

# TECHNICAL SPECIFICATION

# SPÉCIFICATION TECHNIQUE

**High-voltage switchgear and controlgear –  
Part 304: Design classes for indoor enclosed switchgear and controlgear for  
rated voltages above 1 kV up to and including 52 kV to be used in severe  
climatic conditions**

**Appareillage à haute tension –  
Partie 304: Classes de construction pour l'appareillage d'intérieur sous  
enveloppe pour tensions assignées à partir de 1 kV jusqu'à 52 kV inclus pour  
usage sous conditions climatiques sévères**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 304: Design classes for indoor enclosed  
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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62771-304, which is a technical specification, has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
17C/402/DTS	17C/422A/RVC

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

This first edition of IEC/TS 62271-304 cancels and replaces the first edition of IEC/TR 60932, published in 1988, and constitutes a technical revision.

This revised document has been basically changed to be updated to today's use of high-voltage switchgear and controlgear up to 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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of January 2010 have been included in this copy.

## HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 304: Design classes for indoor enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV to be used in severe climatic conditions

#### 1 Scope and object

This part of IEC 62271 applies to indoor enclosed switchgear and controlgear complying with IEC 62271-200 and IEC 62271-201, intended to be used in service conditions more severe with respect to condensation and pollution than the normal service conditions specified in IEC 62271-1.

This technical specification covers equipment where any of the insulation is exposed to indoor climatic conditions.

The test detailed in this technical specification has been designed primarily to investigate the behaviour of electrical insulation and not corrosion on equipments. Nevertheless, the performance of mechanical components, such as mechanisms, interlocks and enclosures may also be recorded.

This technical specification proposes definitions for two degrees of severe service conditions with respect to condensation and pollution. It also proposes test procedures for assessing the performance of enclosed switchgear and controlgear under specified conditions so that conclusions may be drawn concerning their suitability for service under those severe service conditions.

In this technical specification, the term "equipment" is used in accordance with the scope for an "enclosed assembly of switchgear and controlgear" (see IEC 60050-441, definition 441-12-02).

NOTE The testing procedures described in this technical specification may also be applied to internal insulation of outdoor equipment.

#### 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 60060-1: *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068 (all parts), *Environmental testing*

IEC 62271-1:2007, *High-voltage switchgear and controlgear – Part 1: Common specifications*

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

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

### 3 Degrees of severity of service conditions under condensation and pollution

Indoor equipment installed inside a building or room and thus normally protected against the outdoor climatic conditions may be subjected to condensation due to rapid temperature changes and to pollution due to the environment inside the building.

The service conditions with respect to condensation and pollution around the enclosed switchgear and controlgear are designated and characterized as follows:

- $C_0$ : Condensation does not normally occur (not more than twice a year)
- Equipment to be used in locations with humidity and/or temperature control in order to avoid condensation. The building or room provides protection from daily variations of outside climate.
- $C_L$ : Non-frequent condensation (not more than twice a month)
- Equipment to be used in locations without humidity and/or temperature control. The building or room provides protection from daily variations of outside climate, but condensation cannot be excluded.
- $C_H$ : Frequent condensation (more than twice a month)
- Equipment to be used in locations without temperature control. The building or room provides only minimal protection from daily variations of outside climate, so that frequent condensation may occur.
- $P_L$ : Light pollution (as given in 2.1.1, item d) of IEC 62271-1) (see note 2 below)
- In order to reach light pollution in heavy polluted locations precautions may be necessary.
- $P_H$ : Heavy pollution (any value exceeding  $P_L$ )  
 $P_H$  does not include areas subject to conductive dust and/or to industrial smoke, producing thick conductive deposits.
- The location has no special precautions to minimize the presence of deposits, or the equipment is situated in close proximity to pollution sources.

NOTE 1 Absence of pollution is considered as unrealistic. At least light pollution is assumed.

NOTE 2 IEC 62271-1, 2.1.1, item d): "The ambient air is not significantly polluted by dust, smoke, corrosive and/or flammable gases, vapours or salt. The manufacturer will assume that, in absence of specific requirements from the user, there are none."

NOTE 3 Precautions to minimize the amount of deposits inside the enclosure of the equipment may be taken by the choice of an appropriate degree of protection of the enclosed switchgear and controlgear.

Taking into account the fact that the equipment is especially influenced by the combination of humidity and pollution, three degrees of severity of service conditions are defined as follows: