

Electrical installations in ships —

Part 101: Definitions and general requirements

ICS 47.020.60

National foreword

This British Standard reproduces verbatim IEC 60092-101:1994 including Amd 1:1995 and Corrigendum No 1:1996 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee JPEL/18, Electrical installations of ships and of mobile and fixed offshore units, which has the responsibility to:

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Partie 101:
Définitions et prescriptions générales

Electrical installations in ships –

Part 101:
Definitions and general requirements



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 101: Definitions and general requirements

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 cooperation 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.
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- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
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International Standard IEC 92-101 has been prepared by IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This fourth edition cancels and replaces the third edition published in 1980 and constitutes a technical revision.

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

DIS	Report on voting
18(CO)516 18(CO)519	18(CO)537 18(CO)527

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annex A is an integral part of this standard

Annexes B and C are for information only.

INTRODUCTION

IEC 92: *Electrical installations in ships*, forms a series of international standards for electrical installations in sea-going ships, incorporating good practice and co-ordinating, as far as possible, existing rules. These standards form a code of practical interpretation and amplification of the requirements of the International Convention on Safety of Life at Sea, a guide for future regulations which may be prepared and a statement of practice for use by shipowners, shipbuilders and appropriate organizations.

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 101: Definitions and general requirements

Section 1: General

1.1 Scope

This part of IEC 92 is applicable to electrical installations for use in ships.

The definitions and general requirements given in this part are applicable, unless otherwise indicated, to other parts of IEC 92.

1.2 Normative references

The following normative documents contain provisions, which through reference in this text, constitute provisions of this part of IEC 92. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 92 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid normative documents.

IEC 50: *International Electrotechnical Vocabulary (IEV)*

IEC 79: *Electrical apparatus for explosive gas atmospheres*

IEC 79-14: 1984, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in explosive gas atmospheres (other than mines)*

IEC 92-3: 1965, *Electrical installations in ships – Part 3: Cables (construction, testing and installations)*

Amendment 6 (1984)

IEC 92-201: 1980, *Electrical installations in ships – Part 201: System design – General*
Amendment 5 (1990)

IEC 92-301: 1980, *Electrical installations in ships – Part 301: Equipment – Generators and motors*

IEC 92-305: 1980, *Electrical installations in ships – Part 305: Equipment – Accumulator (storage) batteries*
Amendment 1 (1989)

IEC 92-306: 1980, *Electrical installations in ships – Part 306: Equipment — Luminaires and accessories*

IEC 92-352: 1979, *Electrical installations in ships – Part 352: Choice and installation of cables for low-voltage power systems*
Amendment 1 (1987)

IEC 92-502: 1994, *Electrical installations in ships – Part 502: Special features – Tankers*

IEC 92-504: 1994, *Electrical installations in ships – Part 504: Special features – Control and instrumentation*

IEC 112: 1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 167: 1964, *Methods of test for the determination of the insulation resistance of solid insulating materials*

IEC 529: 1989, *Degrees of protection provided by enclosures (IP Code)*

1.3 Definitions

For the purpose of this part of IEC 92, the following definitions apply.

1.3.1 General

The definitions included in this part are those having general application in IEC 92. Definitions applying to particular apparatus or equipment are included in the other parts of IEC 92.

The following definitions indicate the sense in which the expressions defined are used in these standards. For the definition of general terms used in these standards, reference should be made to the *International Electrotechnical Vocabulary* (IEC 50).

1.3.2 appropriate authority: Governmental body and/or classification society with whose rules a ship is required to comply.

1.3.3 ocean-going ship: Any ship not exclusively employed in the navigation of rivers or inland waters.

1.3.4 essential services: Services essential for the navigation, steering or manoeuvring of the ship, or for the safety of human life, or for special characteristics of the ship (for example special services).

1.3.5 accessible (as applied to equipment): An object or device that can be inadvertently touched or approached nearer than a safe distance by any person. It is applied to objects not suitably guarded or insulated.

accessible (as applied to wiring methods): Not concealed.

1.3.6 accessory: Any device, other than a luminaire (see IEC 92-306) associated with the wiring and current-using appliances of an installation; for example, a switch, a fuse, a plug, a socket-outlet, a lampholder, or a junction box.

1.3.7 bond: The connection of non-current-carrying parts to ensure continuity of electrical connection, or to equalize the potential between parts comprising, for example, the armour or lead sheath of adjacent length of cable, the bulkhead, etc. For example bulkhead and cables in a radio-receiving room.

1.3.8 earth: The general mass of the metal hull of the ship.

NOTE – In the U.S.A., "ground" is used instead of "earth".

1.3.9 earthed: Connected to the general mass of the hull of the ship in such a manner as will ensure at all times an immediate discharge of electrical energy without danger.

NOTES

1 A conductor is said to be "solidly earthed" when it is electrically connected to the hull without a fuse-link, switch, circuit-breaker, resistor, or impedance, in the earth connection.

2 In the USA, "grounded" is used instead of "earthed".

1.3.10 basic insulation: Insulation applied to live parts to provide basic protection against electric shock.

NOTE – Basic insulation does not necessarily include insulation used exclusively for functional purposes.

1.3.11 supplementary insulation: Independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation.

1.3.12 double insulation: Insulation comprising both basic insulation and supplementary insulation.

1.3.13 reinforced insulation: A single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in the relevant IEC standard.

NOTE – The term "insulation system" does not imply that the insulation must be one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation.

1.3.14 live: A conductor or circuit is live when a difference of potential exists between it and earth.

1.3.15 section board: A switchgear and controlgear assembly for controlling the supply of electrical power to other section boards, distribution boards, or final subcircuits.

1.3.16 distribution board: An assembly of one or more overcurrent protective devices, arranged for the distribution of electrical power to final subcircuits.

1.3.17 final subcircuit: That portion of a wiring system extending beyond the final overcurrent protective device of a board.

1.3.18 point (in wiring): Any termination of the fixed wiring intended for the attachment of a luminaire or for connecting to the supply a current-using appliance.

1.3.19 safety voltage: A voltage which does not exceed 50 V a.c. r.m.s. between conductors, or between any conductor and earth, in a circuit isolated from the supply by means such as a safety isolating transformer, or convertor with separate windings.

A voltage which does not exceed 50 V d.c. between conductors, or between any conductor and earth, in a circuit which is isolated from higher voltage circuits.

NOTES

- 1 Consideration should be given to the reduction of the limit of 50 V under certain conditions, such as wet surroundings or exposure to heavy seas or where direct contact with live parts is involved.
- 2 The voltage limit should not be exceeded either at full load or no load, but it is assumed, for the purpose of this definition, that any transformer or convertor is operated at its rated supply voltage.

1.3.20 *Materials*

1.3.20.1 arc-resistant material: A material is arc-resistant when it is not excessively damaged by the action of the repeated arcs that may occur at its surface under actual duty conditions.

1.3.20.2 flame-retardant material: A material is flame-retardant when it does not transmit flame and does not continue burning longer than specified during the test defined in 2.28.2.

1.3.20.3 incombustible material: A material which neither burns, nor gives off flammable vapour or gas, in a quantity sufficient to cause ignition by a pilot flame when heated to a temperature in the neighbourhood of 750 °C, under the conditions defined in 2.28.1.

Any material that does not fulfil this condition is deemed to be combustible.

1.3.20.4 moisture-resistant insulating material: An insulating material in which the insulation resistance of a representative sample does not fall below a specified value as the result of immersion in water, when tested as defined in 2.28.3.

In the case where special precautions in the form of local protection, for example by varnishing, are normally employed, the test shall be made on specimens of the material protected in the same manner.

1.3.21 *Spaces*

1.3.21.1 accommodation spaces: Spaces used for public spaces, corridors, lavatories, cabins, offices, crew quarters, barber shops, isolated pantries and lockers, and similar spaces.

1.3.21.2 cargo spaces: Spaces used for cargo (including liquid cargo tanks) and trunks to such spaces.

1.3.21.3 dangerous spaces: Spaces where flammable or explosive vapour, gas or dust, or explosives may be normally expected to accumulate.

NOTE – For tankers, see IEC 92-502.

1.3.21.4 machinery spaces: All spaces containing propelling machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air-conditioning machinery, and similar spaces; and trunks to such spaces.

1.3.21.5 public spaces: Those portions of the accommodation used for halls, dining-rooms, lounges, and similar permanently enclosed spaces.

1.3.21.6 service spaces: Spaces used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, workshops other than those forming part of machinery spaces, and similar spaces and trunks to such spaces.

1.3.21.7 main vertical zones: Sections into which the hull, superstructure and deck houses are divided by fire-resisting bulkheads and decks. The mean length of these on any deck does not in general exceed 40 m.

1.3.21.8 control stations: Spaces in which the ship's radio or main navigating equipment or the emergency source of power are located, or where the fire recording or fire control equipment is centralized.

1.3.22 degrees of protection of enclosures: The enclosures referred to in the various parts of IEC 92 are those as defined in IEC 529. The designation to indicate the degrees of protection consists of the characteristic letters IP followed by two numerals (the "characteristic numerals") indicating conformity with the conditions stated in the following tables 1 and 2.

Table 1 – Degrees of protection indicated by the first characteristic numeral

First characteristic numeral	Degree of protection	
	Short description	Definition
0	Non-protected	No special protection
1	Protected against solid objects greater than 50 mm	A large surface of the body, such as a hand (but no protection against deliberate access). Solid objects exceeding 50 mm in diameter
2	Protected against solid objects greater than 12 mm	Fingers or similar objects not exceeding 80 mm in length. Solid objects exceeding 12 mm in diameter
3	Protected against solid objects greater than 2,5 mm	Tools, wires, etc. of diameter or thickness greater than 2,5 mm. Solid objects exceeding 2,5 mm in diameter
4	Protected against solid objects greater than 1 mm	Wires or strips of thickness greater than 1 mm. Solid objects exceeding 1 mm in diameter
5	Dust-protected	Ingress of dust is not totally prevented, but dust does not enter in sufficient quantity to interfere with satisfactory operation of the equipment
6	Dust-tight	No ingress of dust

Table 2 – Degrees of protection indicated by the second characteristic numeral

Second characteristic numeral	Degree of protection	
	Short description	Definition
0	Non-protected	No special protection
1	Protected against dripping water	Dripping water (vertically falling drops) shall have no harmful effect
2	Protected against dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at any angle up to 15° from its normal position
3	Protected against spraying water	Water falling as a spray at an angle up to 60° from the vertical shall have no harmful effect
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effect
5	Protected against water jets	Water projected by a nozzle against the enclosure from any direction shall have no harmful effect
6	Protected against heavy seas	Water from heavy seas or water projected in powerful jets shall not enter the enclosure in harmful quantities
7	Protected against the effects of immersion	Ingress of water in a harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time
8	Protected against submersion	The equipment is suitable for continuous submersion in water under conditions which shall be specified by the manufacturer. NOTE – Normally this will mean that the equipment is hermetically sealed. However, with certain types of equipment, it can mean that water can enter but only in such a manner that it produces no harmful effects

1.3.23 Voltage

1.3.23.1 voltage tolerance: The maximum departure from nominal user voltage during normal operating conditions, excluding transient and cyclic voltage variations.

NOTE – Voltage tolerance is a steady state tolerance and includes voltage drop in cables and voltage regulator characteristics. It also includes variations due to environmental conditions.

1.3.23.2 voltage unbalance tolerance: The difference between the highest and lowest phase to phase voltage.

1.3.23.3 voltage cyclic variation deviation: The periodic voltage deviation (max. to min. r.m.s. values) of the nominal voltage, such as might be caused by regularly repeated loading.

$$\text{Voltage cyclic variation} = \frac{\pm (U_{\max} - U_{\min}) \times 100}{2 U_{\text{nominal}}} \%$$