KÕRGEPINGELINE LÜLITUS- JA JUHTIMISAPARATUUR. OSA 1: VAHELDUVVOOLU LÜLITUS- JA JUHTIMISAPARATUURI ÜLDLIIGITUS

High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear (IEC 62271-1:2017 + IEC 62271-1:2017/AMD1:2021)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 62271-1:2017 +A1:2022 sisaldab Euroopa standardi EN 62271-1:2017 ja selle muudatuse A1:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 62271-1:2017 +A1:2022 consists of the English text of the European standard EN 62271-1:2017 and its amendment A1:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 27.10.2017, muudatus A1 12.11.2021.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 27.10.2017, for A1 12.11.2021.
Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega [A1] [A1]. Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by amendment A1 is indicated in the text by tags [A1] [A1]. The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.130.10; 29.130.99

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62271-1 + A1

October 2017, November 2021

ICS 29.130.10; 29.130.99

Supersedes EN 62271-1:2008

English Version

High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear (IEC 62271-1:2017 + IEC 62271-1:2017/AMD1:2021)

Appareillage à haute tension - Partie 1: Spécifications communes pour appareillage à courant alternatif (IEC 62271-1:2017 + IEC 62271-1:2017/AMD1:2021)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 1: Gemeinsame Bestimmungen für Wechselstrom-Schaltgeräte und -Schaltanlagen (IEC 62271-1:2017 + IEC 62271-1:2017/AMD1:2021)

This European Standard was approved by CENELEC on 2017-08-16. Amendment A1 was approved by CENELEC on 2021-11-08. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard and its amendment the status of a national standard without any alteration.

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 62271-1:2017 E + EN 62271-1:2017/A1:2021 E

European foreword

The text of document 17/1033/FDIS, future edition 2 of IEC 62271-1, prepared by IEC/TC 17 "High-voltage switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-1:2017.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2018-05-16
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-08-16

This document supersedes EN 62271-1:2008.

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The text of the International Standard IEC 62271-1:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60447	NOTE Harmonized as EN 60447.
IEC 60721-2-4	NOTE Harmonized as prEN 60721-2-4[1)].
IEC 60721-2-2	NOTE Harmonized as EN 60721-2-2.
IEC 60721-3-3	NOTE Harmonized as EN 60721-3-3.
IEC 60721-3-4	NOTE Harmonized as EN 60721-3-4.
IEC 60664-1	NOTE Harmonized as EN 60664-1.
IEC/TS 62271-304	NOTE Harmonized as CLC/TS 62271-304.
IEC 62271-207	NOTE Harmonized as EN 62271-207.
IEC 60721-1	NOTE Harmonized as EN 60721-1.
IEC 60721-2 (series)	NOTE Harmonized as EN 60721-2 (series).
IEC 60721-3 (series)	NOTE Harmonized as EN 60721-3 (series).
IEC 61936-1:2010	NOTE Harmonized as EN 61936-1:2010.
IEC 61936-1:2010/AMD1:2014	NOTE Harmonized as EN 61936-1:2010/A1:2014.

1) At draft stage.

IEC 61850 (series)	NOTE Harmonized as EN 61850 (series).
IEC 62271-3	NOTE Harmonized as EN 62271-3.
IEC 60073	NOTE Harmonized as EN 60073.
IEC 60695-3 (series)	NOTE Harmonized as EN 60695-3 (series).
IEC 60695-7 (series)	NOTE Harmonized as EN 60695-7 (series).
IEC 60068-2-17:1994	NOTE Harmonized as EN 60068-2-17:1994.
CISPR 16-1 (series)	NOTE Harmonized as EN 55016-1 (series).
IEC 60909-0	NOTE Harmonized as EN 60909-0.
IEC 60228	NOTE Harmonized as EN 60228.
IEC 60445	NOTE Harmonized as EN 60445.
IEC 60947-7-1	NOTE Harmonized as EN 60947-7-1.
IEC 60947-7-2	NOTE Harmonized as EN 60947-7-2.
IEC 61810 (series)	NOTE Harmonized as EN 61810 (series).
IEC 61810-1	NOTE Harmonized as EN 61810-1.
IEC 61810-2	NOTE Harmonized as EN 61810-2.
IEC 60947-4-1	NOTE Harmonized as EN 60947-4-1.
IEC 60947-2	NOTE Harmonized as EN 60947-2.
IEC 60947-4-2	NOTE Harmonized as EN 60947-4-2.
IEC 60947-3	NOTE Harmonized as EN 60947-3.
IEC 60947-5-1	NOTE Harmonized as EN 60947-5-1.
IEC 60730-2-13	NOTE Harmonized as EN 60730-2-13.
IEC 60669-1	NOTE Harmonized as EN 60669-1.
IEC 60730-2-9	NOTE Harmonized as EN 60730-2-9.
IEC 61020-1	NOTE Harmonized as EN 61020-1.
IEC 60269-1	NOTE Harmonized as EN 60269-1.
IEC 60269-2	NOTE Harmonized as EN 60269-2.
IEC 60034-1	NOTE Harmonized as EN 60034-1.
IEC 60051-1	NOTE Harmonized as EN 60051-1.
IEC 60051-2	NOTE Harmonized as EN 60051-2.

IEC 60051-4	NOTE Harmonized as EN 60051-4.
IEC 60051-5	NOTE Harmonized as EN 60051-5.
IEC 60309-1	NOTE Harmonized as EN 60309-1.
IEC 60309-2	NOTE Harmonized as EN 60309-2.
IEC 60130 (series)	NOTE Harmonized as EN 60130 (series).
IEC 62326-1	NOTE Harmonized as EN 62326-1.
IEC 60393-1	NOTE Harmonized as EN 60393-1.
IEC 60081	NOTE Harmonized as EN 60081.
IEC 60064	NOTE Harmonized as EN 60064.
IEC 60059	NOTE Harmonized as EN 60059.
IEC 60068-2 (series)	NOTE Harmonized as EN 60068-2 (series).

A1 Amendment A1 European foreword

The text of document 17/1106/FDIS, future IEC 62271-1/AMD1, prepared by IEC/TC 17 “High-voltage switchgear and controlgear” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-1:2017/A1:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022–08–08
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Endorsement notice

The text of the International Standard IEC 62271-1:2017/AMD1:2021 was approved by CENELEC as a European Standard without any modification. A1

IEC 62271-1

Edition 2.1 2021-10
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INTERNATIONAL STANDARD

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High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear

Appareillage à haute tension – Partie 1: Spécifications communes pour appareillage à courant alternatif

IEC 62271-1:2017-07+AMD1:2021-10 CSV(en-fr)

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High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear

Appareillage à haute tension – Partie 1: Spécifications communes pour appareillage à courant alternatif

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 1: Common specifications for alternating current switchgear and controlgear

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 62271-1 has been prepared by technical committee 17: High-voltage switchgear and controlgear.

This second edition cancels and replaces the first edition published in 2007 and Amendment 1:2011. This edition constitutes a technical revision.

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

New numbering in accordance with ISO/IEC directives, Part 2 (2016) and IEEE Std. C37.100.1.

4.1.2 a) The normal service condition for indoor switchgear is limited to one range of 40 °C to –5 °C.

4.1.3 a) The normal service condition for outdoor switchgear is limited to one range of 40 °C to –25 °C.

4.2.2: The specifications from IEC 60071-2:1996 are adopted for altitude correction factors above 1 000 m.

5.2.2: Range I, the rated voltage of 40,5 kV is added Series I Table 1; Table 2 and Table 4 are updated on recommendation of the US National Committee.

6.8: New subclause added for manual operated actuators consistent with “Man Machine Interface” recommendations of IEC 60447 [1] [2].

7.2.6.1: Insert the wording regarding preliminary impulses across open vacuum interrupters according to the result of IEC 17/1026/RQ.

7.3: Changed the requirement for radio interference voltage to a rated voltage level of 245 kV and above, instead of 123 kV and above. This change is based on reported positive test and service experience of utility representatives in the maintenance team of this standard.

7.5.6, Table 14:

a) Introduced the distinction of parts in “OG” (oxidizing gas) or in “NOG” (not oxidizing gas) replacing the former “air” and “SF_6”;

b) Increased the allowable temperature rise for some parts in groups 1 and 2 of Table 14 according to IEC TR 60943 [2];

c) Expanded the definition of allowable temperature rise for categories of accessible surfaces with reference to IEC Guide 117 [3]. See also point 15 in 7.5.6.2.

7.5.6.2: Point 5 is modified to clarify the introduction of “OG” and “NOG” gas.

7.10: Some tests were removed because the relevant test standards of IEC 60068 series were modified or withdrawn.

7.11.3: The acceptance criteria for X-radiation testing are modified to recognize higher rated vacuum interrupters.

Former informative Annex H: Corrosion is deleted, the content is part of IEC TR 62271-306 [4].

New Annex J (informative): Added informative guidelines for the extension of validity of type tests

New Annex K (informative): Added informative guidelines about exposure to pollution

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

FDIS	Report on voting
17/1033/FDIS	17/1037/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The reader’s attention is drawn to the fact that Annex I lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

The list of all parts of the IEC 62271 series under the general title, *High-voltage switchgear and controlgear*, can be found on the IEC website.

2 Numbers in square brackets refer to the Bibliography.

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.

The contents of the Interpretation Sheet 1 of May 2021 have been included in this copy.

AMENDMENT A1 FOREWORD

Amendment 1 to IEC 62271-1:2017 has been prepared by IEC technical committee 17: High-voltage switchgear and controlgear.

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

FDIS	Report on voting
17/1106/FDIS	17/1112/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 Amendment 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/.

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INTRODUCTION

In the preparation of this FDIS draft for the general revision of IEC 62271-1:2007 and IEC 62271-1:2007/AMD1:2011, the maintenance team was motivated by the following principles:

– Application of horizontal standards – such application is mandatory for product standards, (reference IEC Guide 108 [5]). A typical example is the application of IEC 60071 (all parts) dealing with insulation coordination.

– Application of the "principle of verifiability" – as defined in the Directives, Part 2, 5.5 (2016) "…Only those requirements which can be verified shall be included.".

– Organizing information in the proper clause, e.g. terms and definitions in Clause 3, rated values in Clause 5. For example, the values of rated continuous current are specified in Clause 5 but the conditions of test and acceptance criteria (e.g. temperature rise limits) are moved to Clause 7.

– Normal service conditions in Clause 4 are unambiguous statements of conditions under which the switchgear and controlgear is expected to operate. For example: "Solar radiation does not exceed a level of 1 000 W/m^2" rather than "Solar radiation up to a level of 1 000 W/m^2 should be considered".

– Ratings in Clause 5 have been limited to reflect the common specifications of the switchgear and controlgear that are specified by the user and are necessary for operation on the user's network. See the last paragraph of 5.1 for addition clarification.

– Statements or informative NOTES that reflect design guides (not requirements) or application (not standard requirements) are either removed or moved to Clause 9.

  For example, the following former NOTE contains both a design guide and an application issue, neither of which belongs to normal service conditions:
  "Under certain levels of solar radiation, appropriate measures, for example roofing, forced ventilation, test simulating solar gain, etc., may be necessary, or derating may be used, in order not to exceed the specified temperature rises and pressure rise limits".

– Specifications for design and construction in Clause 6 have been limited to requirements that can be verified by test or inspection.

– References to tests and procedures that relate to transportation, installation, commissioning and maintenance have been moved to Clause 11.

– Improve wording to minimize the possibility of miss-interpretation or conflicting interpretations of the specifications, methods or criteria.

– Elimination of hanging paragraphs and actual or potential circular references. Reference to ISO/IEC Directives, Part 2, 22.3.3 (2016).

As a result of the application of these principles or objectives, the FDIS draft includes more revisions that might otherwise be expected.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 1: Common specifications for alternating current switchgear and controlgear

1 Scope

This part of IEC 62271 applies to AC switchgear and controlgear designed for indoor and/or outdoor installation and for operation at service frequencies up to and including 60 Hz and having rated voltages above 1 000 V.

This document applies to all high-voltage switchgear and controlgear except as otherwise specified in the relevant IEC standards for the particular type of switchgear and controlgear.

NOTE For the use of this document, high-voltage is defined as the rated voltage above 1 000 V. However, the term medium voltage is commonly used for distribution systems with voltages above 1 kV and generally applied up to and including 52 kV.

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 60038:2009, *IEC standard voltages*

IEC 60050-131:2002, *International Electrotechnical Vocabulary (IEV) – Part 131: Circuit theory*

IEC 60050-151:2001, *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices*

IEC 60050-192:2015, *International Electrotechnical Vocabulary (IEV) – Part 192: Dependability*

IEC 60050-351, *International Electrotechnical Vocabulary (IEV) – Part 351: Control technology*

IEC 60050-441:1984, *International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses*
IEC 60050-441:1984/AMD1:2000

IEC 60050-551, *International Electrotechnical Vocabulary (IEV) – Part 551: Power electronics*

IEC 60050-581:2008, *International Electrotechnical Vocabulary (IEV) – Part 581: Electromechanical components for electronic equipment*

IEC 60050-601, *International Electrotechnical Vocabulary (IEV) – Chapter 601: Generation, transmission and distribution of electricity – General*

IEC 60050-605, *International Electrotechnical Vocabulary (IEV) – Chapter 605: Generation, transmission and distribution of electricity – Substations*

IEC 60050-614:2016, *International Electrotechnical Vocabulary (IEV) – Part 614: Generation, transmission and distribution of electricity – Operation*

IEC 60050-811, *International Electrotechnical Vocabulary (IEV) – Part 811: Electric traction*

IEC 60050-826:2004, *International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations*

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60071-1:2006, *Insulation co-ordination – Part 1: Definitions, principles and rules*
IEC 60071-1:2006/AMD1:2010

IEC 60071-2:1996, *Insulation co-ordination – Part 2: Application guide*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60255-21-1:1988, *Electrical relays – Part 21: Vibration, shock, bump and seismic tests on measuring relays and protection equipment – Section One: Vibration tests (sinusoidal)*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF_6) for use in electrical equipment*

IEC 60480, *Guidelines for the checking and treatment of sulphur hexafluoride (SF_6) taken from electrical equipment and specification for its re-use*

IEC 60507, *Artificial pollution tests on high-voltage ceramic and glass insulators to be used on a.c. systems*

IEC 60512-2-2, *Connectors for electronic equipment – Tests and measurements – Part 2-2: Electrical continuity and contact resistance tests – Test 2b: Contact resistance – Specified test current method*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC TS 60815-1:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 1: Definitions, information and general principles*

IEC TS 60815-2:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 2: Ceramic and glass insulators for a.c. systems*

IEC TS 60815-3:2008, *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions – Part 3: Polymer insulators for a.c. systems*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-17:2009, *Electromagnetic compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test*

IEC 61000-4-18, *Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test*

IEC 61000-4-29, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

IEC 61000-6-2*, Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

IEC 61000-6-5, *Electromagnetic compatibility (EMC) – Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment*

IEC 61180, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

IEC 61810-7:2006, *Electromechanical elementary relays – Part 7: Test and measurement procedures*

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62271-4, *High-voltage switchgear and controlgear – Part 4: Handling procedures for sulphur hexafluoride (SF_6) and its mixtures*

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR TR 18-2, *Radio interference characteristics of overhead power lines and high-voltage equipment – Part 2: Methods of measurement and procedure for determining limits*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-131, IEC 60050-151, IEC 60050-192, IEC 60050-351, IEC 60050-441, IEC 60050-551, IEC 60050-581, IEC 60050-601, IEC 60050-605, IEC 60050-614, IEC 60050-811 and IEC 60050-826, some of which are recalled hereunder, and the following apply.

ISO and IEC 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