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REDLINE VERSION

Kopplingsapparater för spänning över 1 kV – Del 204: Styva gasisolerade transmissionsledningar för märkspänning över 52 kV

High-voltage switchgear and controlgear –

Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV

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IEC 62271-204

Edition 2.0 2022-05
REDLINE VERSION

INTERNATIONAL STANDARD



**High-voltage switchgear and controlgear –
Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.130.10

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 204: Rigid gas-insulated transmission lines
for rated voltage 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62271-204:2011. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62271-204 has been prepared by subcommittee 17C: Assemblies, of IEC technical committee 17: High-voltage switchgear and controlgear. It is an International Standard.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

- a) update to be in line with IEC 62271-1:2017 and alignment of the voltage ratings and the test voltages.
- b) addition of new information for welds on pressurized parts and gas tightness.

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

Draft	Report on voting
17C/840/FDIS	17C/846/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.

This document is to be read in conjunction with IEC 62271-1:2017 and IEC 62271-203:2022, to which it refers and which are applicable unless otherwise specified. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in IEC 62271-1:2017 and IEC 62271-203:2022. Amendments to these clauses and subclauses are given under the same numbering, whilst additional subclauses are numbered from 101.

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- reconfirmed,
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- replaced by a revised edition, or
- amended.

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV

~~1~~ **General**

1 Scope

This part of IEC 62271 applies to rigid HV gas-insulated transmission lines (GIL) in which the insulation is obtained, at least partly, by ~~a non-corrosive insulating gas~~, an insulating gas or gas mixture other than air at atmospheric pressure, for alternating current of rated voltages above 52 kV, and for service frequencies up to and including 60 Hz.

This document is ~~intended that this international standard be used~~ applicable where the provisions of IEC 62271-203 do not cover the application of GIL (see Note 3).

At each end of the HV gas-insulated transmission line, a specific element ~~may be~~ is used for the connection between the HV gas-insulated transmission line and other equipment like bushings, power transformers or reactors, cable boxes, metal-enclosed surge arresters, voltage transformers or GIS, covered by their own specification.

Unless otherwise specified, the HV gas-insulated transmission line is designed to be used under normal service conditions.

NOTE 1 In this document, the term "HV gas-insulated transmission line" is abbreviated to "GIL".

NOTE 2 In this document, the word "gas" means gas or gas mixture, as defined by the manufacturer.

NOTE 3 Examples of GIL applications:

- where all or part of the HV gas-insulated transmission line is directly buried;
- where the HV gas-insulated transmission line is located, wholly or partly, in an area accessible to public;
- where the HV gas-insulated transmission line is long (typically longer than 500 m) and the typical gas compartment length exceeds the common practice of GIS technology.

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 60050-151, International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices~~

~~IEC 60050-441:1984, International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses~~

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60229:2007, *Electric cables – Tests on extruded oversheaths with a special protective function*

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

IEC 60287-3-1:19952017, *Electric cables – Calculation of the current rating – Part 3-1: Sections on Operating conditions* – ~~Reference operating conditions and selection of cable type~~ *Site reference conditions*

IEC 60376, *Specification of technical grade sulfur hexafluoride (SF₆) 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 (SF₆) taken from electrical equipment and specification of its re-use~~ *Specifications for the re-use of sulfur hexafluoride (SF₆) and its mixtures in electrical equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 62271-1:20072017, *High-voltage switchgear and controlgear – Part 1: Common specifications for alternating current switchgear and controlgear*

IEC 62271-203:20142022, *High-voltage switchgear and controlgear – Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 kV⁴*

~~IEC 62271-303, High-voltage switchgear and controlgear – Part 303: Use and handling of sulphur hexafluoride (SF₆)~~

IEC 62271-4:2013, *High-voltage switchgear and controlgear – Part 4: Handling procedures for sulphur hexafluoride (SF₆) and its mixtures*

~~ISO/IEC Guide 51, Safety aspects – Guidelines for their inclusion in standards~~

ISO 9606 (all parts), *Qualification test of welders – Fusion welding*

ISO 9712, *Non-destructive testing – Qualification and certification of NDT personnel*

ISO 14732, *Welding personnel – Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials – Welding procedure specification*

ISO 15614 (all parts), *Specification and qualification of welding procedures for metallic materials – Welding procedure test*

⁴ ~~To be published.~~

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High-voltage switchgear and controlgear –

Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV

Som svensk standard gäller europastandarden EN IEC 62271-204:2022. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62271-204:2022.

Nationellt förord

Europastandarden EN IEC 62271-204:2022

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 62271-204, Second edition, 2022 - High-voltage switchgear and controlgear - Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN 62271-1, utgåva 2, 2018 och SS-EN IEC 62271-203, utgåva 3, 2022.

Tidigare fastställd svensk standard SS-EN 62271-204, utgåva 1, 2012, gäller ej fr o m 2025-07-05.

ICS 29.130.10

Denna standard är fastställd av SEK Svensk Elstandard,
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Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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English Version

**High-voltage switchgear and controlgear - Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV
(IEC 62271-204:2022)**

Appareillage à haute tension - Partie 204: Lignes de transport rigides à isolation gazeuse de tension assignée supérieure à 52 kV
(IEC 62271-204:2022)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 204: Starre gasisolierte Übertragungsleitungen für Bemessungsspannungen über 52 kV
(IEC 62271-204:2022)

This European Standard was approved by CENELEC on 2022-07-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 17C/840/FDIS, future edition 2 of IEC 62271-204, 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 62271-204:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2023-04-05 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2025-07-05 document have to be withdrawn

This document supersedes EN 62271-204:2011 and all of its amendments and corrigenda (if any).

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Endorsement notice

The text of the International Standard IEC 62271-204:2022 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 standards indicated:

IEC 60071-1	NOTE Harmonized as EN IEC 60071-1
ISO 5817	NOTE Harmonized as EN ISO 5817
ISO 6520 (series)	NOTE Harmonized as EN ISO 6520 (series)
ISO 10042	NOTE Harmonized as EN ISO 10042
ISO 10675-1	NOTE Harmonized as EN ISO 10675-1
ISO 10675-2	NOTE Harmonized as EN ISO 10675-2
ISO 10893-8	NOTE Harmonized as EN ISO 10893-8
ISO 10893-9	NOTE Harmonized as EN ISO 10893-9
ISO 10893-10	NOTE Harmonized as EN ISO 10893-10
ISO 10893-11	NOTE Harmonized as EN ISO 10893-11
ISO 11666	NOTE Harmonized as EN ISO 11666
ISO 17640	NOTE Harmonized as EN ISO 17640
IEC 60270	NOTE Harmonized as EN 60270
ISO 22825	NOTE Harmonized as EN ISO 22825
ISO 23279	NOTE Harmonized as EN ISO 23279

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60060-1	2010	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	2010
IEC 60068-1	2013	Environmental testing - Part 1: General and guidance	EN 60068-1	2014
IEC 60229	2007	Electric cables - Tests on extruded oversheaths with a special protective function	EN 60229	2008
IEC 60287-3-1	2017	Electric cables - Calculation of the current rating - Part 3-1: Operating conditions - Site reference conditions	-	-
IEC 60376	-	Specification of technical grade sulfur hexafluoride (SF ₆) and complementary gases to be used in its mixtures for use in electrical equipment	EN IEC 60376	-
IEC 60480	-	Specifications for the re-use of sulphur hexafluoride (SF ₆) and its mixtures in electrical equipment	EN IEC 60480	-
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
-	-		+ corrigendum May 1993	
+ A1	1999		+ A1	2000
+ A2	2013		+A2	2013
			+AC	2016-12
			+AC	2019-02
IEC 62271-1	2017	High-voltage switchgear and controlgear - Part 1: Common specifications for alternating current switchgear and controlgear	EN 62271-1	2017
IEC 62271-4	2013	High-voltage switchgear and controlgear - Part 4: Handling procedures for sulphur hexafluoride (SF ₆) and its mixtures	EN 62271-4	2013

EN IEC 62271-204:2022 (E)

IEC 62271-203	2022	High-voltage switchgear and controlgear - - Part 203: AC gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	-	-
ISO 9606	series	Qualification test of welders - Fusion welding	EN ISO 9606	series
ISO 9712	-	Non-destructive testing - Qualification and certification of NDT personnel	EN ISO 9712	-
ISO 14732	-	Welding personnel - Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials	EN ISO 14732	-
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INTERNATIONAL STANDARD

NORME INTERNATIONALE

**High-voltage switchgear and controlgear –
Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV**

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Partie 204: Lignes de transport rigides à isolation gazeuse de tension assignée
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Part 204: Rigid gas-insulated transmission lines for rated voltage above 52 kV

1 Scope

This part of IEC 62271 applies to rigid HV gas-insulated transmission lines (GIL) in which the insulation is obtained, at least partly, by an insulating gas or gas mixture other than air at atmospheric pressure, for alternating current of rated voltages above 52 kV, and for service frequencies up to and including 60 Hz.

This document is applicable where the provisions of IEC 62271-203 do not cover the application of GIL (see Note 3).

At each end of the HV gas-insulated transmission line, a specific element is used for the connection between the HV gas-insulated transmission line and other equipment like bushings, power transformers or reactors, cable boxes, metal-enclosed surge arresters, voltage transformers or GIS, covered by their own specification.

Unless otherwise specified, the HV gas-insulated transmission line is designed to be used under normal service conditions.

NOTE 1 In this document, the term "HV gas-insulated transmission line" is abbreviated to "GIL".

NOTE 2 In this document, the word "gas" means gas or gas mixture, as defined by the manufacturer.

NOTE 3 Examples of GIL applications:

- where all or part of the HV gas-insulated transmission line is directly buried;
- where the HV gas-insulated transmission line is located, wholly or partly, in an area accessible to public;
- where the HV gas-insulated transmission line is long (typically longer than 500 m) and the typical gas compartment length exceeds the common practice of GIS technology.

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 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60229:2007, *Electric cables – Tests on extruded oversheaths with a special protective function*

IEC 60287-3-1:2017, *Electric cables – Calculation of the current rating – Part 3-1: Operating conditions – Site reference conditions*

IEC 60376, *Specification of technical grade sulfur hexafluoride (SF₆) and complementary gases to be used in its mixtures for use in electrical equipment*

IEC 60480, *Specifications for the re-use of sulfur hexafluoride (SF₆) and its mixtures in electrical equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

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

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

IEC 62271-4:2013, *High-voltage switchgear and controlgear – Part 4: Handling procedures for sulphur hexafluoride (SF₆) and its mixtures*

ISO 9606 (all parts), *Qualification test of welders – Fusion welding*

ISO 9712, *Non-destructive testing – Qualification and certification of NDT personnel*

ISO 14732, *Welding personnel – Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials – Welding procedure specification*

ISO 15614 (all parts), *Specification and qualification of welding procedures for metallic materials – Welding procedure test*