

AMERICAN NATIONAL STANDARD

**ANSI/ISA-60079-0 (12.00.01)-2009
Supercedes ANSI/ISA-60079-0 (12.00.01)-2005**

**Explosive atmospheres – Part 0:
Equipment – General Requirements**

**ISA-60079-0 approved by ISA S&P Board 14 October 2009
ANSI/UL 60079-0 approved by ANSI 21 October 2009
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Commitment for Amendments

This standard is issued jointly by the International Society of Automation (ISA) and Underwriters Laboratories Incorporated (UL). Comments or proposals for revisions on any part of the standard may be submitted to ISA or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of ISA and UL. ***ISA and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.***

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The most recent designation of ANSI/ISA-60079-0 as an American National Standard occurred on 16 November 2009, and the most recent designation of ANSI/UL 60079-0 as an American National Standard occurred on 21 October 2009.

This ANSI/UL Standard for Safety, which consists of the third edition, is under continuous maintenance, whereby each revision is ANSI approved upon publication. Comments or proposals for revisions on any part of the standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

The International Society of Automation
ANSI/ISA-60079-0
Fifth Edition

Underwriters Laboratories Inc.
ANSI/UL 60079-0
Fifth Edition



Explosive atmospheres - Part 0: Equipment - General requirements

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General Notes

This is the common ISA and UL standard for Explosive atmospheres Part 0: Equipment - General Requirements. It is the fifth edition of ANSI/ISA-60079-0 and the fifth edition of ANSI/UL 60079-0. This document is a modification of the IEC document and includes US deviations encompassing both additions and deletions of information.

ANSI/ISA-60079-0 and ANSI/UL 60079-0 contain identical requirements, and identical publication dates. The presentation and format of the standards material may differ between the two published standards.

This common standard was prepared by ISA and Underwriters Laboratories Inc. (UL).

Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of harmonization

This standard adopts the IEC text with deviations.

The requirements are presented in different formats. The ISA version of the standard illustrates the national differences from the IEC text through the use of legislative text (strike-out and underline). The UL version of the standard illustrates national differences immediately following the IEC text. National differences between the UL version and the ISA version shall be word for word except for editorial changes.

Interpretations

The interpretation by the SDO of an identical or equivalent standard shall be based on the literal text to determine compliance with the standard in accordance with the procedural rules of the SDO. If more than one interpretation of the literal text has been identified, a revision shall be proposed as soon as possible to each of the SDOs to more accurately reflect the intent.

UL Effective Date

As of 21 October 2009 all products Listed or Recognized by UL must comply with the requirements in this standard except for clauses in the following list, which are effective 31 December 2012.

Clauses 6.6, 7.2.2, 7.3, 9.2 - 9.3, 26.4.1.2.2, 29.2 c)

Between 21 October 2009 and 31 December 2012, new product submittals to UL may be evaluated under all requirements in this standard or, if requested in writing, evaluated under presently effective requirements only. The presently effective requirements are contained in the Fourth edition of ANSI/UL 60079-0.

A UL effective date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved standard.

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Preface (ISA)

This ISA standard is based on the 5th edition of IEC Publication 60079-0. It is the intention of the ISA12 Committee to develop an ANSI Standard that is harmonized with IEC 60079-0 to the fullest extent possible. This preface is included for informational purposes and is not part of ANSI/ISA-60079-0. The document is a modification of the IEC document and includes U.S. deviations encompassing both additions and deletions of information.

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

- Requirements for explosive dust atmospheres transferred from IEC 61241-0.
- The marking Group "II" alone has been replaced by "IIA", "IIB", or "IIC" as many of the enclosure requirements are now aligned with a specific sub-group.
- Dust groups defined as Group IIIA, IIIB and IIIC.
- Limits for ultrasonic and electromagnetic radiation introduced.
- Remainder of "electrostatic" requirements transferred from IEC 60079-26.
- Equipment protection levels (EPL) introduced.
- Transition of term from "apparatus" to "equipment" (where appropriate).

The standards referenced within this document may contain provisions which, through reference in this text, constitute requirements of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the standards indicated within this document. Members of IEC and ISO maintain registers of currently valid International Standards. ANSI maintains registers of currently valid U.S. National Standards.

This document has been prepared as part of the service of ISA toward a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subject to periodic review. Toward this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Secretary, Standards and Practices Board; ISA; 67 Alexander Drive; P. O. Box 12277; Research Triangle Park, NC 27709; Telephone (919) 549-8411; Fax (919) 549-8288; E-mail: standards@isa.org.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general, and the International System of Units (SI) in particular, in the preparation of instrumentation standards. The Department is further aware of the benefits to USA users of ISA standards of incorporating suitable references to the SI (and the metric system) in their business and professional dealings with other countries. Toward this end, this Department will endeavour to introduce SI-acceptable metric units in all new and revised standards, recommended practices, and technical reports to the greatest extent possible. *Standard for Use of the International System of Units (SI): The Modern Metric System*, published by the American Society for Testing & Materials as IEEE/ASTM SI 10-97, and future revisions, will be the reference guide for definitions, symbols, abbreviations, and conversion factors.

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GENERAL

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60079-0, Explosive atmospheres - Part 0: Equipment - General requirements, copyright 2007, are indicated by notations (differences) and are presented in bold text.

In the ISA publication of this standard, National Differences are presented using legislative text (strike-out and underline). The national difference type is identified in an informative annex.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

The UL printed standard includes the national difference types within the body of the text. The ISA printed standard includes the national difference types in an annex at the back of the standard.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences based on **safety practices**. These are differences for IEC requirements that may be acceptable, but adopting the IEC requirements would require considerable retesting or redesign on the manufacturer's part.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

DR – These are National Differences based on the **national regulatory requirements**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add – An addition entails adding a complete new numbered clause, subclause, table or figure. Addition is not meant to include adding select words to the base IEC text.

Deletion / Delete – A deletion entails complete deletion of an entire numbered clause, subclause, table or figure without any replacement text.

Modification / Modify – A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, or figure of the base IEC text.

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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 $+60\text{ °C}$;
- pressure 80 kPa ($0,8\text{ bar}$) to 110 kPa ($1,1\text{ bar}$); 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 $+60\text{ °C}$, the normal ambient temperature range for the equipment is -20 °C to $+40\text{ °C}$, 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.