

INTERNATIONAL STANDARD

**Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) –
Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV)**

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CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	8
4 Voltage designations and materials	9
5 Conductors.....	12
6 Insulation.....	12
7 Assembly of multicore cables, inner coverings and fillers.....	14
8 Metal layers for single-core and multicore cables.....	16
9 Metal screen.....	16
10 Concentric conductor.....	17
11 Metal sheath.....	17
12 Metal armour	17
13 Oversheath.....	21
14 Test conditions	22
15 Routine tests	22
16 Sample tests	24
17 Type tests, electrical.....	27
18 Type tests, non-electrical.....	29
19 Electrical tests after installation	35
Annex A (normative) Fictitious calculation method for determination of dimensions of protective coverings.....	45
Annex B (normative) Rounding of numbers	51
Annex C (normative) Determination of hardness of HEPR insulation	52
Bibliography.....	55
Figure C.1 – Test on surfaces of large radius of curvature	53
Figure C.2 – Test on surfaces of small radius of curvature.....	54
Table 1 – Recommended rated AC voltages U_0	10
Table 2 – Insulating compounds.....	11
Table 3 – Maximum conductor temperatures for different types of insulating compound.....	11
Table 4 – Sheathing compounds and maximum conductor temperatures for different types of sheathing compound	12
Table 5 – Nominal thickness of PVC/A insulation	13
Table 6 – Nominal thickness of cross-linked polyethylene (XLPE) insulation	13
Table 7 – Nominal thickness of ethylene propylene rubber (EPR) and hard ethylene propylene rubber (HEPR) insulation	14
Table 8 – Thickness of extruded inner covering	15
Table 9 – Nominal diameter of round armour wires	20
Table 10 – Nominal thickness of armour tapes.....	20
Table 11 – Routine test voltages.....	23

Table 12 – Number of samples for sample tests	24
Table 13 – Electrical type test requirements for insulating compounds	36
Table 14 – Non-electrical type tests (see Tables 15 to 23)	37
Table 15 – Test requirements for mechanical characteristics of insulating compounds (before and after ageing)	38
Table 16 – Test requirements for particular characteristics of PVC insulating compounds	39
Table 17 – Test requirements for particular characteristics of various cross-linked insulating compounds	40
Table 18 – Test requirements for mechanical characteristics of sheathing compounds (before and after ageing)	41
Table 19 – Test requirements for particular characteristics of PVC sheathing compounds	42
Table 20 – Test requirements for particular characteristics of thermoplastic PE sheathing compounds	43
Table 21 – Test requirements for particular characteristics of halogen free sheathing compounds	43
Table 22 – Test requirements for particular characteristics of elastomeric sheathing compounds	44
Table 23 – Test methods and requirements for halogen free compounds	44
Table A.1 – Fictitious diameter of conductor	46
Table A.2 – Assembly coefficient k for laid-up cores	47
Table A.3 – Increase of diameter for concentric conductors and metal screens	48
Table A.4 – Increase of diameter for additional bedding	50

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FOREWORD

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IEC 60502-1 has been prepared by IEC technical committee 20: Electric cables. It is an International Standard.

This third edition cancels and replaces the second edition published in 2004 and Amendment 1:2009. This edition constitutes a technical revision.

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

- a) references to IEC 60811 (all parts) have been updated and mechanical testing requirements specific to halogen free low-smoke oversheath of material type ST₈ have been considered;
- b) the use of the types of sheathing material to be used is now clearly defined;
- c) the applicability of cables for use in DC systems is now included in the scope;

d) items which were earlier marked as "under consideration" were studied either for an appropriate solution if found available, or for removal for the time being.

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

Draft	Report on voting
20/1938/FDIS	20/1949/RVD

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/standardsdev/publications.

A list of all parts in the IEC 60502 series, published under the general title *Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV)* 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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Part 1: Cables for rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV)

1 Scope

This part of IEC 60502 specifies the construction, dimensions and test requirements of power cables with extruded solid insulation for rated AC voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV) for fixed installations such as distribution networks or industrial installations.

Cables of rated AC voltage 1 kV ($U_m = 1,2$ kV) designed and tested in accordance with this document can also be used, if declared by the manufacturer, in DC distribution systems having their nominal voltage ≤ 750 V DC (with a maximum of 900 V DC) between a live conductor and neutral/earth, or $\leq 1\,500$ V DC (with a maximum 1 800 V DC) between two live conductors. Applicable core identification for DC systems are considered in accordance with local installation regulations.

NOTE 1 Recommendations for preferred core colours for line conductors in DC systems are given in IEC 60445. However, local installation regulations for DC systems can already contain specific identification requirements.

This document includes cables which exhibit properties of reduced flame spread, low levels of smoke emission and halogen-free gas emission when exposed to fire.

Cables for special installation and service conditions are not included, for example cables for overhead networks, the mining industry, nuclear power plants (in and around the containment area), submarine use or shipboard application, or cables directly connected to photovoltaic systems.

NOTE 2 Cables for photovoltaic systems are covered by IEC 62930.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60183, *Guidance for the selection of high-voltage A.C. cable systems*

IEC 60228, *Conductors of insulated cables*

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

IEC 60332-1-2, *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 60332-3-24, *Tests on electric and optical cables under fire conditions – Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category C*

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

IEC 60724, *Short-circuit temperature limits of electric cables with rated voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV)*

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

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

IEC 60811-203, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 203: General tests – Measurement of overall dimensions*

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*

IEC 60811-402, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 402: Miscellaneous tests – Water absorption tests*

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 60811-502, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 502: Mechanical tests – Shrinkage test for insulations*

IEC 60811-503, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 503: Mechanical tests – Shrinkage test for sheaths*

IEC 60811-504, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 504: Mechanical tests – Bending tests at low temperature for insulations and sheaths*

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 60811-506, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 506: Mechanical tests – Impact test 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)*

IEC 60811-605, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 605: Physical tests – Measurement of carbon black and/or mineral filler in polyethylene compounds*

IEC 60811-606, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 606: Physical tests – Methods for determining the density*

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

IEC 62230, *Electric cables – Spark-test method*

ISO 48-2:2018, *Rubber, vulcanized or thermoplastic – Determination of hardness – Part 2: Hardness between 10 IRHD and 100 IRHD*