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INTERNATIONAL STANDARD

REDLINE VERSION

**Explosive atmospheres -
Part 0: Equipment - General requirements**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Explosive atmospheres -
Part 0: Equipment - General requirements**

FOREWORD

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IEC 60079-0 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres. It is an International Standard.

This eighth edition cancels and replaces the seventh edition, published in 2017. This edition constitutes a technical revision.

Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the "history" tab of the page for each document.

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

Draft	Report on voting
31/1958/FDIS	31/1968/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 parts of the IEC 60079 series, under the general title *Explosive atmospheres*, 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- withdrawn, or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.

1 Scope

This part of IEC 60079 specifies the general requirements for construction, testing and marking of Ex Equipment and Ex Components intended for use in or associated with explosive atmospheres.

The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) ~~under which it may be assumed that~~ for Ex Equipment ~~can be operated~~ are:

- 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 a volume fraction of 21 % ~~v/v~~.

This part of IEC 60079 and other documents supplementing this document specify additional test requirements for Ex Equipment operating outside the standard temperature range, but ~~in some cases~~, further additional consideration and additional testing ~~may be~~ is required for Ex Equipment operating outside the standard atmospheric pressure range and standard oxygen content. Such additional testing ~~may be~~ is particularly relevant with respect to Types of Protection that depend on quenching of a flame such as 'flameproof enclosures "d"' (IEC 60079-1) or limitation of energy, 'intrinsic safety "i"' (IEC 60079-11).

NOTE 1 Although the standard atmospheric conditions above give a temperature range for the atmosphere of -20 °C to $+60\text{ °C}$, the normal ambient temperature range for the Ex Equipment is -20 °C to $+40\text{ °C}$, unless otherwise specified and marked. See 5.1.1. It is considered that -20 °C to $+40\text{ °C}$ is appropriate for many items of Ex Equipment and that to manufacture all Ex Equipment to be suitable for a standard atmosphere upper ambient temperature of $+60\text{ °C}$ would place unnecessary design constraints.

NOTE 2 Requirements given in this document result from an ignition hazard assessment made on equipment. The ignition sources taken into account are those found associated with this type of equipment, such as hot surfaces, electromagnetic radiation, mechanically generated sparks, mechanical impacts resulting in thermite reactions, electrical arcing and static electric discharge in normal industrial environments.

NOTE 3 Where an explosive gas atmosphere and a combustible dust atmosphere are, or can be, present at the same time, the simultaneous presence of both often warrants additional protective measures. Additional guidance on the use of Ex Equipment in hybrid mixtures (mixture of a flammable gas or vapour with a combustible dust or combustible flyings) is given in IEC 60079-14.

NOTE 4 Any short-term thermal excursions that occur as a result of electrical current excursions above normal rated currents, such as those that occur during the starting of motors, are not considered to create a significant possibility of ignition of an explosive atmosphere due to the relatively short duration of the event and the convection that occurs during the event.

IEC 60079 does not specify requirements for safety, other than those directly related to the ~~explosion risk~~ reduction (mitigation) of ignition hazards.

Ignition sources like adiabatic compression, shock waves, exothermic chemical reaction, self-ignition of dust, naked flames and hot gases/liquids, are not addressed by this document.

NOTE 5 Although outside the scope of this document, such equipment would typically be subjected to an ignition hazard ~~analysis~~ assessment that identifies and lists all of the potential sources of ignition by the equipment and the measures to be applied to prevent them becoming effective. See ISO ~~IEC~~ 80079-36.

This document is supplemented or modified by the following parts ~~and technical specifications~~ of the IEC 60079 and ISO/IEC 80079 series:

- IEC 60079-1: *Gas - Flameproof enclosures "d"*
- IEC 60079-2: *Gas and dust - Pressurized enclosure "p"*
- IEC 60079-5: *Gas - Powder filling "q"*
- IEC 60079-6: *Gas - Liquid immersion "o"*
- IEC 60079-7: *Gas - Increased safety "e"*
- IEC 60079-11: *Gas and dust - Intrinsic safety "i"*
- IEC 60079-13: *Gas and dust - Equipment protection by pressurized room "p" & artificially ventilated room "v"*
- IEC 60079-15: *Gas - Type of protection "n"*
- IEC 60079-18: *Gas and dust - Encapsulation "m"*
- IEC 60079-25: *Gas and dust - Intrinsically safe electrical systems*
- IEC 60079-26: *Gas and dust - Equipment with ~~equipment protection level (EPL)~~ ~~Gas Separation Elements~~ or combined Levels of Protection*
- IEC 60079-28: *Gas and dust - Protection of equipment and transmission systems using optical radiation*
- IEC 60079-29-0: *Gas - Gas detection equipment - General requirements and test methods*
- IEC 60079-29-1: *Gas detectors - Performance requirements of detectors for flammable gases*
- IEC 60079-29-4: *Gas detectors - Performance requirements of open path detectors for flammable gases*
- IEC/IEEE 60079-30-1: *Gas and dust - Electrical resistance trace heating - General and testing requirements*
- IEC 60079-31: *Dust - Protection by enclosure "t"*
- IEC 60079-33: *Gas and dust - Special protection "s"*
- IEC 60079-35-1: *Caplights for use in mines susceptible to firedamp - General requirements - Construction and testing in relation to the risk of explosion*
- IEC TS 60079-39: *Gas - Intrinsically safe systems with electronically controlled spark duration limitation*
- IEC TS 60079-40: *Gas - Requirements for process sealing between flammable process fluids and electrical systems*
- IEC TS 60079-46: *Gas and dust - Equipment assemblies*
- IEC TS 60079-47: *Gas and dust - Equipment protection by 2-wire intrinsically safe Ethernet concept (2-WISE)*
- IEC 62784: *Dust - Vacuum cleaners and dust extractors providing EPL Dc*
- ISO 80079-36: *Gas and dust - Non-electrical equipment for explosive atmospheres - Basic method and requirements*
- ISO 80079-37: *Gas and dust - Non-electrical equipment for explosive atmospheres - Non electrical Type of Protection constructional safety "c", control of ignition source "b", liquid immersion "k"*

This document, along with the additional parts of IEC 60079 and ISO/IEC 80079 mentioned above, is not applicable to the construction of

- electromedical apparatus,
- shot-firing exploders,
- test devices for exploders, and
- shot-firing circuits.

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 60034-1, *Rotating electrical machines - Part 1: Rating and performance*

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, *Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"*

~~IEC 60079-20-1, Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data~~

IEC 60079-26, *Explosive atmospheres - Part 26: Equipment with ~~Equipment Protection Level (EPL) Ga~~ Separation Elements or combined Levels of Protection*

~~IEC 60079-35-1, Explosive atmospheres - Part 35-1: Caplights for use in mines susceptible to firedamp - General requirements - Construction and testing in relation to the risk of explosion~~

IEC 60086-1:2021, *Primary batteries - Part 1: General*

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

IEC 60216-1, *Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results*

IEC 60216-2, *Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria*

IEC 60243-1, *Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies*

IEC 60243-2, *Electric strength of insulating materials - Test methods - Part 2: Additional requirements for tests using direct voltage*

IEC 60423, *Conduit systems for cable management - Outside diameters of conduits for electrical installations and threads for conduits and fittings*

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

~~IEC 60662, High-pressure sodium vapour lamps - Performance specifications~~

IEC 60664-1, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*

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

IEC 62626-1, *Low-voltage switchgear and controlgear enclosed equipment - Part 1: Additional requirements for enclosed switch-disconnectors ~~outside the scope of~~ in accordance with*

IEC 60947-3 ~~to provide isolation~~ - Isolation of electrical equipment during repair and maintenance work in specific applications

ISO 48-2, Rubber, vulcanized or thermoplastic - Determination of hardness - Part 2: Hardness between 10 IRHD and 100 IRHD

ISO 178, Plastics - Determination of flexural properties

ISO 179 (all parts), Plastics - Determination of Charpy impact properties

ISO 262, ISO general purpose metric screw threads - Selected sizes for bolts, screws, studs and nuts

ISO 273, Fasteners - Clearance holes for bolts and screws

ISO 527-2, Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics

ISO 965-1, ISO general purpose metric screw threads - Tolerances - Part 1: Principles and basic data

ISO 965-3, ISO general purpose metric screw threads - Tolerances - Part 3: Limit deviations for ~~constructional~~ screw threads

ISO 3601-1, Fluid power systems - O-rings - Part 1: Inside diameters, cross-sections, tolerances and designation codes

ISO 3601-2, Fluid power systems - O-rings - Part 2: Housing dimensions for general applications

ISO 4014, Fasteners - Hexagon head bolts - Product grades A and B

ISO 4017, Fasteners - Hexagon head screws - Product grades A and B

ISO 4026, Hexagon socket set screws with flat point

ISO 4027, Hexagon socket set screws with cone point

ISO 4028, Hexagon socket set screws with dog point

ISO 4029, Hexagon socket set screws with cup point

ISO 4032, Fasteners - Hexagon regular nuts (style 1 ~~Product grades A and B~~)

ISO 4762, Hexagon socket head cap screws

ISO 4892-2, Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps

ISO 7380-1, Fasteners - Button head screws with reduced loadability - Part 1: Hexagon socket button head screws

ISO 14583, Hexalobular socket pan head screws

ISO/IEC 80079-20-1, *Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data*

ANSI/UL 746B, *Polymeric Materials - Long-Term Property Evaluations*

ANSI/UL 746C, *Polymeric Materials - Used in Electrical Equipment Evaluations*

ASTM D5964, *Standard practice for rubber IRM 901, IRM 902, and IRM 903 replacement oils for ASTM No. 1, ASTM No. 2, and ASTM No. 3*

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IEC 60034-11, *Rotating electrical machines - Part 1: Rating and performance*

IEC TS 60034-25, *Rotating electrical machines - Part 25: AC electrical machines used in power drive systems - Application guide*

IEC 60034-29, *Rotating electrical machines - Part 29: Equivalent loading and superposition techniques - Indirect testing to determine temperature rise*

IEC 60050-426, *International Electrotechnical Vocabulary (IEV) - Part 426: ~~Equipment for~~ Explosive atmospheres*

IEC 60079-2, *Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"*

IEC 60079-5, *Explosive atmospheres - Part 5: Equipment protection by powder filling "q"*

IEC 60079-6, *Explosive atmospheres - Part 6: Equipment protection by liquid immersion "o"*

IEC 60079-7, *Explosive atmospheres - Part 7: Equipment protection by increased safety "e"*

IEC 60079-10-1, *Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres*

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