
Maritime navigation and radiocommunication equipment and systems - Integrated Bridge Systems (IBS) - Operational and performance requirements, methods of testing and required test results (IEC 61209:1999)

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English version

**Maritime navigation and radiocommunication equipment and systems
Integrated bridge systems (IBS)
Operational and performance requirements, methods of testing
and required test results
(IEC 61209:1999)**

Matériels et systèmes de navigation
et de radiocommunication maritimes
Systèmes intégrés de passerelle
Exigences d'exploitation et de
fonctionnement, méthodes d'essai et
résultats d'essai exigés
(CEI 61209:1999)

Navigations- und Funkkommunikations-
geräte und -systeme für die
Seeschifffahrt
Integrierte Brückensysteme (IBS)
Betriebs- und Leistungsanforderungen,
Prüfverfahren und geforderte
Prüfergebnisse
(IEC 61209:1999)

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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.

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 80/199/FDIS, future edition 1 of IEC 61209, 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 61209 on 1999-08-01.

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) 2000-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-08-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A, D and ZA are normative and annexes B, C and E are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61209:1999 was approved by CENELEC as a European Standard without any modification.

In the official version, for annex A, Additional IMO requirements, the following notes have to be added for the standards indicated:

- [SIST EN 61209:2004
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- IEC 60872-1 NOTE: Harmonized as EN 60872-1:1998 (not modified).
 - IEC 60936 NOTE: Harmonized as EN 60936:1993 (not modified).
 - IEC 60936-2 NOTE: Harmonized as EN 60936-2:1999 (not modified).
 - IEC 61023 NOTE: Harmonized as EN 61023:1993 (not modified).
 - IEC 61075 NOTE: Harmonized as EN 61075:1993 (modified).
 - IEC 61097-1 NOTE: Harmonized as EN 61097-1:1993 (not modified).

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

- IEC 60417 NOTE: Harmonized as EN 60417:1999 (series; not modified).
 - IEC 60447 NOTE: Harmonized as EN 60447:1993 (not modified).
 - IEC 60529 NOTE: Harmonized as EN 60529:1991 (not modified).
 - IEC 60651 NOTE: Harmonized as EN 60651:1994 (not modified).
 - IEC 60812 NOTE: Harmonized as HD 485 S1:1987 (not modified).
-

Annex ZA (normative)

**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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	1996	Maritime navigation and radiocommunication equipment and systems General requirements - Methods of testing and required test results	EN 60945	1997
IEC 61162	series	Maritime navigation and radiocommunication equipment and systems Digital interfaces	EN 61162	series
ISO 8468	1990	Ship's bridge layout and associated equipment - Requirements and guidelines	EN ISO 8468	1994
ISO 9000	series	Quality management and quality assurance standards	EN ISO 9000	series
ISO 9001	1994	Quality systems - Model for quality assurance in design/ development, production, installation and servicing	EN ISO 9001	1994
ISO 9002	1994	Quality systems - Model for quality assurance in production, installation and servicing	EN ISO 9002	1994
	1997	IMO International Convention for the Safety of Life at Sea (SOLAS)	-	-
IMO A.686	1991	Code on alarms and indicators	-	-
IMO A.823	1995	Performance standards for automatic radar plotting aids (ARPAs)	-	-
IMO A.830	1995	Code on alarms and indicators	-	-
IMO 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	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IMO MSC. 64(67)	1996	Performance standards for integrated bridge systems (IBS)	-	-
IMO MSC/Circular 566	1991	Provisional guidelines on the conduct of trials in which the officer of the navigational watch acts as the sole look-out in periods of darkness	-	-
IACS UR N1	1992	Unified requirements for one man bridge operated (OMBO) ships	-	-

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INTERNATIONAL STANDARD

IEC 61209

First edition
1999-04

Maritime navigation and radiocommunication equipment and systems – Integrated bridge systems (IBS) – Operational and performance requirements, methods of testing and required test results

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*Matériels et systèmes de navigation et de
radiocommunication maritimes –*

Systèmes intégrés de passerelle –

*Exigences d'exploitation et de fonctionnement,
méthodes d'essai et résultats d'essai exigés*

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND RADIOCOMMUNICATION
EQUIPMENT AND SYSTEMS –**
**Integrated bridge systems (IBS) –
Operational and performance requirements,
methods of testing and required test results**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61209 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

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

FDIS	Report on voting
80/199/FDIS	80/221/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.

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

Annexes B, C and E are for information only.

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

INTRODUCTION

In 1991, the International Electrotechnical Commission (IEC) technical committee 80 (TC 80) observed that, while considerable work was progressing to develop standards for the individual systems or subsystems of a modern ship's bridge, no international organization had yet assigned the task of integrating these individual systems or co-ordinating the individual standards.

The normal progression would be the development of an International Maritime Organization (IMO) safety-related circular or assembly resolution, to be followed by assignment for the development of the IEC standard to a TC working group (WG).

IEC TC 80 felt that the development of an integrated bridge system was so important that they should not wait any longer before embarking on the development of this International Standard. They therefore assigned the task to TC 80, WG 9, Integrated bridge systems (IBS) for ships, and informed IMO of this work programme.

WG 9 co-ordinated their work closely with similar activity within the IMO subcommittees on Safety of Navigation (NAV), Design and Equipment, Radiocommunications, Search and Rescue, and other working groups of TC 80, the activities of the International Association of Classification Societies (IACS), as well as individual classification societies, and national initiatives. Many of the working group members actively participated in one or more of these other groups.

IEC TC 80 submitted the material contained in the requirements section of this standard to IMO with a proposal that it could provide the basis for an international agreement on the subject of integrated bridges. The IMO Maritime Safety Committee (MSC), at its 67th session, agreed to the essence of this proposal and adopted resolution MSC.64(67), annex 1, performance standards for integrated bridge systems (IBS).

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The aims of this standard are to provide recommendations for the design, manufacture, integration and testing of:

- stand-alone equipment;
- networks;
- integration units; and
- multifunction displays

in connection with the aspect of interaction (integration) within a bridge.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –

Integrated bridge systems (IBS) – Operational and performance requirements, methods of testing and required test results

1 Scope

This International Standard specifies the minimum requirements for the design, manufacture, integration and testing of integrated bridge systems (IBS) to comply with IMO resolution MSC.64(67), annex 1, of the International Maritime Organization (IMO), and other relevant IMO performance standards, in order to meet the functional requirements contained in applicable IMO instruments, not precluding multiple usage of equipment and modules or the need for duplication.

Reference is made, where appropriate, to IMO resolution MSC.64(67) annex 1, and text in this standard, the meaning of which is identical to that in the IMO resolution, is printed in *italics* and identified by the resolution paragraph numbers in brackets.

This standard aims to increase safe and efficient ship management by suitably qualified personnel taking care of, *inter alia*, uninterrupted functional availability of systems, and of human factors.

Operation of the IBS may conflict with the requirements for individual equipment. Such conflicts may imply modification to, or deviation from, individual equipment standards or the carriage of additional equipment. This standard highlights those deviations as well as their justification. Existing standards for individual equipment are not addressed.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, these publications do not apply. However parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative documents referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60945:1996, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162 (all parts), *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*

ISO 8468:1990, *Ship's bridge layout and associated equipment – Requirements and guidelines*

ISO 9000 (all parts), *Quality management and quality assurance standards*

ISO 9001:1994, *Quality systems – Model for quality assurance in design, development, production, installation and servicing*

ISO 9002:1994, *Quality systems – Model for quality assurance in production, installation and servicing*

IMO International Convention for the Safety of Life at Sea (SOLAS):1997, Consolidated edition

IMO A.686:1991, *Code on alarms and indicators*

IMO A.823:1995, *Performance standards for automatic radar plotting aids (ARPAs)*

IMO A.830:1995, *Code on alarms and indicators* (amendments to IMO 686: 1991)

IMO A.694:1991, *General requirements for shipborne radio equipment forming part of the global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO MSC.64(67):1996, Annex 1 – *Performance standards for integrated bridge systems (IBS)*

IMO MSC.64(67):1996, Annex 4 – Amendments to A.477:1981, *Performance standards for radar equipment*

IMO MSC/Circular 566:1991, *Provisional guidelines on the conduct of trials in which the officer of the navigational watch acts as the sole look-out in periods of darkness*

IACS UR N1:1992, *Unified requirements for one man bridge operated (OMBO) ships*

NOTE – Additional IMO requirements which may be applicable to IBS are listed in annex A.

3 Definitions and abbreviations SIST EN 61209:2004

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3.1 Definitions

For the purpose of this standard, the following definitions apply.

3.1.1

configuration of complete system

all operational functions of the IBS as installed

3.1.2

configuration available

operation(s) allocated to and available at each workstation

3.1.3

configuration in use

operation(s) and task(s) currently in use at each workstation

3.1.4

connectivity

a complete data link and the presence of valid data

3.1.5

essential functions

functions related to determination, execution and maintenance of safe course, speed and position of the ship in relation to the waters, traffic and weather conditions (passage execution)

Such functions normally include, but are not limited to,

- route planning;
- navigation;
- collision avoidance;
- manoeuvring;
- docking;
- monitoring of internal safety systems;
- external and internal communication related to safety in bridge operation and distress situations;
- ship stability

3.1.6 essential information

that information which is necessary for the monitoring and control of essential functions

3.1.7 functionality

ability to perform an intended function. The performance of a function normally involves a system of displays, controls and instrumentation

3.1.8 IMO requirements

IMO conventions, regulations, resolutions, codes, recommendations, guidelines, circulars and related ISO and IEC standards

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3.1.9

(1.1, 2) **integrated bridge system (IBS)**

any combination of systems which are interconnected in order to allow centralized access to sensor information or command/control from workstations to perform two or more of the following operations:

- *passage execution;*
- *communications;*
- *machinery control;*
- *loading, discharging and cargo control;*
- *safety and security.*

Management operations may also be performed within the IBS (see annex C).

3.1.10 integrity

ability of a system to provide users with accurate, timely, complete and unambiguous information and warnings within a specified time when the system shall not be used

3.1.11 latency

time interval between an event and the resulting information, including time for processing, transmission and reception

3.1.12 multifunction display

a single visual display unit which can present, either simultaneously or through a series of selectable pages, information from more than one operation of an IBS

3.1.13

part

an individual subsystem, equipment or module

3.1.14

performance check

a representative selection of short qualitative tests, to confirm correct operation of essential functions of the IBS

3.1.15

sensor

a device which provides information to or is controlled or monitored by the IBS

A compilation of definitions of integration related terms is contained in annex E.

3.2 Abbreviations

Abbreviations used in this standard:

ARPA	Automatic radar plotting aid
GMDSS	Global maritime distress and safety system
IACS	International Association of Classification Societies
IBS	Integrated bridge system
IEC	International Electrotechnical Commission
IMO	International Maritime Organization
ISO	International Organization for Standardization
MMI	Man-machine-interface SIST EN 61209:2004
MSC	IMO Maritime Safety Committee
NAV	IMO Subcommittee on Safety of Navigation
SOLAS	(International Convention for the) Safety of Life at Sea
SSD	System specification document
VDU	Visual display unit

Additional relevant abbreviations are found in annex B.

4 General requirements

4.1 (3.1) General

4.1.1 (3.1.1) *The IBS shall comply with all applicable IMO requirements as contained in clause 2 and annex A of this standard. Parts executing multiple operations shall meet the requirements specified for each individual function they can control, monitor or perform. By complying with the provisions of this standard, all essential functions remain available in the event of a single failure. Therefore, means for operation independent of the IBS shall not be required.*

4.1.2 (3.1.2) *Each part of an IBS shall meet the relevant requirements of IMO resolution A.694(17) as detailed in IEC 60945. In consequence the IBS is in compliance with these requirements without further environmental testing to IEC 60945.*

4.1.3 Where implemented, passage execution shall not be interfered with by other operations.

4.1.4 (3.1.3) *A failure of one part shall not affect the functionality of other parts except for those functions directly dependent upon the information from the defective part.*

4.2 (3.2) Integration

The IBS shall provide functional integration meeting the following requirements.

4.2.1 (3.2.1) *The functionality of the IBS shall ensure that operations are at least as effective as with stand-alone equipment.*

4.2.2 (3.2.2) *Continuously displayed information shall be reduced to the minimum necessary for safe operation of the ship. Supplementary information shall be readily accessible.*

4.2.3 Integrated display and control functions shall adopt a consistent man-machine-interface (MMI) philosophy and implementation. Particular consideration shall be paid to

- symbols;
- colours;
- controls;
- information priorities;
- layout.

4.2.4 (3.2.3) *Where multifunction displays and controls are used to perform functions necessary for safe operation of the ship they shall be duplicated and interchangeable.*

4.2.5 (3.2.4) *It shall be possible to display the complete system configuration, the available configuration and the configuration in use.*

4.2.6 Any unintentional change of a configuration shall be brought to the immediate attention of the user. An unintentional change of the configuration in use shall, in addition, activate an audible and visual alarm.

4.2.7 (3.2.5) *Each part to be integrated shall provide details of its operational status and the latency and validity of essential information. Means shall be provided within the IBS to make use of this information.*

4.2.8 (3.2.6) *An alternative means of operation shall be provided for essential functions.*

4.2.9 For integrated machinery control, it shall be possible for all machinery essential for the safe operation of the ship to be controlled from a local position.

4.2.10 (3.2.7) *An alternative source of essential information shall be provided. The IBS shall identify loss of either source.*

4.2.11 (3.2.8) *The source of information (sensor, result of calculation or manual input) shall be displayed continuously or on request.*

4.3 (3.3) Data exchange

4.3.1 (3.3.1) *Interfacing within the IBS and to an IBS shall comply with IEC 61162, as applicable.*

4.3.2 (3.3.2) *Data exchange shall be consistent with safe operation of the ship. The manufacturer shall specify in the system specification document (SSD) the maximum permissible latency for each function, considering the use of fast control loop, normal control loop, essential information and other information.*