## 1 Scope

This ~~part of IEC 60079~~ standard specifies the general requirements for construction, testing and marking of electrical equipment and Ex components intended for use in explosive atmospheres. Explosive atmospheres are identified by the National Electrical Code®, ANSI/NFPA 70 as hazardous (classified) locations and include the following specified locations:

- Class I, Zone 0
- Class I, Zone 1
- Class I, Zone 2
- Zone 20
- Zone 21
- Zone 22

Unless modified by one of the standards supplementing this standard, electrical equipment complying with this standard is intended for use in hazardous areas in which explosive atmospheres exist under normal atmospheric conditions of

- temperature –20 °C to +60 °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 equipment in atmospheric conditions outside this range requires special consideration and may require additional assessment and testing.

NOTE 1 Although the normal atmospheric conditions above give a temperature range for the atmosphere of -20°C to +60°C, the normal ambient temperature range for the equipment is -20°C to +40°C, unless otherwise specified and marked. See 5.1.1.

NOTE 2 In designing equipment for operation in explosive atmospheres under conditions other than the atmospheric conditions given above, this standard may be used for guidance. However, additional testing related specifically to the intended conditions of use is recommended. This is particularly important when the types of protection 'flameproof enclosure "d"' ~~(IEC 60079-1)~~ and 'intrinsic safety "i"' ~~(IEC 60079-11 or IEC 61241-11)~~ 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.

~~NOTE 4 It is acknowledged that, with developments in technology, it may 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. The designation "Ex s" has been reserved to indicate a type of protection that is not defined by the IEC 60079 series of standards, but may be referenced in national requirements.~~

NOTE 5 Where an explosive gas atmosphere and a combustible dust atmosphere are, or may be, present at the same time, the simultaneous presence of both should be considered and may require additional protective measures.

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

NOTE 6 Such equipment should be subjected to a hazard analysis that identifies and lists all of the potential sources of ignition by the electrical equipment and the measures to be applied to prevent them becoming effective.

This standard is supplemented or modified by the following standards concerning specific types of protection:

– ~~IEC 60079-1~~ ANSI/ISA 60079-1 (12.22.01): Gas – Flameproof enclosures "d";
– ~~IEC 60079-2~~ ANSI/ISA 60079-2 (12.04.01): Gas – Pressurized enclosures "p";
– ~~IEC 60079-5~~ ANSI/ISA 60079-5 (12.25.01): Gas – Powder filling "q";
– ~~IEC 60079-6~~ ANSI/ISA 60079-6 (12.26.01): Gas – Oil immersion "o";
– ~~IEC 60079-7~~ ANSI/ISA 60079-7 (12.16.01): Gas – Increased safety "e";
– ~~IEC 60079-11~~ ANSI/ISA 60079-11 (12.02.01): Gas – Intrinsic safety "i";
– ~~IEC 60079-15~~ ANSI/ISA 60079-15 (12.12.01): Gas – Type of protection “n”;
– ~~IEC 60079-18~~ ANSI/ISA 60079-18 (12.23.01): Gas ~~and Dust~~ – Encapsulation "m";
– ~~IEC 61241-1~~ ANSI/ISA 61241-1 (12.10.03): Dust – Protection by enclosures “tD”;
– ~~IEC 61241-2 (IEC 61241-4)~~ ANSI/ISA 61241-2 (12.10.06): Dust – Pressurization “pD”;
– ~~IEC 61241-11~~ ANSI/ISA 61241-11 (12.10.04): Dust – Intrinsic safety “iD”.
– ANSI/ISA 61241-18 (12.10.07): Dust – Encapsulation “mD”.

~~NOTE 7 The former requirements of IEC 61241-18, Encapsulation “mD”, have been incorporated in IEC 60079-18.~~

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

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

~~IEC 60079-26 Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga~~

ANSI/ISA 60079-26 (12.00.03):Electrical equipment for use in Class I, Zone 0 hazardous (classified) locations

~~IEC 60079-28: Explosive atmospheres – Part 28: Protection of equipment and transmission systems using optical radiation~~

~~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 60079-30-1: Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements.~~

ANSI/IEEE 515: Standard for Testing, Design, Installation, and Maintenance of Electrical Heat Tracing for Industrial Applications.

NOTE Components such as power connections, splices, end terminations, as well as cable entries, fittings, and seals, are to be evaluated according to the type of protection employed.

This standard with the additional standards mentioned above, are not applicable to the construction of

- electromedical apparatus,
- shot-firing exploders,

- test devices for exploders, and
- 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.

ANSI/NFPA 70:2008, *National Electrical Code*

ANSI/UL 347, *High Voltage Industrial Control Equipment*

ANSI/UL 486E, *Equipment Wiring Terminals for use with Aluminum and/or Copper Conductors*

ANSI/UL 508, *Industrial Control Equipment*

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

IEC 60034-5*, Rotating electrical machines – Part 5: Classification of degrees of protection provided by the enclosures of rotating electrical machines (IP Code)*

IEC 60050(426), *International Electrotechnical Vocabulary (IEV) – Chapter 426: Electrical apparatus for explosive atmospheres*

~~IEC 60079-1*, Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*~~

ANSI/ISA-60079-1 (12.22.01)*, Electrical Apparatus for Use in Hazardous (Classified) Locations: Type of Protection - Flameproof "d"*

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

ISA-60079-2 (12.04.01), 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*, Explosive atmospheres – Part 5: Equipment protection by powder filling "q"*~~

ANSI/ISA-60079-5 (12.25.01), *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations: Type of Protection – Power filling "q"*

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

ANSI/ISA-60079-6 (12.26.01), *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations: Type of Protection – Oil-Immersion "o"*