

**High-voltage switchgear and  
controlgear -- Part 207: Seismic  
qualification for gas-insulated  
switchgear assemblies for rated  
voltages above 52 kV**

High-voltage switchgear and controlgear -- Part 207:  
Seismic qualification for gas-insulated switchgear  
assemblies for rated voltages above 52 kV

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 62271-207:2007 sisaldab Euroopa standardi EN 62271-207:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 62271-207:2007 consists of the English text of the European standard EN 62271-207:2007.</p> <p>This document is endorsed on 23.11.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This International Standard applies to switchgear assemblies for alternating current of rated voltages above 52 kV for indoor and outdoor installations, including their supporting structure rigidly connected to the ground, and does not cover the seismic qualification of live tank circuit breakers. Switchgear assemblies do have typically low centers of gravity, e.g. Gasinsulated switchgear (GIS). For switchgear with higher gravity levels, e.g. live tank circuit breakers, the IEC 62271-300 is applicable. Where switchgear assemblies are not ground-mounted, e.g. in a building, conditions for applications are subject to agreement between users and manufacturers. The seismic qualification of the switchgear assemblies takes into account any auxiliary and control equipment either directly mounted or as a separate structure. This standard provides procedures to seismically qualify ground-mounted switchgear assemblies for rated voltages above 52 kV. The seismic qualification of the switchgear assemblies is only performed upon request. This standard specifies seismic severity levels and gives a choice of methods that may be applied to demonstrate the performance of high-voltage switchgear assemblies for which seismic qualification is required. The final seismic analysis shall be performed by assuming that the switchgear is installed on firm ground.</p>	<p><b>Scope:</b></p> <p>This International Standard applies to switchgear assemblies for alternating current of rated voltages above 52 kV for indoor and outdoor installations, including their supporting structure rigidly connected to the ground, and does not cover the seismic qualification of live tank circuit breakers. Switchgear assemblies do have typically low centers of gravity, e.g. Gasinsulated switchgear (GIS). For switchgear with higher gravity levels, e.g. live tank circuit breakers, the IEC 62271-300 is applicable. Where switchgear assemblies are not ground-mounted, e.g. in a building, conditions for applications are subject to agreement between users and manufacturers. The seismic qualification of the switchgear assemblies takes into account any auxiliary and control equipment either directly mounted or as a separate structure. This standard provides procedures to seismically qualify ground-mounted switchgear assemblies for rated voltages above 52 kV. The seismic qualification of the switchgear assemblies is only performed upon request. This standard specifies seismic severity levels and gives a choice of methods that may be applied to demonstrate the performance of high-voltage switchgear assemblies for which seismic qualification is required. The final seismic analysis shall be performed by assuming that the switchgear is installed on firm ground.</p>
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English version

**Ferrite cores -  
Dimensions -  
Part 1: General specification  
(IEC 62317-1:2007)**

Noyaux en ferrite -  
Dimensions -  
Partie 1: Spécifications générales  
(CEI 62317-1:2007)

Ferritkerne -  
Maße -  
Teil 1: Allgemeine Festlegungen  
(IEC 62317-1:2007)

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**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of document 51/874/CDV, future edition 1 of IEC 62317-1, prepared by IEC TC 51, Magnetic components and ferrite materials, was submitted to the IEC-CENELEC Parallel Unique Acceptance Procedure and was approved by CENELEC as EN 62317-1 on 2007-08-01.

The following dates were fixed:

- |  |       |            |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2008-05-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn   | (dow) | 2010-08-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62317-1:2007 was approved by CENELEC as a European Standard without any modification.

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## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60133	- <sup>1)</sup>	Dimensions of pot-cores made of magnetic oxides and associated parts	EN 60133	2001 <sup>2)</sup>
IEC 60647	- <sup>1)</sup>	Dimensions for magnetic oxide cores intended for use in power supplies (EC-cores)	-	-
IEC 61185	- <sup>1)</sup>	Ferrite cores (ETD-cores) intended for use in power supply applications - Dimensions	EN 61185	2005 <sup>2)</sup>
IEC 61247	- <sup>1)</sup>	PM-cores made of magnetic oxides and associated parts - Dimensions	EN 61247	1997 <sup>2)</sup>
IEC 61596	- <sup>1)</sup>	Magnetic oxide EP-cores and associated parts for use in inductors and transformers - Dimensions	EN 61596	1997 <sup>2)</sup>
IEC 62317-4	- <sup>1)</sup>	Ferrite cores - Dimensions - Part 4: RM-cores and associated parts	EN 62317-4	2005 <sup>2)</sup>
IEC 62317-7	- <sup>1)</sup>	Ferrite cores - Dimensions - Part 7: EER-cores	EN 62317-7	2005 <sup>2)</sup>
IEC 62317-8	- <sup>1)</sup>	Ferrite cores - Dimensions - Part 8: E-cores	EN 62317-8	2006 <sup>2)</sup>
IEC 62317-9	- <sup>1)</sup>	Ferrite cores - Dimensions - Part 9: Planar cores	EN 62317-9	2006 <sup>2)</sup>
IEC 62323	- <sup>1)</sup>	Dimensions of half pot-cores made of ferrite for inductive proximity switches	EN 62323	2005 <sup>2)</sup>
IEC/TR 61604	- <sup>1)</sup>	Dimensions of uncoated ring cores of magnetic oxides	-	-

<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**High-voltage switchgear and controlgear –  
Part 207: Seismic qualification for gas-insulated switchgear assemblies for rated  
voltages above 52 kV**

**Appareillage à haute tension –  
Partie 207: Qualification sismique pour ensembles d'appareillages à isolation  
gazeuse pour des niveaux de tension assignée supérieurs à 52 kV**



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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**High-voltage switchgear and controlgear –  
Part 207: Seismic qualification for gas-insulated switchgear assemblies for  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –****Part 207: Seismic qualification for gas-insulated  
switchgear assemblies for rated voltages above 52 kV**

## FOREWORD

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International Standard IEC 62271-207 has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

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

FDIS	Report on voting
17C/407/FDIS	17C/415/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 first edition of IEC 62271-207 cancels and replaces the first edition of IEC 62271-2 and constitutes a technical revision.

The change from IEC 62271-2 is as follows:

- the minimum voltage rating was changed from 72,5 kV to above 52 kV;

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

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 publication will remain unchanged until the maintenance result 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.

## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### **Part 207: Seismic qualification for gas-insulated switchgear assemblies for rated voltages above 52 kV**

#### **1 Scope and object**

This International Standard applies to switchgear assemblies for alternating current of rated voltages above 52 kV for indoor and outdoor installations, including their supporting structure rigidly connected to the ground, and does not cover the seismic qualification of live tank circuit breakers. Switchgear assemblies do have typically low centers of gravity, e.g. gas-insulated switchgear (GIS).

For switchgear with higher gravity levels, e.g. live tank circuit breakers, the IEC 62271-300 is applicable.

Where switchgear assemblies are not ground-mounted, e.g. in a building, conditions for applications are subject to agreement between users and manufacturers.

The seismic qualification of the switchgear assemblies takes into account any auxiliary and control equipment either directly mounted or as a separate structure.

This standard provides procedures to seismically qualify ground-mounted switchgear assemblies for rated voltages above 52 kV.

The seismic qualification of the switchgear assemblies is only performed upon request.

This standard specifies seismic severity levels and gives a choice of methods that may be applied to demonstrate the performance of high-voltage switchgear assemblies for which seismic qualification is required.

The final seismic analysis shall be performed by assuming that the switchgear is installed on firm ground.

#### **2 Normative references**

The following referenced documents are indispensable for the application 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: Test – Mounting of specimens for vibration, impact and similar dynamic tests*

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

IEC 60068-3-3:1991, *Environmental testing – Part 3: Guidance – Seismic test methods for equipments*

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

IEC 60694, *Common specifications for high-voltage switchgear and controlgear standards*

### **3 Terms and definitions**

For the purposes of this document, the terms and definitions in IEC 60068-3-3, IEC 62271-203 and IEC 60694 apply.

### **4 Seismic qualification requirements**

#### **4.1 General**

The seismic qualification shall demonstrate the ability of the switchgear assemblies to withstand seismic stress.

No failure on the main circuits, the control and auxiliary circuit, including the relevant mounting structures, shall occur.

Permanent deformations are acceptable provided that they do not impair the functionality of the equipment. The equipment shall properly operate after the seismic event as defined in 8.2 and 8.3.

NOTE In the USA the evaluation of the seismic qualifications is conducted according to IEEE 693.

#### **4.2 Preliminary analysis**

##### **4.2.1 Selection of the representative test-set**

Due to practical reasons concerned with the available experimental facilities, the seismic qualification of switchgear assemblies can require the definition and the choice of different sub-sets which still meaningfully represent the whole system for the purpose of structural and functional checks.

Such test-sets shall include the switching devices with their relevant operating mechanism and control equipment, and their electrical and mechanical interfaces.

It is recommended

- to test generic components; to test the worst case components, such as those with the highest load and center of gravity.
- to identify the dynamic behaviour of the plant (natural frequencies and damping ratios) through the experimental activities of Annex A.

##### **4.2.2 Mathematical model of the test-set**

On the basis of technical information concerning the design characteristics of the substation, a three-dimensional model of the test-set shall be created. Such a model shall take into consideration the presence of actual compartments and of their supporting structures, and shall have sufficient sensitivity to describe the dynamic behaviour of the test-set in the frequency range being studied.