INTERNATIONAL STANDARD

IEC 60092-354

Second edition
2003-06

Electrical installations in ships –

Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV)

Installations électriques à bord des navires –

Partie 354: Câbles d'énergie unipolaires et tripolaires à isolant massif extrudé pour tensions assignées 6 kV (U_m = 7,2 kV) à 30 kV (U_m = 36 kV)

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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.
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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 60092-354 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 1994 and constitutes a technical revision.

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

FDIS	Report on voting
18A/243/FDIS	18A/245/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.

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 2008. At this date, the publication will be

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- withdrawn;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

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV)

1 Scope and object

This part of IEC 60092 is applicable to shipboard and offshore power cables with extruded solid insulation, conductor and core screening, having a voltage rating of 3,6/6 (7,2) kV, 6/10 (12) kV, 8,7/15 (17,5) kV, 12/20 (24) kV, 18/30 (36) kV (see Clause 4) and intended for fixed installations. The voltage rating for shipboard use is limited to 8,7/15(17,5) kV.

The various types of power cables are given in Clause 8. The constructional requirements and test methods are expected to comply with those indicated in IEC 60092-350, unless otherwise specified in this standard.

The object of this standard is:

– to standardize cables whose safety and reliability is ensured when they are installed in accordance with the requirements of IEC 60092-352 for shipboard use

– to lay down standard manufacturing requirements and characteristics of such cables directly or indirectly bearing on safety;

– to specify test methods for checking conformity with those requirements.

NOTE 1 Only radial field cables are covered.

NOTE 2 IEC 61892-4, *Mobile and fixed offshore units – Electrical installations – Part 4: Cables* is under consideration by TC18.

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 60038, *IEC standard voltages*

IEC 60092-350, *Electrical installations in ships – Part 350: Shipboard power cables – General construction and test requirements*

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 60092-352, *Electrical installations in ships – Part 352: Choice and installation of cables for low-voltage power systems*

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

IEC 60228, *Conductors of insulated cables*

IEC 60230, *Impulse tests on cables and their accessories*

IEC 60332-3-22, *Tests on electric cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A*

IEC 60811 (all parts), *Common test methods for insulating and sheathing materials of electric cables and optical cables*

IEC 60885-2, *Electrical test methods for electric cables – Part 2: Partial discharge tests*

3 Definitions

For the purposes of this document, the definitions given in IEC 60092-350 apply.

4 Rated voltage

The standard rated voltages U_o/U (U_m) of the cables considered in this standard are as follows:

U_o/U (U_m) = 3,6/6 (7,2) – 6/10 (12) – 8,7/15 (17,5) – 12/20 (24) – 18/30 (36) kV r.m.s.

In the voltage designation of cables given above,

U_o is the rated power-frequency voltage between conductor and earth or metallic screen, for which the cable is designed;

U is the rated power-frequency voltage between conductors for which the cable is designed;

U_m is the maximum value of the "highest system voltage" for which the equipment may be used (see IEC 60038).

Refer also to IEC 60092-352.

NOTE Refer also to IEC 61892-4, under consideration by TC18.

5 Types of insulating compounds

The insulating compounds shall be those designated as EPR, HF EPR, HEPR, HF HEPR, XLPE and HF XLPE in IEC 60092-351.

6 Types of sheathing compounds

The sheathing compounds and their designations shall be those given in IEC 60092-359.

7 Markings

7.1 Indication of origin

Cables shall be provided with a continuous indication of origin (manufacturer's name or trade mark), rated voltage (U_0/U) and construction (number of cores and cross sectional area of power conductors) to be printed or embossed on the sheath. In addition, it is permitted to include an identification thread or printed tape. In the case of braid armour applied over the outer-sheath, identification by thread or printed tapes inserted under the braid is obligatory.

EXAMPLE

"name or trade mark" 6/10 kV 3×70

7.2 Continuity

The marking of the manufacturer's name or trade mark is deemed to be continuous if the distance between the end of any marking and the beginning of the next does not exceed:

550 mm if the indication is on the outer sheath, or

275 mm in all other cases.

7.3 Durability

Printed marking shall be durable. Compliance with this requirement is checked by the test of 17.1.

7.4 Legibility

The marking of the manufacturer's name or trade mark shall be legible.

7.5 Core identification for three-core cables

Cores of cables shall be provided with a suitable method of identification. Each core shall be easily distinguishable from the other cores in the cable.

8 General description

The cables shall be single- or three-core radial field cables constituted as follows: copper conductor, conductor semi-conducting screen, insulation, insulation semi-conducting and metallic screen, laid up (for three-core cables). The following types and combinations of protective coverings and layers are permitted:

a) a single sheath of one of the materials listed in IEC 60092-359;

b) an inner sheath and an outer sheath of one of the materials listed in IEC 60092-359;

c) a single sheath of one of the materials listed in IEC 60092-359 with an outer metal braid;

d) an inner sheath, a metal armour, and an outer sheath of one of the materials listed in IEC 60092-359.

e) a copper braid over an extruded inner covering with an outer single sheath of one of the materials listed in IEC 60092-359.

A thermoplastic inner sheath is not recommended where the outer sheath consists of a vulcanized material.

NOTE Cables for installation in spaces where corrosion may occur, e.g. weather decks, wet locations, battery compartments, refrigeration spaces, etc., shall have an outer sheath over the braid, if any, unless the braid itself is corrosion resistant.