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High-voltage switchgear and controlgear -
Part 208: Methods to quantify the steady state, power-frequency electromagnetic fields generated by HV switchgear assemblies and HV/LV prefabricated substations, both for rated voltages above 1 kV and up to and including 52 kV

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IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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High-voltage switchgear and controlgear - Part 208: Methods to quantify the steady state, power-frequency electromagnetic fields generated by HV switchgear assemblies and HV/LV prefabricated substations, both for rated voltages above 1 kV and up to and including 52 kV

FOREWORD

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IEC 62271-208 document has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

This first edition cancels and replaces the first edition of IEC TR 62271-208, published in 2009. This edition constitutes a technical revision.

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

a) the isoline measurement procedure is introduced and compared to the hot spot one when it is required as a measurement for the characterization of a generated electromagnetic field.

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

Draft	Report on voting
17C/977/FDIS	17C/983/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, or
– revised.

INTRODUCTION

Manufacturers of electricity supply equipment can be asked to provide information about the electromagnetic field characteristics to enable the user to

- assess the electromagnetic field conditions to assist with planning, installation, operating instructions and service,
- take measures to meet requirements or regulations on electromagnetic fields,
- compare different products as far as their level of electromagnetic fields is concerned.

The purpose of this document is to describe a methodology for the evaluation (measurement or calculation) of generated electromagnetic fields. In particular, if a measurement is required, hot spot and isolines procedures are introduced and described.

The electromagnetic field characteristic of the equipment comprises the values of the electric and the magnetic fields around its accessible surfaces.

The electromagnetic field characteristic defined in this document refers to a single product as defined in the scope. In real installations, several field sources can superimpose, so the resulting electromagnetic fields on site can differ significantly from the single product characteristics.

This document does not define a mandatory test for the products mentioned in the scope.

Neither the establishment of limits for the electromagnetic fields generated by equipment, nor the establishment of assessment methods for the human exposure to electromagnetic fields are within the content or intent of this document.

1 Scope

This part of IEC 62271 gives practical guidance for the evaluation and documentation of the external steady state power-frequency electromagnetic fields which are generated by HV switchgear and controlgear assemblies and prefabricated substations. Basic requirements to measure or calculate the electric and magnetic fields are summarised for assemblies covered by IEC 62271-200 and IEC 62271-201, and for prefabricated substations covered by IEC 62271-202.

NOTE 1 The methods described in this document refer to three-phase equipment. However, the methodology can be used correspondingly for any single- or multi-phase equipment covered by this document.

This document applies to equipment rated for voltages above 1 kV up to and including 52 kV and power-frequencies from 15 Hz to 60 Hz. The electromagnetic fields which are generated by harmonics or transients are not considered in this document. However, the methods described are equally applicable to the harmonic fields of the power-frequency.

Detailed generic information on requirements and measurements of low-frequency electromagnetic fields is given in IEC 61786-1 and IEC 61786-2.

This document covers evaluation under factory or laboratory conditions before installation. The electric and the magnetic fields can be evaluated either by measurements or by calculations.

NOTE 2 Where practicable, the methods described in this document can also be used for installations on site.

It is not within the scope of this document to specify limit values of electromagnetic fields or methods for the assessment of human exposure.

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

IEC 61786-1, *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 1: Requirements for measuring instruments*

IEC 61786-2, *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings - Part 2: Basic standard for measurements*

IEC 62271-200, *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, *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 62271-202, *High-voltage switchgear and controlgear - Part 202: AC prefabricated substations for rated voltages above 1 kV and up to and including 52 kV*

Bibliography

[1] IEC 60050-121:2021, *International Electrotechnical Vocabulary (IEV) - Part 121: Electromagnetism*

[2] IEC 62110, *Electric and magnetic field levels generated by AC power systems - Measurement procedures with regard to public exposure*

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