

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**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**

**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 sèche
ou remplie d'un fluide**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**

FOREWORD

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International Standard IEC 62271-209 has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

This first edition of IEC 62271-209 cancels and replaces the second edition of IEC/TS 60859 and constitutes a technical revision. The changes from IEC/TS 60859 are as follows:

- the minimum voltage rating was changed from "72,5 kV" to "above 52 kV";
- the current rating was increased to 3150 A;

- simplifications and modifications of the dimension tables in Figure 2 and Figure 4 such as diameters for 123 kV to 170 kV have been adopted in order to accommodate larger cable cross-sections; new dimensions accept old terminations, new terminations may not meet old GIS standards;
- the following dimensions have been deleted: I1, I3 as well as note 3 on Figure 4;
- in Figure 4, new dimensions have been adopted for the voltage range from 245 kV to 300 kV, interchangeability for 245 kV to 300 kV is not maintained due to reduction in GIS cable termination housing;
- the lengths I7 and I8 have been modified;
- changes in the text in relation to minimum functional pressure for insulation p_{me} (Table 1 has been removed);
- the limit of 170 kV for 3-phase application was deleted (Subclause 5.2);
- Figure 5 was deleted.

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

FDIS	Report on voting
17C/405/FDIS	17C/412/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 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

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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

1 Scope

This standard covers the connection assembly of fluid-filled and extruded cables to gas-insulated metal enclosed switchgear (GIS), in single- or three-phase arrangements where the cable-terminations are fluid-filled or dry type and there is a separating insulating barrier between the cable insulation and the gas insulation of the switchgear.

The purpose of this standard is to establish electrical and mechanical interchangeability between cable-terminations and the gas-insulated metal-enclosed switchgear and to determine the limits of supply. It complements and amends, if necessary, the relevant IEC standards. For the purpose of this standard the term "switchgear" is used for "gas-insulated metal enclosed switchgear".

It does not cover directly immersed cable terminations, as described in CIGRE brochure 89.

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 60038:1983, *IEC standard voltages*¹
Amendment 1 (1994)
Amendment 2 (1997)

IEC 60141 (all parts), *Tests on oil-filled and gas-pressure cables and their accessories*

IEC 60141-1:1993, *Tests on oil-filled and gas-pressure cables and their accessories – Part 1: Oil-filled, paper-insulated, metal-sheathed cables and accessories for alternating voltages up to and including 400 kV*

IEC 60141-2:1963, *Tests on oil-filled and gas-pressure cables and their accessories – Part 2: Internal gas-pressure cables and accessories for alternating voltages up to 275 kV*

IEC 60694:1996, *Common specifications for high-voltage switchgear and controlgear standards*

IEC 60840:2004, *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*

¹ There exists a consolidated version (2002) including Amendment 1 and 2.

IEC 62067:2001, *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*

Amendment 1 (2006)

IEC 62271-203:2003, *High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

Report of CIGRE WG 23-10, ELECTRA 151, December 1993, *Earthing of GIS – An Application Guide*

CIGRE brochure 89: *Accessories for HV Extruded Cables, CIGRE WG 21.06, 1995, Chapter 2.1.5 Directly Immersed Metal Enclosed GIS Termination*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

cable-termination

equipment fitted to the end of a cable to ensure electrical connection with other parts of the system and to maintain the insulation up to the point of connection. Two types are described in this standard.

3.1.1

fluid-filled cable-termination

cable-termination which comprises of a separating insulating barrier between the cable insulation and the gas insulation of switchgear. The cable-termination includes an insulating fluid as part of the cable connection assembly.

3.1.2

dry-type cable-termination

cable-termination which comprises an elastomeric electrical stress control component in intimate contact with a separating insulating barrier (insulator) between the cable insulation and the gas insulation of the switchgear. The cable-termination does not require any insulating fluid.

3.2

main-circuit end terminal

part of the main circuit of a gas-insulated metal enclosed switchgear forming part of the connection interface

3.3

cable connection enclosure

part of the gas-insulated metal-enclosed switchgear which houses the cable-termination and the main-circuit end terminal

3.4

cable connection assembly

combination of a cable-termination, a cable connection enclosure and a main-circuit end terminal, which mechanically and electrically connects the cable to the gas-insulated metal enclosed switchgear

3.5

design pressure

pressure used to determine the thickness of the enclosure and the components of the cable termination subjected to that pressure (according to IEC 62271-203:2003)