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Electrical installations in ships – Part 353: Power cables for rated voltages 1 kV and 3 kV

Installations électriques à bord des navires – Partie 353: Câbles d'énergie pour les tensions assignées 1 kV et 3 kV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL INSTALLATIONS IN SHIPS –

Part 353: Power cables for rated voltages 1 kV and 3 kV

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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International Standard IEC 60092-353 has been prepared by Subcommittee 18A: Electric cables for ships and mobile and fixed offshore units of IEC Technical Committee 18: Electrical installations of ships and of mobile and fixed offshore units.

This third edition cancels and replaces the second edition published in 1995 and Amendment 1 (2001). This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Rationalization of the number of insulating and sheathing materials. In particular polyvinyl chloride based insulation (PVC) and sheath (ST1) have been removed. PVC sheath ST2 is permitted even though it releases harmful fumes under fire conditions;
b) Modification of construction requirements in line with IEC 60092-350;

c) Requirements and test methods have been divided in several tables for clarification. Requirements for enhanced cold properties, oil resistance and resistance to drilling fluids have been aligned to IEC 60092-350;

d) The new testing methods for fire resistant cables are referenced in the standard.

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

FDIS	Report on voting
18A/316A/FDIS	18A/319/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.

A list of all the parts of the IEC 60092 series, under the general title *Electrical installations in ships*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

ELECTRICAL INSTALLATIONS IN SHIPS –

Part 353: Power cables for rated voltages 1 kV and 3 kV

1 Scope and object

This part of the IEC 60092 series is applicable to shipboard and offshore non radial field power cables with extruded solid insulation, having a voltage rating of 0,6/1 (1,2) kV and 1,8/3 (3,6) kV intended for fixed installations.

Cables for use in circuits requiring resistance to fire are included.

The various types of power cables are given in 5.1. The constructional requirements and test methods shall 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 or IEC 61892-4;
– 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.

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 60038:2009, *IEC standard voltages*

IEC 60050-461:2008, *International electrotechnical vocabulary – Part 461: Electric cables*

IEC 60092-350, *Electrical installations in ships – Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications*

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

IEC 60092-352, *Electrical installations in ships – Part 352: Choice and installation of electrical cables*

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

IEC 60228:2004, *Conductors of insulated cables*

IEC 60331-1:2009, *Tests for electric cables under fire conditions – Circuit integrity – Part 1: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm*

IEC 60331-2:2009, *Tests for electric cables under fire conditions – Circuit integrity – Part 2: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter not exceeding 20 mm*

IEC 60331-11:1999, *Tests for electric cables under fire conditions – Circuit integrity – Part 11: Apparatus – Fire alone at a flame temperature of at least 750 °C*
Amendment 1 (2009)[1]

IEC 60331-21:1999, *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

IEC 60332-1-2:2004, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-3-22:2000, *Tests on electric cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A*
Amendment 1 (2008)[2]

IEC 60445:2010, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60684-2:1997, *Flexible insulating sleeving – Part 2: Methods of test*
Amendment 1 (2003)[3]

IEC 60754-1:1994, *Test on gases evolved during combustion of materials from cables – Part 1: Determination of the amount of halogen acid gas*

IEC 60754-2:1991, *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*
Amendment 1 (1997)

IEC 61034-1:2005, *Measurement of smoke density of cables burning under defined conditions – Part 1: Test apparatus*

IEC 61034-2:2005, *Measurement of smoke density of cables burning under defined conditions – Part 2: Test procedure and requirements*

IEC 61892-4, *Mobile and fixed offshore units – Electrical installations – Part 4: Cables*

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1 There exists a consolidated edition (1.1) which includes IEC 60331-11:1999 and its amendment 1.

2 There exists a consolidated edition (1.1) which includes IEC 60332-3-22:2000 and its amendment 1.

3 There exists a consolidated edition (2.1) which includes IEC 60684-2:1997 and its amendment 1 and its corrigendum.

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AVANT-PROPOS

1) La Commission Electrotechnique Internationale (CEI) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de la CEI). La CEI a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, la CEI – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de la CEI"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec la CEI, participent également aux travaux. La CEI collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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La Norme internationale CEI 60092-353 a été établie par le sous-comité 18A: Câbles électriques pour navires et unités mobiles et fixes en mer, du comité d'études 18 de la CEI: Installations électriques des navires et des unités mobiles et fixes en mer.

Cette troisième édition annule et remplace la deuxième édition parue en 1995 et l'Amendement 1 (2001). Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) Rationalisation du nombre de matériaux d'isolation et de gainage. En particulier, l'isolation à base de PVC (polychlorure de vinyle) et la gaine (ST1) ont été supprimées. La gaine ST2 en PVC est autorisée même si elle diffuse des fumées nocives en cas d'incendie;