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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 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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This commented version (CMV) of the official standard IEC 62271-203:2022 edition 3.0 allows the user to identify the changes made to the previous IEC 62271-203:2011 edition 2.0. Furthermore, comments from IEC SC 17C experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 62271-203 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 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition: **2**

a) the document has been aligned with IEC 62271-1:2017;

b) beside SF_6 also alternative gases have been implemented where needed;

c) the terms and definitions have been updated and terms not used have been removed;

d) Subclause 6.16 “Gas and vacuum tightness” has been updated;

e) Subclause 6.16.3 “Closed pressure systems”: Two classes of gas has been introduced:

   1) GWP ≤ 1 000

   2) GWP > 1 000

   and the tightness requirements for type tests for gasses with GWP > 1 000 has been reduced from 0,5 % to 0,1 % per year per gas compartment;

f) Subclause 6.108 “Interfaces”: Typical maximum pressures in service for interfaces connected to GIS have been defined;

g) Subclauses 7.2 through 7.8 have been restructured;

h) Subclause 7.107 “Corrosion test on earthing connections” has been updated;

i) Subclause 7.108 “Corrosion tests on sealing systems of enclosures and auxiliary equipment” has been updated;

j) Annex F ‘Service Continuity’ has been modified and aligned with the recommendations of CIGRE WG B3.51.

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

Draft	Report on voting
17C/835/FDIS	17C/844/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/standardsdev/publications.

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

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 kV 3

~~1 General~~

1 Scope

This part of IEC 62271 specifies requirements for gas-insulated metal-enclosed switchgear in which the insulation is obtained, at least partly, by an insulating gas or gas mixture 4 other than air at atmospheric pressure, for alternating current of rated voltages above 52 kV, for indoor and outdoor installation, and for service frequencies up to and including 60 Hz.

For the purpose of this document, the terms “GIS” and “switchgear” are used for “gas-insulated metal-enclosed switchgear”.

The gas-insulated metal-enclosed switchgear covered by this document consists of individual components intended to be directly connected together and able to operate only in this manner.

This document completes and amends, if ~~necessary~~ applicable, the various relevant standards applying to the individual components constituting GIS.

2 Normative references 5

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 60044-1:1996, *Instrument transformers – Part 1: Current transformers*~~

~~IEC 60044-2:1997, *Instrument transformers – Part 2: Inductive voltage transformers*~~

IEC 60068-2-11, ~~*Basic environmental testing procedures*~~ *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-17, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

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

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

IEC 60137:~~2008~~2017, ~~*Insulating*~~ *Insulated bushings for alternating voltages above 1 000 V*

IEC 60141-1, *Tests on oil-filled and gas-pressure cables and their accessories – Part 1: Oil-filled, paper or polypropylene paper laminate insulated, metal-sheathed cables and accessories for alternating voltages up to and including ~~400~~ 500 kV*

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

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF_6) and complementary gases to be used in its mixtures for use in electrical equipment*

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

IEC 60840, *Power cables with extruded insulation and their accessories for rated voltages above 30 kV (U_m = 36 kV) up to 150 kV (U_m = 170 kV) – Test methods and requirements*

~~IEC/TR 61639:1996, *Direct connection between power transformers and gas-insulated metal-enclosed switchgear for rated voltages of 72,5 kV and above*~~

IEC 61869-1, *Instrument transformers – Part 1: General requirements*

IEC 61869-2, *Instrument transformers – Part 2: Additional requirements for current transformers*

IEC 61869-3, *Instrument transformers – Part 3: Additional requirements for inductive voltage transformers*

IEC 62067, *Power cables with extruded insulation and their accessories for rated voltages above 150 kV (U_m = 170 kV) up to 500 kV (U_m = 550 kV) – Test methods and requirements*

IEC 62271-1:~~2007~~2017, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*

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

IEC 62271-100:~~2008~~2021, *High-voltage switchgear and controlgear – Part 100: Alternating current circuit-breakers*

IEC 62271-102:~~2001~~2018, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62271-209:~~2007~~2019, *High-voltage switchgear and controlgear – Part 209: Cable connections for gas-insulated metal-enclosed switchgear for rated voltages above 52 kV – Fluid-filled and extruded insulation cables – Fluid-filled and dry-type cable-terminations*

IEC 62271-211:2014, *High-voltage switchgear and controlgear – Part 211: Direct connection between power transformers and gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

~~IEC/TR 62271-303, *High-voltage switchgear and controlgear – Part 303: Use and handling of sulphur hexafluoride (SF_6)*~~

~~ISO 3231, *Paints and varnishes – Determination of resistance to humid atmospheres containing sulfur dioxide*~~

ISO 22479, *Corrosion of metals and alloys – Sulfur dioxide test in a humid atmosphere (fixed gas method)*

IEC 62271-203

Edition 3.0 2022-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Appareillage à haute tension – Partie 203: Appareillage sous enveloppe métallique à isolation gazeuse et à courant alternatif de tensions assignées supérieures à 52 kV



IEC 62271-203:2022-05(en-fr)

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IEC 60137:2017, *Insulated bushings for alternating voltages above 1 000 V*

IEC 60141-1, *Tests on oil-filled and gas-pressure cables and their accessories – Part 1: Oil-filled, paper or polypropylene paper laminate insulated, metal-sheathed cables and accessories for alternating voltages up to and including 500 kV*

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

IEC 60376, *Specification of technical grade sulphur hexafluoride (SF_6) and complementary gases to be used in its mixtures for use in electrical equipment*

IEC 60480, *Specifications for the re-use of sulphur hexafluoride (SF_6) and its mixtures in electrical equipment*

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

IEC 62271-100:2021, *High-voltage switchgear and controlgear – Part 100: Alternating current circuit-breakers*

IEC 62271-102:2018, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62271-209:2019, *High-voltage switchgear and controlgear – Part 209: Cable connections for gas-insulated metal-enclosed switchgear for rated voltages above 52 kV – Fluid-filled and extruded insulation cables – Fluid-filled and dry-type cable-terminations*

IEC 62271-211:2014, *High-voltage switchgear and controlgear – Part 211: Direct connection between power transformers and gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILLAGE À HAUTE TENSION –

Partie 203: Appareillage sous enveloppe métallique à isolation gazeuse et à courant alternatif de tensions assignées supérieures à 52 kV

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L'IEC 62271-203 a été établie par le sous-comité 17C: Ensembles, du comité d'études 17 de l'IEC: Appareillage haute tension. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2011. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) le document a été aligné sur l'IEC 62271-1:2017;
b) outre le SF_6, des gaz alternatifs ont également été mis en œuvre lorsque nécessaire;
c) les termes et définitions ont été actualisés et les termes non employés ont été supprimés;

d) le paragraphe 6.16 “Étanchéité au gaz et au vide” a été actualisé;

e) paragraphe 6.16.3 ‘’Systèmes à pression autonome’’: Deux classes de gaz ont été présentées:

   1) PRC ≤ 1 000

   2) PRC > 1 000

   et les exigences d'étanchéité relatives aux essais de type pour des gaz avec PRC > 1 000 ont été réduites de 0,5 % à 0,1 % par an et par compartiment de gaz;

f) paragraphe 6.108 “Interfaces”: des pressions maximales types en service pour les interfaces reliées au PSEM ont été définies;

g) les paragraphes 7.2 à 7.8 ont été restructurés;

h) le paragraphe 7.107 “Essai de corrosion sur les connexions de terre” a été actualisé;

i) le paragraphe 7.108 ‘’Essais de corrosion sur les systèmes d'étanchéité des enveloppes et des équipements auxiliaires’’ a été actualisé;

j) l’Annexe F ‘’Continuité de service’’ a été modifiée et alignée sur les recommandations du groupe de travail B3.51 du CIGRE.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
17C/835/FDIS	17C/844/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l’élaboration de cette Norme internationale est l’anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Le comité a décidé que le contenu du présent document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

APPAREILLAGE À HAUTE TENSION –

Partie 203: Appareillage sous enveloppe métallique à isolation gazeuse et à courant alternatif de tensions assignées supérieures à 52 kV

1 Domaine d'application

La présente partie de l'IEC 62271 spécifie les exigences pour l'appareillage sous enveloppe métallique à isolation gazeuse dont l'isolation est réalisée, au moins partiellement, par un gaz isolant ou un mélange de gaz autre que l'air à la pression atmosphérique, pour courant alternatif de tensions assignées supérieures à 52 kV, pour l'installation à l'intérieur et à l'extérieur, et pour des fréquences de service inférieures ou égales à 60 Hz.

Pour les besoins du présent document, les termes "poste sous enveloppe métallique" (PSEM) et "appareillage" sont utilisés pour "appareillage sous enveloppe métallique à isolation gazeuse".

L'appareillage sous enveloppe métallique à isolation gazeuse auquel s'applique le présent document est constitué par des matériels individuels destinés à être directement raccordés entre eux et qui ne peuvent fonctionner que sous cette forme.

Le présent document complète et modifie, le cas échéant, les différentes normes pertinentes applicables aux matériels individuels constitutifs de l'appareillage sous enveloppe métallique à isolation gazeuse.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-11, *Essais d'environnement – Partie 2-11: Essais – Essai Ka: Brouillard salin*

IEC 60068-2-17, *Essais fondamentaux climatiques et de robustesse mécanique – Partie 2-17: Essais – Essai Q: Étanchéité*

IEC 60085:2007, *Isolation électrique – Évaluation et désignation thermiques*

IEC 60099-4:2014, *Parafoudres – Partie 4: Parafoudres à oxyde métallique sans éclateur pour réseaux à courant alternatif*

IEC 60137:2017, *Traversées isolées pour tensions alternatives supérieures à 1 000 V*

IEC 60141-1, *Essais de câbles à huile fluide, à pression de gaz et de leurs dispositifs accessoires – Partie 1: Câbles au papier à huile fluide et à gaine métallique et accessoires pour des tensions alternatives inférieures ou égales à 400 kV*

IEC 60270, *Technique des essais à haute tension – Mesures des décharges partielles*

IEC 60376, *Spécification de la qualité technique de l'hexafluorure de soufre (SF_6) et des gaz complémentaires à employer dans les mélanges de SF6 pour utilisation dans les matériels électriques*

IEC 60480, *Spécifications pour la réutilisation de l'hexafluorure de soufre (SF_6) et des mélanges contenant du SF6 dans le matériel électrique*

IEC 60840, *Câbles d'énergie à isolation extrudée et leurs accessoires pour des tensions assignées supérieures à 30 kV (U_m = 36 kV) et jusqu'à 150 kV (U_m = 170 kV) – Méthodes et exigences d'essai*

IEC 61869-1, *Transformateurs de mesure – Partie 1: Exigences générales*

IEC 61869-2, *Transformateurs de mesure – Partie 2: Exigences supplémentaires concernant les transformateurs de courant*

IEC 61869-3, *Transformateurs de mesure – Partie 3: Exigences supplémentaires concernant les transformateurs inductifs de tension*

IEC 62067, *Câbles d'énergie à isolation extrudée et leurs accessoires pour des tensions assignées supérieures à 150 kV (U_m = 170 kV) et jusqu'à 500 kV (U_m = 550 kV) – Méthodes et exigences d'essai*

IEC 62271-1:2017, *Appareillage à haute tension – Partie 1: Spécifications communes pour appareillage à courant alternatif*

IEC 62271-4, *Appareillage à haute tension – Partie 4: Utilisation et manipulation de l'hexafluorure de soufre (SF_6) et des mélanges contenant du SF_6*

IEC 62271-100:2021, *Appareillage à haute tension – Partie 100: Disjoncteurs à courant alternatif*

IEC 62271-102:2018, *Appareillage à haute tension – Partie 102: Sectionneurs et sectionneurs de terre à courant alternatif*

IEC 62271-209:2019, *Appareillage à haute tension – Partie 209: Raccordement de câbles pour appareillage sous enveloppe métallique à isolation gazeuse de tension assignée supérieure à 52 kV – Câbles remplis d'un fluide ou à isolation extrudée – Extrémité de câble de type sec ou remplie d'un fluide*

IEC 62271-211:2014, Appareillage à haute tension – Partie 211: *Raccordements directs entre transformateurs de puissance et appareillage sous enveloppe métallique à isolation gazeuse de tensions assignées supérieures à 52 kV*

ISO 22479, *Corrosion des métaux et alliages – Essai au dioxyde de soufre en atmosphère humide (méthode avec volume fixe de gaz)*