

INTERNATIONAL STANDARD

IEC
60092-350

Second edition
2001-06

Electrical installations in ships –

Part 350: Shipboard power cables – General construction and test requirements

Installations électriques à bord des navires –

*Partie 350:
Câbles d'énergie pour utilisation à bord des navires –
Construction générale et prescriptions d'essai*

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Reference number
IEC 60092-350:2001(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.

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

X

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –**Part 350: Shipboard power cables –
General construction and test requirements**

FOREWORD

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International Standard IEC 60092-350 has been prepared by subcommittee 18A: Cables and cable installations, of IEC technical committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This second edition cancels and replaces the first edition published in 1988, Amendment 1 (1994) and Amendment 2 (1999), and constitutes a technical revision.

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

FDIS	Report on voting
18A/206/FDIS	18A/213/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 3.

Annexes A, B, D, E and F form an integral part of this standard.

Annex C is for information only.

This standard forms a part of IEC 60092 *Electrical installations in ships*.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be:

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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ELECTRICAL INSTALLATIONS IN SHIPS –

Part 350: Shipboard power cables – General construction and test requirements

1 Scope

This part of IEC 60092 specifies the general constructional requirements and general test recommendations for shipboard cables with copper conductors intended for power systems at voltages up to and including 8,7/15 kV.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60092. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60092 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 document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60092-351, *Electrical installations in ships – Part 351: Insulating materials for shipboard and mobile and fixed offshore units power, telecommunication and control data cables*

IEC 60092-359, *Electrical installations in ships – Part 359: Sheathing materials for shipboard power and telecommunication cables*

IEC 60228, *Conductors of insulated cables*

IEC 60331 (all parts), *Tests for electric cables under fire conditions – Circuit integrity*

IEC 60332-3, *Tests on electric cables under fire conditions – Part 3: Tests on bunched wires or cables*

IEC 60811-1-1, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section 1: Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

IEC 60811-1-2, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Two: Thermal ageing methods*

IEC 60811-1-4, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Four: Tests at low temperature*

IEC 60811-2-1, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 2-1: Methods specific to elastomeric compounds – Ozone resistance, hot set and mineral oil immersion tests*

IEC 60811-3-1, *Common test methods for insulating and sheathing materials of electric cables – Part 3: Methods specific to PVC compounds – Section One: Pressure test at high temperature – Tests for resistance to cracking*

IEC 60811-3-2, *Common test methods for insulating and sheathing materials of electric cables – Part 3: Methods specific to PVC compounds – Section Two: Loss of mass test – Thermal stability test*

IEC 60754-1, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the amount of halogen acid gas*

IEC 60754-2, *Test on gases evolved during combustion of electric cables – Part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

3 Definitions

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

3.1 Definitions concerning cables

3.1.1

insulated cable

assembly consisting of

- one or more cores;
- individual covering(s) (if any);
- assembly protection (if any);
- protective covering(s) (if any).

Additional uninsulated conductor(s) may be included in the cable

3.1.2

radial field cable

cable in which each core is covered with an individual screen

3.1.3

screen

conducting layer(s) having the function of control of the electric field within the insulation. It may also provide smooth surfaces at the boundaries of the insulation and assist in the elimination of spaces at these boundaries

3.1.4

conductor

part of the cable which has the specific function of carrying current

3.1.5

stranded conductor

conductor consisting of a number of individual wires, all or the major part of which should have a helical form

NOTE The stranded conductor may be circular or shaped.

3.1.6

core

assembly comprising a conductor and its own insulation

3.1.7

core screen

electric screen of non-metallic and/or metallic materials covering the insulation

**3.1.8
shield**

surrounding earthed metallic layer to confine the electric field within the cable and/or to protect the cable from external electric influence

**3.1.9
flexible cable**

cable which is required to be capable of being flexed while in service, and of which the structure and materials are such as to fulfil this requirement

**3.1.10
cord**

flexible cable with a limited number of conductors of small cross-sectional area

**3.1.11
length of lay**

axial length of one complete turn of the helix formed by one of the cable components

**3.1.12
separator**

thin layer, used as a barrier to prevent mutually detrimental effects between different components of a cable, for example between conductor and insulation or between insulation and sheath

**3.1.13
filler**

material used to fill the interstices between the cores of a multiconductor cable

**3.1.14
inner covering**

non-metallic covering which surrounds the assembly of the cores (and fillers, if any) of a multicore cable and over which the protective covering is applied

**3.1.15
sheath**

uniform and continuous tubular covering consisting of non-metallic material, generally extruded

**3.1.16
oversheath**

non-metallic sheath applied over a metallic covering, constituting the outermost sheath of the cable

**3.1.17
armour**

covering consisting of metal tape(s) or wires, generally used to protect the cable from external mechanical effects

**3.1.18
braid**

covering made of plaited metallic or non-metallic material

3.2 Definitions of dimensional values

3.2.1

nominal value

value by which a quantity is designated and which is often used in tables. Usually, nominal values give rise to values to be checked by measurements, taking into account specified tolerances

3.2.2

approximate value

value which is neither guaranteed nor checked; it is used, for example, for the calculation of other dimensional values

3.2.3

median value

when several results have been obtained and ordered in increasing (or decreasing) succession, the median value is the middle value if the number of available values is odd, and the mean of the two middle values if the number is even

3.2.4

fictitious value

value calculated according to the "fictitious method" described in annex A

3.3 Definitions concerning the tests

3.3.1

routine tests

routine tests are tests made on all finished cable lengths to demonstrate the integrity of the cable

NOTE By agreement between purchaser, manufacturer and, when involved, approval organization (making reference, for example, to results of quality control procedures), the number of lengths of finished cable on which these tests should be carried out may be reduced.

3.3.2

special tests

tests made by the manufacturer on samples of completed cable or components taken from a completed cable, at a specified frequency, so as to verify that the finished product meets the design specifications

3.3.3

type tests

tests required to be made by a manufacturer before supplying on a general commercial basis a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials or design which might change the performance characteristics

4 Conductors

4.1 Material

The conductors shall consist of plain or metal-coated annealed copper.