

INTERNATIONAL STANDARD

NORME INTERNATIONALE

iTeh STANDARD

Power cables with extruded insulation and their accessories for rated voltages above 150 kV ($U_m = 170$ kV) up to 500 kV ($U_m = 550$ kV) – Test methods and requirements

(standards.iteh.ai)

Câbles d'énergie à isolation extrudée et leurs accessoires pour des tensions assignées supérieures à 150 kV ($U_m = 170$ kV) et jusqu'à 500 kV ($U_m = 550$ kV) – Méthodes et exigences d'essai

<https://standards.iteh.ai/catalog/standards/sist/6ee91e26-2975-4201-a52d-0eef6c0565e0/iec-62067-2022>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2022 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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. 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 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

iTeh STANDARD

Power cables with extruded insulation and their accessories for rated voltages above 150 kV ($U_m = 170$ kV) up to 500 kV ($U_m = 550$ kV) – Test methods and requirements

(standards.iteh.ai)

Câbles d'énergie à isolation extrudée et leurs accessoires pour des tensions assignées supérieures à 150 kV ($U_m = 170$ kV) et jusqu'à 500 kV ($U_m = 550$ kV) – Méthodes et exigences d'essai

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.20

ISBN 978-2-8322-1092-8

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms and definitions	12
3.1 Definitions of dimensional values (thicknesses, cross-sections, etc.)	12
3.2 Definitions relating to tests.....	12
3.3 Other definitions	13
4 Voltage designations, materials and rounding of numbers	14
4.1 Rated voltages.....	14
4.2 Cable insulating compounds	14
4.3 Cable metal screens/sheaths	15
4.4 Cable oversheathing compounds	15
4.5 Rounding of numbers.....	16
5 Precautions against water penetration in cables	16
6 Cable characteristics	16
7 Accessories characteristics	17
7.1 Gas immersed cable terminations	17
7.2 Insulators for outdoor cable terminations	17
7.3 Accessory characteristics to be declared	17
8 Test conditions	18
8.1 Ambient temperature.....	18
8.2 High voltage tests	18
8.3 Waveform of impulse test voltages	18
8.4 Relationship of test voltages to rated voltages	18
8.5 Determination of the cable conductor temperature	19
8.6 Tests on gas immersed terminations	19
9 Routine tests on cables and accessories	19
9.1 General.....	19
9.2 Partial discharge test	20
9.3 Voltage test	20
9.4 Electrical test on oversheath of the cable.....	20
10 Sample tests on cables.....	20
10.1 General.....	20
10.2 Frequency of tests	21
10.3 Repetition of tests.....	21
10.4 Conductor examination	21
10.5 Measurement of electrical resistance of conductor and of metal screen/sheath	21
10.6 Measurement of thickness of insulation and oversheath.....	21
10.6.1 General	21
10.6.2 Requirements for the insulation	22
10.6.3 Requirements for the cable oversheath.....	22
10.7 Measurement of thickness of metal sheath.....	22
10.7.1 General	22
10.7.2 Lead or lead alloy sheath.....	23

10.7.3	Copper or aluminium sheath	23
10.7.4	Metal tape for CD design	24
10.8	Measurement of diameters	24
10.9	Hot set test for XLPE and EPR insulations	24
10.9.1	Procedure	24
10.9.2	Requirements	24
10.10	Measurement of capacitance	24
10.11	Measurement of density of HDPE insulation	24
10.11.1	Procedure	24
10.11.2	Requirements	24
10.12	Lightning impulse voltage test	24
10.13	Water penetration test	25
10.14	Tests on components of cables with a longitudinally applied metal tape or foil bonded to the oversheath	25
11	Sample tests on accessories	25
11.1	Tests on components of accessory	25
11.2	Tests on complete accessory	25
12	Type tests on cable systems	26
12.1	General	26
12.2	Range of type approval	26
12.3	Summary of type tests	27
12.4	Electrical type tests on complete cable systems	28
12.4.1	Test voltage values	28
12.4.2	Tests and sequence of tests	28
12.4.3	Bending test	29
12.4.4	Partial discharge tests	29
12.4.5	Tan δ measurement	30
12.4.6	Heating cycle voltage test	30
12.4.7	Impulse voltage tests	31
12.4.8	Examination	32
12.4.9	Resistivity of semi-conducting screens	32
12.5	Non-electrical type tests on cable and on cable components	32
12.5.1	General	32
12.5.2	Check of cable construction	33
12.5.3	Tests for determining the mechanical properties of insulation before and after ageing	33
12.5.4	Tests for determining the mechanical properties of oversheaths before and after ageing	33
12.5.5	Ageing tests for pieces of cable to check compatibility of materials	34
12.5.6	Loss of mass test on PVC oversheaths of type ST ₂	34
12.5.7	Pressure test at high temperature on oversheaths	35
12.5.8	Test for PVC oversheaths (ST ₁ and ST ₂) and LSHF oversheaths (ST ₁₂) at low temperature	35
12.5.9	Heat shock test for PVC oversheaths (ST ₁ and ST ₂)	35
12.5.10	Ozone resistance test for EPR insulation	35
12.5.11	Hot set test for EPR and XLPE insulations	35
12.5.12	Measurement of density for HDPE insulation	36

12.5.13	Measurement of carbon black content for black PE oversheaths (ST ₃ and ST ₇)	36
12.5.14	Test under fire conditions	36
12.5.15	Water penetration test	38
12.5.16	Tests for components of cables with a longitudinally applied metal tape or foil, bonded to the oversheath	38
13	Prequalification test of the cable system	38
13.1	General and range of prequalification test approval	38
13.2	Prequalification test on complete cable system	39
13.2.1	Summary of prequalification tests	39
13.2.2	Test voltage values	39
13.2.3	Test arrangement	40
13.2.4	Heating cycle voltage test	40
13.2.5	Lightning impulse voltage test	41
13.2.6	Examination	41
13.3	Tests for the extension of the prequalification of a cable system	41
13.3.1	Summary of the extension of prequalification test	41
13.3.2	Electrical part of the extension of prequalification tests on complete cable system	41
14	Type test on cables	43
15	Type test on accessories	43
16	Electrical test after installation (on-site tests)	43
16.1	General	43
16.2	DC voltage test of the oversheath	43
16.3	Tests using AC voltage	44
16.3.1	AC voltage test of the insulation	44
16.3.2	Partial discharge test	44
Annex A (informative)	Determination of the cable conductor temperature	52
A.1	Purpose	52
A.2	Calibration of the temperature of the main test loop	52
A.2.1	General	52
A.2.2	Installation of cable and temperature sensors	52
A.2.3	Calibration method	54
A.3	Heating for the test	54
A.3.1	Method 1 – Test using a reference cable	54
A.3.2	Method 2 – Test using conductor temperature calculations and measurement of the surface temperature	55
Annex B (normative)	Rounding of numbers	56
Annex C (informative)	List of type, prequalification and extension of prequalification tests for cable systems	57
Annex D (normative)	Measurement method for resistivity of semi-conducting screens	59
Annex E (normative)	Water penetration test	62
E.1	Test piece	62
E.2	Test	62
E.3	Requirements	63
Annex F (normative)	Test for water penetration in the conductor	64
F.1	Test piece	64
F.2	Test	64

F.3	Requirements	64
Annex G (normative) Tests on components of cables with a longitudinally applied metal tape or foil, bonded to the oversheath		66
G.1	Visual examination.....	66
G.2	Adhesion and peel strength.....	66
G.2.1	General	66
G.2.2	Test: Adhesion strength.....	66
G.2.3	Test: Peel strength of overlapped metal foil	67
G.2.4	Requirements	68
Annex H (normative) Additional tests for accessories.....		70
H.1	General.....	70
H.2	Range of approval.....	71
H.2.1	Range of approval for joints without screen or metal sheath interruption.....	71
H.2.2	Range of approval for joints with screen or metal sheath interruption.....	72
H.2.3	Range of approval for accessories for cable screen interruption and/or earth connection.....	72
H.2.4	Range of approval for terminations with an insulated screen.....	72
H.3	Tests of joints with or without screen or metal sheath interruption and accessories for cable screen interruption and/or earth connection	72
H.3.1	Conditioning of sample for test.....	72
H.3.2	Water immersion test.....	72
H.3.3	Electrical tests	73
H.3.4	Examination.....	74
H.4	Tests of terminations with an insulated screen.....	75
H.4.1	Conditioning of sample for test	75
H.4.2	DC voltage withstand test between screen and earth.....	75
H.4.3	Lightning impulse voltage withstand test between screen and earth.....	75
H.4.4	Examination.....	75
H.5	Tests for insulators for outdoor terminations	75
H.5.1	Tests for ceramic insulators	75
H.5.2	Tests for composite insulators	76
H.6	Tests for gas-immersed terminations in case of changing insulating gas	76
H.6.1	General	76
H.6.2	Electrical tests	76
H.6.3	Leak rate test	77
Annex I (informative) Guidance on examination of cable and accessories		78
Annex J (informative) Guidance for type test on heating-cycle-voltage-test interruption and cycle validity		79
J.1	Interruption of cycles during a heating cycle voltage test.....	79
J.1.1	Scheduled interruption of test	79
J.1.2	Non-scheduled interruption of test	79
J.2	Valid heating cycles	79
Annex K (normative) Methods for determining the weighted value of halogen content of the non-metallic materials in the cable		80
K.1	Calculating the weighted value for the cable when the halogen content of individual non-metallic material is tested	80
K.2	Preparation of the test sample for measurement of halogen content on a sample representative of the non-metallic materials in the cable	80
Bibliography.....		81

Figure 1 – Example of EQ test arrangement for the prequalification of a system with another joint, designed for rigid as well as for flexible installation	42
Figure A.1 – Schematic diagram of test set-up for the reference loop and the main test loop ...	53
Figure A.2 – Example of an arrangement of the temperature sensors on the conductor of the reference loop	54
Figure D.1 – Dimensions for preparation of samples for measurement of resistivity of conductor screen	60
Figure D.2 – Dimensions for preparation of samples for measurement of resistivity of insulation screen.....	61
Figure E.1 – Schematic diagram of apparatus for water penetration test.....	63
Figure F.1 – Schematic diagram of apparatus for water penetration test in the conductor.....	65
Figure G.1 – Adhesion of metal tape or foil	67
Figure G.2 – Example of overlapped metal foil	68
Figure G.3 – Peel strength of overlapped metal foil.....	68
Figure G.4 – Typical strength versus grip spacing curve (1).....	69
Figure G.5 – Typical strength versus grip spacing curve (2).....	69
Table 1 – Insulating compounds for cables	44
Table 2 – Oversheathing compounds for cables	45
Table 3 – Tan δ requirements for insulating compounds for cables	45
Table 4 – Test voltages.....	45
Table 5 – Non-electrical type tests for insulating and oversheathing compounds for cables ..	46
Table 6 – Test requirements for mechanical characteristics of insulating compounds for cables (before and after ageing)	47
Table 7 – Test requirements for mechanical characteristics of oversheathing compounds for cables (before and after ageing)	48
Table 8 – Test requirements for particular characteristics of insulating compounds for cables	48
Table 9 – Test requirements for particular characteristics of PVC and LSHF oversheathing for cables	49
Table 10 – Test requirements for fire performance characteristics of cables with PVC and LSHF oversheaths	50
Table 11 – Cantilever operating load for insulators for outdoor terminations	51
Table 12 – Test voltages for AC voltage test after installation	51
Table C.1 – Type tests for cable systems.....	57
Table C.2 – PQ tests on cable systems.....	58
Table C.3 – EQ tests on cable systems.....	58
Table G.1 – Minimum acceptable adhesion or peel strength forces	69
Table H.1 – Test sequence	71
Table H.2 – Lightning impulse voltage withstand test between screen and earth of joints with or without screen or metal sheath interruption and accessories for cable screen interruption and/or earth connection	74
Table H.3 – Lightning impulse voltage withstand test between screen and screen of joints with screen or metal sheath interruption and accessories for cable screen interruption and/or earth connection.....	74
Table H.4 – Lightning impulse voltage withstand tests between screen and earth of terminations with an insulated screen	75

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**POWER CABLES WITH EXTRUDED INSULATION AND
THEIR ACCESSORIES FOR RATED VOLTAGES
ABOVE 150 kV ($U_m = 170$ kV) UP TO 500 kV ($U_m = 550$ kV) –
TEST METHODS AND REQUIREMENTS**

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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 62067 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 2011. This edition constitutes a technical revision.

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

- a) A new material class (ST₁₂) is introduced which has fire performance requirements.
- b) A full range of fire performance tests is available which can be selected on the basis of claimed cable performance characteristics.

- c) The range of cable metal screen designs and the bending test has been revised in line with IEC TR 61901 [1]¹.
- d) Requirements are introduced for outdoor termination insulators.
- e) Design and testing requirements for gas immersed terminations (and their separating insulating barriers) are coordinated with IEC 62271-209. An additional type test is required where the separating insulating barrier is installed by the switchgear manufacturer.
- f) A separate water penetration test for the cable conductor is required.
- g) AC voltage testing of the insulation after installation has been revised in line with recently published CIGRE recommendations.
- h) Tests have been added for a change in the type of insulating gas used in the cable connection enclosure of a gas immersed termination.

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

Draft	Report on voting
20/2017/FDIS	20/2020/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.

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

¹ Numbers in square brackets refer to the bibliography.

INTRODUCTION

As a result of major developments in cable systems with extruded insulation for voltages above 150 kV, CIGRE Study Committee (SC) 21 set up Working Group (WG) 21.03 in 1990. The terms of reference of WG 21.03 were *"to prepare recommendations for electrical type tests, sample and routine tests, based on extending IEC 60840:1988 up to 400 kV and to make proposals for prequalification/development tests which, as a minimum, should be performed"*.

WG 21.03 reported that the extension of IEC 60840 [2] to voltages above 150 kV needed extra consideration because of the following factors:

- 1) such cables form part of the backbone of the transmission system and, therefore, reliability considerations are of the highest priority;
- 2) these cables and their accessories operate with higher electrical stresses than cables up to 150 kV and, as a result, have a smaller safety margin with respect to the intrinsic performance boundaries of the cable system;
- 3) such cables and accessories have a thicker insulation wall than those up to 150 kV and, as a result, are subjected to greater thermo-mechanical effects;
- 4) the design and coordination of the cables and accessories become more difficult with increasing system voltage levels.

The recommendations of the WG 21.03 were published in Electra No. 151 [3] [4] in December 1993 and taken into account by IEC in 1995 in the preparation of this standard for cable systems with extruded insulation for voltages above 150 kV. IEC considered that the new standard should also cover the 500 kV level. Thus, at its meeting in September 1996, CIGRE SC 21 set up a task force 21.18 to study the extension of the initial recommendations to the 500 kV level. The resulting updated recommendations were taken into account by IEC Technical Committee (TC) 20 in the preparation of the first edition of this standard.

On the advice of CIGRE, a long term accelerated ageing test was introduced in the first edition, in order to gain some indication of the long term reliability of a cable system. This test, known as the "prequalification test", was to be performed on the complete system comprising the cable, joints and terminations in order to demonstrate the performance of the system.

In addition, CIGRE WG 21.09, published recommendations for "tests after installation on high-voltage extruded insulation cable systems" in Electra No. 173 [5] in August 1997. These recommendations (which state, amongst other things, that DC tests should be avoided on the main insulation, as they are both ineffective and potentially damaging) were also taken into account in the first edition of this standard.

At its meeting in November 2004, TC 20 concluded that the next revision of IEC 62067 should include the recommendation for testing of HV and EHV extruded cables that was under preparation by the CIGRE SC B1 (previously SC 21) WG B1.06. This was made available as a CIGRE Technical Brochure 303 [6] before the meeting of TC 20 in October 2006, which confirmed this view. Therefore, Technical Brochure 303 has been considered by TC 20 and major parts have been implemented in this standard. This has resulted in some modifications to the prequalification test requirements, a major change being the addition of the extension of the prequalification test. The latter test requires approximately one quarter of the time to complete when compared with the full prequalification test.

This third edition of IEC 62067 has been produced as part of the normal periodic review and updating procedures of IEC taking into account progress and developments within the energy industry.

A list of relevant CIGRE references is given in the bibliography.

POWER CABLES WITH EXTRUDED INSULATION AND THEIR ACCESSORIES FOR RATED VOLTAGES ABOVE 150 kV ($U_m = 170$ kV) UP TO 500 kV ($U_m = 550$ kV) – TEST METHODS AND REQUIREMENTS

1 Scope

This document specifies test methods and requirements for power cable systems, cables with extruded insulation and their accessories for fixed installations, for rated voltages above 150 kV ($U_m = 170$ kV) up to and including 500 kV ($U_m = 550$ kV).

The requirements apply to single-core cables and to their accessories for usual conditions of installation and operation, but not to special cables and their accessories, such as submarine cables, for which modifications to the standard tests can be necessary or special test conditions that may need to be devised.

This document does not cover transition joints between cables with extruded insulation and paper insulated cables.

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 62067:2022

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*
<https://standards.iteh.ai/en/iec/60060-1-1/2975-4201-a52d-0eef6c0565e0/iec-62067-2022>

IEC 60060-3, *High-voltage test techniques – Part 3: Definitions and requirements for on-site testing*

IEC 60137, *Insulated bushings for alternating voltages above 1000 V*

IEC 60228, *Conductors of insulated cables*

IEC 60229:2007, *Electric cables – Tests on extruded oversheaths with a special protective function*

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

IEC 60287-1-1, *Electric cables – Calculation of the current rating – Part 1-1: Current rating equations (100 % load factor) and calculation of losses – General*

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 60332-1-3, *Tests on electric and optical fibre cables under fire conditions – Part 1-3: Test for vertical flame propagation for a single insulated wire or cable – Procedure for determination of flaming droplets/particles*

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

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

IEC 60754-3, *Test on gases evolved during combustion of materials from cables – Part 3: Measurement of low level of halogen content by ion chromatography*

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 60811-202:2012/AMD1:2017

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

IEC 60811-409, *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 60811-501:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 501: Mechanical tests – Tests for determining the mechanical properties of insulation and sheathing compounds*
IEC 60811-501:2012/AMD1:2018
<https://standards.iteh.ai/catalog/standards/sist/6ee91e26-2973-4201-a52d-0eef6c0565e0/iec-62067-2022>

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 60811-508:2012, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 508: Mechanical tests – Pressure test at high temperature for insulations and sheaths*
IEC 60811-508:2012/AMD1:2017

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

IEC 60811-605:2012, *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 60885-3, *Electrical test methods for electric cables – Part 3: Test methods for partial discharge measurements on lengths of extruded power cables*

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

IEC 61462, *Composite hollow insulators – Pressurized and unpressurized insulators for use in electrical equipment with rated voltage greater than 1 000 V – Definitions, test methods, acceptance criteria and design recommendations*

IEC 62155, *Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1 000 V*

IEC 62271-209, *High-voltage switchgear and controlgear – Part 209: Cable connections for gas-insulated metal-enclosed switchgear for rated voltages above 52 kV – Fluid-filled and extruded insulation cables – Fluid-filled and dry-type cable-terminations*

3 Terms and definitions

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

IEC and ISO maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 Definitions of dimensional values (thicknesses, cross-sections, etc.)

3.1.1

nominal value

value by which a quantity is designated and which is often used in tables

Note 1 to entry: Usually, in this document, nominal values give rise to values to be checked by measurements taking into account specified tolerances.

3.1.2

median value

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

3.2 Definitions relating to tests

3.2.1

routine test

test made by the manufacturer on each manufactured component (length of cable or accessory) to check that the component meets the specified requirements

3.2.2

sample test

test made by the manufacturer on samples of completed cable, or components taken from a completed cable or accessory, at a specified frequency, so as to verify that the finished product meets the specified requirements

3.2.3

type test

test made before supplying, on a general commercial basis, a type of cable system covered by this document, in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: Type tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the materials, design or type of manufacturing process of cable or accessory which might change the performance characteristics.

3.2.4

prequalification test

PQ test

test made before supplying, on a general commercial basis, a type of cable system covered by this document, in order to demonstrate satisfactory long term performance of the complete cable system

3.2.5

extension of prequalification test

EQ test

test made before supplying, on a general commercial basis, a type of cable system covered by this document, in order to demonstrate satisfactory long term performance of the complete cable system, taking into account an already prequalified cable system

3.2.6

electrical test after installation

test made to demonstrate the integrity of the cable system as installed

Note 1 to entry: Integrated optical elements, if present, will be tested upon purchaser request. Tests to be defined on agreement between purchaser and manufacturer.

3.3 Other definitions

3.3.1

cable system

cable with installed accessories including components used for thermo-mechanical restraint of systems limited to those used for terminations and joints only

3.3.2

nominal electrical stress

electrical stress calculated at U_0 using nominal dimensions

Note 1 to entry: The equations for calculation of the stresses are given in Clause 6, item n).

Note 2 to entry: Electrical stress is expressed in kV/mm.

3.3.3

combined design

CD

metal screen design that combines radial watertightness and electrical properties

Note 1 to entry: Details of the construction are given in 4.3.

3.3.4

separate design

SD

metal screen design that uses different metal components for radial watertightness and electrical properties

Note 1 to entry: Details of the construction are given in 4.3.