High-voltage switchgear and controlgear - Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal enclosed and solid-insulation enclosed switchgear for rated voltages above 1 kV

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62271-207:2023 sisaldab Euroopa standardi EN IEC 62271-207:2023 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62271-207:2023 consists of the English text of the European standard EN IEC 62271-207:2023.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.12.2023.	Date of Availability of the European standard is 15.12.2023.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	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.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62271-207

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Supersedes EN 62271-207:2012

English Version

High-voltage switchgear and controlgear - Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal enclosed and solid-insulation enclosed switchgear for rated voltages above 1 kV (IEC 62271-207:2023)

Appareillage à haute tension - Partie 207: Qualification sismique des ensembles d'appareillages à isolation gazeuse et des appareillages sous enveloppe métallique et sous enveloppe isolante solide pour des tensions assignées supérieures à 1 kV (IEC 62271-207:2023)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 207: Erdbebenqualifikation für gasisolierte Schaltgerätekombinationen, metallgekapselte und isolierstoffgekapselte Schaltanlagen mit Bemessungsspannungen über 1 kV (IEC 62271-207:2023)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN IEC 62271-207:2023 E

European foreword

The text of document 17C/902/FDIS, future edition 3 of IEC 62271-207, prepared by SC 17C "Assemblies" of IEC/TC 17 "High-voltage switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62271-207:2023.

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) 2024-09-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-12-14

This document supersedes EN 62271-207:2012 and all of its amendments and corrigenda (if any).

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The text of the International Standard IEC 62271-207:2023 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 standard indicated:

IEC 62271-207:2012	NOTE	Approved as EN 62271-207:2012 (not modified)
IEC 62155	NOTE	Approved as EN 62155
IEC 62231	NOTE	Approved as EN 62231
IEC 61462	NOTE	Approved as EN IEC 61462

IEC 62271-207

Edition 3.0 2023-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

High-voltage switchgear and controlgear – Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal enclosed and solid-insulation enclosed switchgear for rated voltages above 1 kV

Appareillage à haute tension – Partie 207: Qualification sismique des ensembles d'appareillages à isolation gazeuse et des appareillages sous enveloppe métallique et sous enveloppe isolante solide pour des tensions assignées supérieures à 1 kV

IEC 62271-207:2023-11(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal-enclosed and solid-insulation enclosed switchgear for rated voltages above 1 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.
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IEC 62271-207 has been prepared by subcommittee 17C: Assemblies, of IEC technical committee 17: High-voltage switchgear and controlgear. It is an International Standard.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision. It also cancels and replaces, through merging, the first edition of IEC TS 62271-210 published in 2013.

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

a) modification of the minimum voltage rating from 52 kV to above 1 kV in order to include medium voltage equipment previously being within IEC TS 62271-210 scope;

b) further harmonisation of qualification procedures with the revised IEEE Std 693-2018 [1][1], Annex A and Annex P, including

   1) matching this document's required response spectra with IEEE Std 693-2018 performance level spectra and IEC TS 62271-210 spectra,

   2) addition of a step-by-step procedure assisting the user of this document to select an appropriate seismic qualification level combining seismic integrity with cost-effective design,

   3) addition of analytical earthquake component combination techniques, and

   4) reference to publicly available accelerograms specially developed to match the IEEE Std 693-2018 spectra for testing and analysis purposes, since this document and IEC TS 62271-210 spectra are identical in shape with IEEE Std 693 spectra.

c) various enhancements of test procedures;

d) addition of minimum contents for seismic qualification reports;

e) scope extended to cover DC GIS including and above 100 kV.

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

Draft	Report on voting
17C/902/FDIS	17C/916/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/publications.

A list of all the parts in the IEC 62271 series, under the general title *High-voltage switchgear and controlgear*, 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,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

[1] Numbers in square brackets refer to the Bibliography.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 207: Seismic qualification for gas-insulated switchgear assemblies, metal-enclosed and solid-insulation enclosed switchgear for rated voltages above 1 kV

1 Scope

This part of IEC 62271 applies to

– gas-insulated switchgear (GIS) assemblies
  - for alternating current of rated voltages above 52 kV complying with IEC 62271-203, and
  - for direct current of rated voltages including and above 100 kV,
  - for indoor and outdoor installations, including their supporting structures,
– AC metal-enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV complying with IEC 62271-200, ground or floor mounted, intended to be used under seismic conditions, and
– AC solid-insulation enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV complying with IEC 62271-201, ground or floor mounted, intended to be used under seismic conditions.

The seismic qualification of the switchgear and controlgear assemblies takes into account testing of typical switchgear and controlgear assemblies combined with methods of analysis. Mutual interaction between directly mounted auxiliary and control equipment and switchgear assemblies is considered.

Seismic qualification philosophy includes selection of seismic qualification level (Clause 4), methodologies for qualification by testing (Clause 5) and by combined testing and analysis (Clause 6), acceptance criteria (Clause 7) and seismic qualification documentation (Clause 8).

Recommendations on increasing the seismic adequacy of switchgear and controlgear assemblies are provided in Annex B. A flowchart of the seismic qualification process is included in Annex C.

The seismic qualification of switchgear and controlgear assemblies by the manufacturer is performed usually if needed.

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 60068-2-47, *Environmental testing – Part 2-47: Tests – Mounting of specimens for vibration, impact and similar dynamic tests*

IEC 60068-2-57:2013, *Environmental testing – Part 2-57: Tests – Test Ff: Vibration – Time-history and sine-beat method*

IEC 60068-3-3:2019, *Environmental testing – Part 3-3: Supporting documentation and guidance – Seismic test methods for equipment*

IEC 60099-4:2014, *Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems*

IEC 62271-1:2017, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*

IEC 62271-200:2021, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-201:2014, *High-voltage switchgear and controlgear – Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-203:2022, *High-voltage switchgear and controlgear – Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

ISO 2041, *Mechanical vibration, shock and condition monitoring – Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60068-3-3, IEC 62271-1, IEC 62271-200, IEC 62271-201, IEC 62271-203, ISO 2041 and the following apply.

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

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

3.1
switchgear and controlgear
switching devices and their combination with associated control, measuring, protective and regulating equipment, including assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures

[SOURCE: IEC 60050-441:1984, 441-11-01]

3.2
metal-enclosed switchgear and controlgear
switchgear and controlgear assemblies with an external metal enclosure intended to be earthed, and complete except for external connections

[SOURCE: IEC 60050-441:1984, 441-12-04, modified – Note deleted.]

3.3
gas-insulated metal-enclosed switchgear
GIS
metal-enclosed switchgear in which the insulation is obtained, at least partly, by an insulating gas or gas mixture other than air at atmospheric pressure

[SOURCE: IEC 60050-441:1984, 441-12-05, modified – Abbreviated term "GIS" added. Words "or gas mixture" added to the definition, and note deleted.]