

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electrical installations in ships –
Part 360: Insulating and sheathing materials for shipboard and offshore units,
power, control, instrumentation and telecommunication cables**

**Installations électriques à bord des navires –
Partie 360: Matériaux d'isolation et de gainage des câbles d'alimentation, de
commande, d'instrumentation et de télécommunication installés à bord des
navires et des unités en mer**



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CONTENTS

FOREWORD.....	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Cross-linked insulating compounds.....	9
4.1 General.....	9
4.2 Electrical characteristics	9
4.3 Mechanical characteristics	10
5 Cross-linked sheathing compounds	12
5.1 General.....	12
5.2 Mechanical characteristics	12
6 Thermoplastic sheathing compounds	14
6.1 General.....	14
6.2 Mechanical characteristics	15
7 Additional optional properties of sheathing compounds.....	16
7.1 General.....	16
7.2 Test requirements.....	16
Annex A (normative) Determination of hardness of HEPR insulation	18
A.1 Test piece.....	18
A.2 Test procedure.....	18
A.2.1 General	18
A.2.2 Surfaces of large radius of curvature	18
A.2.3 Surfaces of small radius of curvature	18
A.2.4 Conditioning and test temperature	18
A.2.5 Number of measurements.....	19
Annex B (normative) Determination of the elastic modulus of HEPR insulation	21
B.1 Procedure	21
B.2 Requirements	21
Annex C (normative) Procedure for enhanced hot oil immersion test for sheaths	22
C.1 Sampling and preparation of the test pieces.....	22
C.2 Determination of the cross-sectional area of the test piece	22
C.3 Oil to be used	22
C.4 Procedure	22
C.5 Expression of results	22
C.6 Requirements	23
Annex D (normative) Procedure for drilling fluid immersion test for sheaths	24
D.1 Drilling fluid resistance test.....	24
D.2 Drilling fluid to be used	24
D.3 Procedure	24
D.4 Expression of results	24
D.5 Requirements	25
Figure A.1 – Testing surfaces of large radius of curvature	19
Figure A.2 – Testing surfaces of small radius of curvature	20

Table 1 – Categories and types of materials	6
Table 2 – Types of cross-linked insulating compounds.....	9
Table 3 – Electrical requirements of insulation compounds	9
Table 4 – Test requirements for cross-linked elastomeric insulating compounds	10
Table 5 – Types of cross-linked sheathing compound	12
Table 6 – Test requirements for cross-linked sheathing compounds.....	13
Table 7 – Types of thermoplastic sheathing compound	15
Table 8 – Test requirements for thermoplastic sheathing compounds.....	15
Table 9 – Test requirements for sheathing compounds with enhanced oil resistance properties	17
Table 10 – Test requirements for sheathing compounds with drilling fluid resistance properties	17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL INSTALLATIONS IN SHIPS –**Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables**

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 60092-360 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 first edition cancels and replaces IEC 60092-351 Ed. 3 published in 2004 and IEC 60092-359 Ed. 1 published in 1987, Amendment 1:1994 and Amendment 2:1992. This edition constitutes a technical revision.

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

- a) rationalization of the number of insulating and sheathing materials. In particular polyvinyl chloride based insulation (PVC) and sheath (ST 1) have been removed. PVC sheath ST 2 is permitted even though it releases harmful fumes under fire conditions. SE and SH also release harmful fumes under fire conditions;

- b) updated temperature limit for thermoplastic sheath in line with the operating temperature on the conductor;
- c) new optional categories of sheathing materials with enhanced oil resistance, and resistance to drilling fluids;
- d) removal of the air bomb test for EPR and HEPR insulating types;
- e) there has been some redistribution of test methods between IEC 60092-350 and this new standard to remove all tests carried out on complete cables.

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

FDIS	Report on voting
18A/360/FDIS	18A/361/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 parts of the IEC 60092 series, published 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 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables

1 Scope

This part of IEC 60092 specifies the requirements for electrical, mechanical and particular characteristics of insulating and sheathing materials intended for use in shipboard and fixed and mobile offshore unit power, control, instrumentation and telecommunication cables.

The different insulating and sheathing materials have been divided into three categories as listed in the following Table 1.

Table 1 – Categories and types of materials

Title	Compounds included
Cross-linked insulating compounds	EPR; HEPR; XLPE; S 95; HF 90
Cross-linked sheathing compounds	SE; SH; SHF 2
Thermoplastic sheathing compounds	SHF 1; ST 2

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60092-350:—¹, *Electrical installations in ships – Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications*

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

IEC 60754-2, *Test on gases evolved during combustion of materials from cables – Part 2: Determination of acidity (by pH measurement) and conductivity*

IEC 60684-2:2011, *Flexible insulating sleeving – Part 2: Methods of test*

IEC 60811-201, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 201: General tests – Measurement of insulation thickness*

IEC 60811-202:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 202: General tests – Measurement of thickness of non-metallic sheath*

IEC 60811-401, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 401: Miscellaneous tests – Thermal ageing methods – Ageing in an air oven*

¹ To be published.

IEC 60811-403, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 403: Miscellaneous tests – Ozone resistance test on cross-linked compounds*

IEC 60811-404, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 404: Miscellaneous tests – Mineral oil immersion tests for sheaths*

IEC 60811-409, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 409: Miscellaneous tests – Loss of mass test for thermoplastic insulations and sheaths*

IEC 60811-501, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 501: Mechanical tests – Tests for determining the mechanical properties of insulating and sheathing compounds*

IEC 60811-505, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 505: Mechanical tests – Elongation at low temperature for insulations and sheaths*

IEC 60811-507, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 507: Mechanical tests – Hot set test for cross-linked materials*

IEC 60811-508, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 508: Mechanical tests – Pressure test at high temperature for insulation and sheaths*

IEC 60811-509, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 509: Mechanical tests – Test for resistance of insulations and sheaths to cracking (heat shock test)*

ISO 1817, *Rubber vulcanised – Determination of the effect of liquids*

ISO 48:2007, *Rubber, vulcanised or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

variation

difference between the median value after ageing and the median value without ageing

Note 1 to entry: Variation is expressed as a percentage between the median value before and after ageing.

3.2

median value

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

3.3

types of insulating compounds

3.3.1

EPR

ethylene-propylene rubber

cross-linked compound in which the elastomer is an ethylene-propylene, EPDM or an equivalent synthetic elastomer providing a compound compliant with type EPR

Note 1 to entry: This note applies to the French language only.