.....	15
4.6.5 Bridge audio.....	15
4.6.6 Communications audio.....	16
4.6.7 Radar data – post-display selection.....	16
4.6.8 Echo sounder.....	16
4.6.9 Main alarms.....	16
4.6.10 Rudder order and response.....	16
4.6.11 Engine order and response.....	16
4.6.12 Hull openings (doors) status.....	16
4.6.13 Watertight and fire door status.....	17
4.6.14 Accelerations and hull stresses.....	17
4.6.15 Wind speed and direction.....	17
5 Technical characteristics.....	17
5.1 Co-relation in date and time.....	17
5.2 Particular design requirements for the protective capsule.....	17
5.3 Location beacon(s) for the protective capsule.....	17
5.4 Survivability of recorded data.....	18

5.4.1	Long-term retention under normal conditions	18
5.4.2	Survival following an incident	18
5.5	Information to be included in the manufacturer's documentation	18
5.5.1	Installation guidelines	18
5.5.2	Operation and maintenance manual	19
5.5.3	Information for use by an investigation authority	19
5.6	Bridge audio specifications	19
5.6.1	Input interface	19
5.6.2	Reference signal	19
5.6.3	Audio frequency response	19
5.6.4	Quality index	20
5.6.5	Audio noise level – signal to noise and distortion	20
5.7	Communications audio	20
5.7.1	Input interfaces	20
5.7.2	Reference signal	20
5.7.3	Audio frequency response	20
5.7.4	Quality index	20
5.7.5	Audio noise level – signal to no signal	21
5.7.6	Audio noise level – signal to noise and distortion (SINAD)	21
5.8	Radar data – post-display selection	21
5.8.1	Input interface	21
5.8.2	Image outputs	21
6	Methods of testing and required test results	22
6.1	General	22
6.1.1	Test setup	22
6.1.2	Download and playback equipment	23
6.1.3	Sequence of tests	23
6.1.4	Requirements to be checked by inspection only	23
6.1.5	Environmental test conditions for normal operation	23
6.1.6	Recording duration	24
6.1.7	Reserve power source	24
6.1.8	Recharging of reserve source of power	24
6.1.9	Brief interruption of electrical power	24
6.1.10	System integrity	25
6.1.11	Maintenance of sequential records	25
6.1.12	Co-relation in date and time	25
6.1.13	Design and construction of the protective capsule	25
6.1.14	Selection of data items	28
6.1.15	Power source	28
6.2	Data items to be recorded	28
6.2.1	Date/time – ship's position – speed – heading	28
6.2.2	Bridge audio	28
6.2.3	Communications audio	32
6.2.4	Radar data, post-display selection	35
6.2.5	Echo sounder – main alarms – rudder order and response – engine order and response – hull openings (doors) status – watertight and doors status – acceleration and hull stresses – wind speed and direction	43
6.2.6	Interfaces	44

Annex A (normative) IEC 61162 sentence formats	45
Annex B (informative) Mandatory alarms	46
Annex C (normative) Download and playback equipment for investigating authorities	48
Annex D (informative) Requirement/test – cross references	52
Bibliography	54
Figure 1 – Test set-up block diagram.....	37
Figure 2 – Comparison of images	41
Table 1 – Bridge audio, signal to no signal measurements	31
Table 2 – Bridge audio, signal to noise and distortion (SINAD) measurements	32
Table 3 – Communications audio, signal to no-signal measurements	34
Table 4 – Communications audio, signal to noise and distortion (SINAD) measurements	35
Table 5 – Intersection colours of test images 1 and 2	39
Table A.1 – References in this standard	45
Table B.1 – IMO instrument: SOLAS Chapter II-1	46
Table B.2 – IMO instrument: SOLAS Chapter II-2	47
Table B.3 – IMO instrument: Resolution A.481	47
Table D.1 – Subject list and subclauses	52



INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND RADIOCOMMUNICATION
EQUIPMENT AND SYSTEMS –
SHIPBORNE VOYAGE DATA RECORDER (VDR) –****Part 1: Voyage data recorder (VDR) –
Performance requirements, methods of testing
and required test results**

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International Standard IEC 61996-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This first edition cancels and replaces IEC 61996 published in 2000 and constitutes a technical revision. A new requirement has been added to 4.3.5 for an interface to be used for downloading the stored data to an external computer. This is defined in Annex C which is derived from amendments published by the IMO in resolution MSC.214(81). An optional LAN interface for connection to radar has been added in 5.8. Some corrections to the text have also been made. Subclause 4.3.5 (Assessment of final recording medium) has been renumbered as 4.3.4.2 and subclause 4.3.6 (Interfaces) has been renumbered as 4.3.5.

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

CDV	Report on voting
80/470/CDV	80/499/RVC

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 the IEC 61996 series, under the general title *Maritime navigation and radiocommunication equipment and systems – Shipborne voyage data recorder (VDR)*, 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.

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

Part 1: Voyage data recorder (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 shipborne voyage data recorder (VDR) installations as required by Chapter V 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 standard takes precedence.

This standard incorporates the applicable parts of the performance standards included in IMO Resolutions A.861(20) and MSC.214(81) Annex 1.

NOTE All text of this standard, whose wording is identical to that of IMO Resolution A.861, 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 60945:2002, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61097-2, *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*

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

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 A.689:1991, *Testing of life saving appliances*

IMO MSC.214(81): Annex 1: *Amendments to the recommendation on performance standards for shipborne voyage data recorders (VDRs) (Resolution A.861(20))*

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

ITU-R M.633-1:1990, *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 (DMTS)*

SAE AS8045:1988, *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

3.1 Definitions

3.1.1

activation of a suitable alarm

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

3.1.2

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
- helmsman
- communication

3.1.3**data**

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

3.1.4**dedicated reserve power source** (A.861/4.5)

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

3.1.5**final recording medium** (A.861/4.3)**(FRM)**

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

3.1.6**playback equipment** (A.861/4.4)

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. Playback equipment is not normally installed on a ship and is not regarded as part of a VDR within this standard

3.1.7**recorder** (A.861/4.1)**(VDR)**

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

3.1.8**resolution**

smallest detectable increment between two values

3.1.9**sensor** (A.861/4.2)

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

3.2 Abbreviations

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
EUT	Equipment under test
GMDSS	Global maritime distress and safety system
GNS	IEC 61162 sentence: GNSS fix data
GNSS	Global navigation satellite system
HTC	IEC 61162 sentence: Heading/track control command
HTD	IEC 61162 sentence: Heading/track control data
HDG	IEC 61162 sentence: Magnetic compass heading
HDT	IEC 61162 sentence: True heading
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
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

4.1 General

Performance requirements described in this Clause are specified by reference to the numbered paragraphs of IMO Resolution A.861.

4.2 Purpose

(A.861/1)

The purpose of a Voyage Data Recorder (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 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

(A.861/5)

4.3.1 Design and construction

(A.861/5.1.4)

The design and construction, which shall be in accordance with the requirements of resolution A.694(17) and international standards acceptable to the International Maritime Organization (IMO), shall take special account of the requirements for data security and continuity of operation as detailed in 4.4 and 4.5.

4.3.2 Maintenance of sequential records

(A.861/5.1.1)

The 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

(A.861/5.1.2, 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 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

(A.861/5.1.3)

4.3.4.1 Type of protective capsule

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).

4.3.4.2 Assessment of final recording medium

NOTE This subclause was numbered 4.3.5 in IEC 61996.

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.

4.3.4.3 Access to capsule

(A.861/5.1.3.1)

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.

4.3.4.4 Recovery

(A.861/5.1.3.2)

The capsule shall maximise the probability of survival and recovery of the final recorded data after any incident (see 5.2).

4.3.4.5 Structure of the capsule

The capsule containing the final recording medium shall be designed to be installed on the external deck of the vessel. It 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 capsule shall be designed to protect the stored data against the following (see 5.2):

- shock;
- penetration;
- fire;
- deep-sea pressure and immersion.

4.3.4.6 Visibility and marking

(A.861/5.1.3.3)

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

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

4.3.4.7 Location

(A.861/5.1.3.4)

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

Both fixed and float free designs shall include an acoustic underwater beacon. In the case of a protective capsule intended for float-free operation, it shall also have a suitable radio transmitter, and a light (see 5.2).

4.3.5 Interfaces

(A.861/7)

NOTE This subclause was numbered 4.3.6 in the first edition.

4.3.5.1 Compliance with IEC 61162

Interfacing to the various sensors required shall be in accordance with the relevant international interface standard, IEC 61162 series, where possible (see Annex A).

The interfaces for bridge audio, communications audio and radar are defined in 5.6.1, 5.7.1 and 5.8.1 respectively.

Any interface units which may be required to convert non-IEC 61162 signals, shall conform to the requirements of IEC 60945.

In all cases, any connection to any item of the ship's equipment shall be such that the operation of that equipment suffers no deterioration, even if the VDR system develops faults.

NOTE No loss of steering or propulsion is allowed.

4.3.5.2 Data interface

The VDR shall provide an interface for downloading the stored data to an external computer (see Annex C).

4.4 Data selection and security

(A.861/5.1.4)