

INTERNATIONAL STANDARD

IEC 60079-0

Fourth edition
2004-01

Electrical apparatus for explosive gas atmospheres –

Part 0: General requirements

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL APPARATUS FOR EXPLOSIVE
GAS ATMOSPHERES –****Part 0: General requirements**

FOREWORD

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International Standard IEC 60079-0 has been prepared by technical committee 31: Electrical apparatus for explosive atmospheres.

This fourth edition cancels and replaces the third edition, published in 1998, and constitutes a full technical revision.

The significant changes with respect to the previous edition are listed below:

- Standard atmospheric conditions re-introduced
- All requirements for third-party certification removed
- New type of protection "n" introduced
- New apparatus standards for caplights, intrinsically safe systems, Zone 0 apparatus, and trace heating introduced
- Clarification of the status of symbol "s"
- Definitions for symbols "U" and "X" revised to align with current usage

- Definition for Ex component transferred from IEC 60079-18
- New definitions drafted for “energy limited” parameters to allow common usage by types of protection “i” and “n”
- New definitions for batteries transferred from IEC 60079-7
- Definition added for ambient temperature
- Definition added for continuous operating temperature (COT)
- Definition for certificate transferred from IEC 60079-15 and revised based on ISO/IEC 17000
- Definition added for cable gland
- Clause 5 for temperature re-written to address the influences of ambient temperature, internal sources of heat, and external sources of heating or cooling
- Small component ignition test transferred from IEC 60079-11 and IEC 60079-15
- Requirements for bonding transferred from IEC 60079-7 and IEC 60079-15
- Requirements for gasket retention transferred from IEC 60079-15 for wider applicability
- Relative thermal index (RTI) added as an alternative to thermal index (TI)
- Electrostatic requirements transferred and rationalized from IEC 60079-15 and IEC 60079-26 to apply to all of Group I and Group II
- Introduction of two additional test methods to evaluate the use of non-metallic materials with respect to the storage of electrostatic charges
- Light metal requirements transferred and rationalized from IEC 60079-15 and IEC 60079-26 to apply to all of Group I and Group II
- Introduction of an existing test to evaluate the use of a non-metallic enclosure wall in an earth bonding connection
- Clause 16 rewritten to align with industry usage of the terms *cable gland* and *conduit entry*.
- Equipotential bonding requirements for machines transferred from IEC 60079-7 and IEC 60079-15
- Requirement for disconnectors in switchgear and luminaires revised to provide IP20 protection for live parts and include additional marking
- General requirements for cells and batteries transferred from IEC 60079-7 and IEC 60079-15
- Impact test revised to specify drop height in lieu of energy
- Clarification of application of 5 °C and 10 °C temperature margins to type-tested samples
- Clarification of order of tests for metallic materials
- Clarification of number of samples and order of tests for non-metallic materials
- Clarification of order of marking
- Clarification of marking details for associated apparatus
- Clarification of marking of specific gases
- Clarification of marking of temperature class
- Clarification of usage of compulsory certificate number

- Clarification of marking of small apparatus
- Compilation of all warning markings into a table
- Clarification of marking examples
- Addition of a clause on instructions
- Deletion of Annex A as information is available in more appropriate standards (IEC 60079-20)
- Revision and clarification of Annex A (previously Annex B) to accommodate term *cable gland*

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

FDIS	Report on voting
31/474A/FDIS	31/487/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.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

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

IEC 60079-0:2004

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INTRODUCTION

It is acknowledged that, with developments in technology, it will be possible to achieve the objectives of the IEC 60079 series of standards in respect of explosion prevention by methods that are not yet fully defined. Where a manufacturer wishes to take advantage of such developments, this International Standard, as well as other standards in the IEC 60079 series, may be applied in part. It is intended that the manufacturer prepare documentation that clearly defines how the IEC 60079 series of standards has been applied, together with a full explanation of the additional techniques employed. In this case, the letter "s" has been reserved to indicate a method of protection that is not fully defined in the standards. Compliance with this standard cannot be claimed in these circumstances.

Withdrawing

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ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

Part 0: General requirements

1 Scope

This part of IEC 60079 specifies the general requirements for construction, testing and marking of electrical apparatus and Ex components intended for use in explosive gas atmospheres.

Unless modified by one of the parts in the IEC 60079 series, electrical apparatus complying with this standard is intended for use in hazardous areas in which explosive gas atmospheres, caused by mixtures of air and gases, vapours or mists, exist under normal atmospheric conditions of

- temperature -20 °C to $+60\text{ °C}$;
- pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar); and
- air with normal oxygen content, typically 21 % v/v.

The application of electrical apparatus in atmospheric conditions outside this range may need special consideration.

NOTE 1 The determination of the maximum surface temperature is based on an operational ambient temperature of -20 °C to $+40\text{ °C}$, if not otherwise specified by the manufacturer. See also 5.1.1.

NOTE 2 In designing apparatus for operation in explosive gas atmospheres under conditions other than the atmospheric conditions given above, this standard may be used as a guide. However, additional testing related specifically to the intended conditions of use is recommended. This is particularly important when the types of protection 'flameproof enclosures "d"' (IEC 60079-1) and 'intrinsic safety "i"' (IEC 60079-11) are applied.

NOTE 3 Requirements given in this standard result from an ignition hazard assessment made on electrical equipment. The ignition sources taken into account are those found associated with this type of equipment, such as hot surfaces, mechanically generated sparks, thermite reactions, electrical arcing and static electric discharge in normal industrial environments. For other ignition sources like adiabatic compression, shock waves, exothermic chemical reaction, self ignition of dust, naked flames, hot gases/liquids the apparatus are subjected to a hazard analysis that identifies and lists all of the potential sources of ignition by the electrical apparatus and the measures to be applied to prevent them becoming effective.

This standard does not specify requirements for safety, other than those directly related to the explosion risk.

This standard is supplemented or modified by the following parts of IEC 60079 concerning specific types of protection:

- IEC 60079-1: Flameproof enclosures "d";
- IEC 60079-2: Pressurized enclosures "p";
- IEC 60079-5: Powder filling "q";
- IEC 60079-6: Oil immersion "o";
- IEC 60079-7: Increased safety "e";
- IEC 60079-11: Intrinsic safety "i";
- IEC 60079-15: Type of protection "n";
- IEC 60079-18: Encapsulation "m".

This standard is supplemented or modified by the following apparatus standards:

- IEC 60079-25
- IEC 60079-26
- IEC 62013-1
- IEC 62086-1.

This part of IEC 60079, along with other parts in the IEC 60079 series and the additional standards mentioned above, is not applicable to the construction of electromedical apparatus, shot-firing exploders, test devices for exploders and for shot-firing circuits.

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 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification*

IEC 60079-1, *Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosures "d"*

IEC 60079-2, *Electrical apparatus for explosive gas atmospheres – Part 2: Pressurized enclosures "p"*

IEC 60079-4, *Electrical apparatus for explosive gas atmospheres – Part 4: Method of test for ignition temperature*

IEC 60079-5, *Electrical apparatus for explosive gas atmospheres – Part 5: Powder filling "q"*

IEC 60079-6, *Electrical apparatus for explosive gas atmospheres – Part 6: Oil-immersion "o"*

IEC 60079-7, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety "e"*

IEC 60079-10, *Electrical apparatus for explosive gas atmospheres – Part 10: Classification of hazardous areas*

IEC 60079-11, *Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety "i"*

IEC 60079-15, *Electrical apparatus for explosive gas atmospheres – Part 15: Type of protection "n"*

IEC 60079-18, *Electrical apparatus for explosive gas atmospheres – Part 18: Encapsulation "m"*

IEC 60079-25: *Electrical apparatus for explosive gas atmospheres – Part 25: Intrinsically safe systems*¹

IEC 60079-26: *Electrical apparatus for explosive gas atmospheres – Part 26: Construction, test and marking of zone 0 electrical apparatus*²

IEC 60086-1, *Primary batteries – Part 1: General*

IEC 60095-1, *Lead-acid starter batteries – Part 1: General requirements and methods of test*

IEC 60192, *Low-pressure sodium vapour lamps – Performance specifications*

IEC 60216-1, *Electrical insulating materials – Properties of thermal endurance – Part 1: Ageing procedures and evaluation of test results*

IEC 60216-2, *Guide for the determination of thermal endurance properties of electrical insulating materials – Part 2: Choice of test criteria*

IEC 60423, *Conduits for electrical purposes – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

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

IEC 60622, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Sealed nickel-cadmium prismatic rechargeable single cells*

IEC 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 60662, *High-pressure sodium vapour lamps*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 61056-1, *General-purpose lead-acid cells and batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of test*

IEC 61150, *Alkaline secondary cells and batteries – Sealed nickel-cadmium rechargeable monobloc batteries in button cell design*

IEC 61436, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Sealed nickel-metal hydride rechargeable single cells*

IEC 61951-1, *Secondary cells and batteries containing alkaline and other non-acid electrolytes – Portable sealed rechargeable single cells – Part 1: Nickel-cadmium*

IEC 62013-1, *Caplights for use in mines susceptible to firedamp – Part 1: General requirements – Construction and testing in relation to the risk of explosion*

IEC 62086-1: *Electrical apparatus for explosive gas atmospheres – Electrical resistance trace heating – Part 1: General and testing requirements*

¹ To be published.

² In preparation.