

INTERNATIONAL STANDARD

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





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.



IEC 60092-353

Edition 5.0 2024-06

INTERNATIONAL STANDARD

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.060.20; 47.020.60

ISBN 978-2-8322-8646-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 General requirements	7
4.1 Rated voltage	7
4.2 Markings	8
4.2.1 Indication of origin and voltage identification	8
4.2.2 Continuity of marking	8
4.2.3 Core identification.....	8
5 Constructional requirements	8
5.1 General description.....	8
5.1.1 Overview	8
5.1.2 Unarmoured cables (excluding 1,8/3 kV).....	9
5.1.3 Armoured cables	9
5.2 Conductors	10
5.3 Insulation	10
5.3.1 Material	10
5.3.2 Application.....	10
5.3.3 Thickness of insulation	10
5.4 Cabling (including fillers and binders)	11
5.5 Inner covering.....	11
5.5.1 General	11
5.5.2 Thickness of inner covering	11
5.6 Screen	12
5.6.1 Construction	12
5.6.2 Application.....	13
5.7 Inner sheath.....	13
5.7.1 Material	13
5.7.2 Application.....	13
5.7.3 Thickness of inner sheath.....	13
5.8 Braid armour	13
5.8.1 General	13
5.8.2 Braid wire diameter.....	14
5.8.3 Coverage density.....	14
5.8.4 Application of the armour.....	14
5.9 Outer sheath	14
5.9.1 Material	14
5.9.2 Application.....	14
5.9.3 Thickness of outer sheath.....	14
5.9.4 Colour of outer sheath	15
5.10 Construction for special applications	15
5.10.1 Cables for installation in areas with explosive atmospheres.....	15
5.10.2 Cables for installation between areas with and without explosive atmospheres.....	15
6 Tests – Methods and requirements.....	15
Annex A (informative) Identification of cores of multicore cables	19

A.1	Inscription	19
A.2	Arrangement of the marks	19
A.3	Spacing and dimensions of the marks	19
A.4	Appearance of inscription	20
	Bibliography	21
	Figure A.1 – Arrangement of the marks	19
	Table 1 – Insulation thickness	11
	Table 2 – Thickness of extruded inner covering and fictitious diameters	12
	Table 3 – Requirements of drain wire	12
	Table 4 – Tests applicable to all cables	15
	Table 5 – Additional tests required for halogen-free cables	17
	Table 6 – Additional test required for low smoke cables	17
	Table 7 – Additional test required for fire resistant cables	17
	Table 8 – Additional tests required for specific performances	17
	Table 9 – Additional test for cables for installation between areas with and without explosive atmospheres	18
	Table A.1 – Dimensions of the marks	20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

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. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011. This edition constitutes a technical revision.

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

- a) Updated references to IEC 60092-350 for general construction and test methods and IEC 60092-360 for insulating and sheathing materials.
- b) Added subclause 5.10: Construction for special applications.
- c) Added Table 9: Additional test for cables for installation between areas with and without explosive atmospheres.

- d) Deleted the test requirement IEC 60331-21 from Table 7.
- e) Deleted the former Annex A (Alternative enhanced insulation thickness for 0,6/1 kV).

The text of this International Standard is based on the following documents:

Draft	Report on voting
18A/476/CDV	18A/482/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.