# ANSI/ISA-60079-11 (12.02.01)-2002

**(Formerly ANSI/ISA-12.02.01-2002 (IEC 60079-11 Mod))**

**Supercedes ISA-12.02.01-1999 (IEC 60079-11 Mod)**

# Electrical Apparatus for Use in Class I, Zones 0, 1, & 2 Hazardous (Classified) Locations - Intrinsic Safety "i"

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**Commitment for Amendments**

This Standard is issued jointly by ISA — The Instrumentation, Systems, and Automation Society (ISA) and Underwriters Laboratories Incorporated (UL). Amendments to this Standard will be made only after processing according to the Standards writing procedures by ISA and UL.

The most recent designation of ANSI/UL 60079-11 as an American National Standard occurred on 2 December 2002 and on 26 February 2003 for ANSI/ISA-60079-11.

This ANSI/UL Standard for Safety, which consists of the first 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. Written comments are to be sent to the UL-RTP Standards Department, 12 Laboratory Drive, Research Triangle Park, NC 27709.

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**ISA — The Instrumentation, Systems, and Automation Society**
**ANSI/ISA-60079-11**
***First Edition***

**Underwriters Laboratories Inc.**
**ANSI/UL 60079-11**
***First Edition***



# Electrical Apparatus for Use in Class I, Zones 0, 1, & 2 Hazardous (Classified) Locations — Intrinsic Safety "i"

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# General Notes

This is the common ISA and UL Standard for Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic Safety “i". It is the first edition of ANSI/ISA-60079-11 [formerly ANSI/ISA-12.02.01-1999 (IEC 60079-11 Mod)] and the first edition of UL 60079-11. The ISA suffix “Mod” indicates the document is a modification of the IEC document and includes U.S. deviations encompassing both additions and deletions of information.

ANSI/ISA-60079-11 and UL 60079-11 contain identical requirements, and concurrent publication dates that align with each organization’s ANSI accreditation approval processes. The presentation and format of the standards material may differ between the two published standards.

This common Standard was prepared by ISA — The Instrumentation, Systems, and Automation Society 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 2 December 2002 all products Listed or Recognized by UL must comply with the requirements in this Standard.

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## Preface

This preface, as well as all footnotes and annexes, is included for information purposes and is not part of ANSI/ISA-60079-11.

This document has been prepared as part of the service of ISA—The Instrumentation, Systems, and Automation Society—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 endeavor 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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## Foreword (UL)

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

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# National Differences

GENERAL

In the UL publication of this standard, National Differences from the text of International Electrotechnical Commission (IEC) Publication 60079-11, Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic Safety "i", copyright 1999, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

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 standard may not include all types of these National Differences.

NOTE 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.

**DR** – These are National Differences based on the National Electrical Code (NEC) and other U.S. Regulatory Requirements.

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

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## Foreword (ISA)

All text of IEC 60079-11 is included in this document. U.S. National Deviations are shown by ~~strikeout~~ through deleted text and underline under added text. Tables or portions of tables that are to be deleted are shown as shaded; figures to be deleted are marked with the overlay “Figure X Deleted.” All added tables are numbered by a table number corresponding to the applicable sub-clause for improved clarity and are NOT underlined. Notes appear in the table titles showing the tables as added material. There are five annexes in this standard. Annexes C, E, F and G are informative and are not considered part of this standard.

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# 1 Scope

1.1 This standard ~~part of IEC 60079~~ specifies the construction and testing of intrinsically safe apparatus, intended for use in potentially explosive atmospheres and for associated apparatus, which is intended for connection to intrinsically safe circuits which enter such atmospheres. It also contains details of the test apparatus previously published as IEC 60079-3.

1.2 This standard supplements ANSI/ISA-60079-0 ~~IEC 60079-0 1998~~, the requirements of which apply to intrinsically safe apparatus and to associated apparatus except as indicated in the following list.

If associated apparatus is protected by a type of protection listed in ANSI/ISA-60079-0 ~~IEC 60079-0~~ then the requirements of that method of protection together with the relevant parts of ANSI/ISA-60079-0 ~~IEC 60079-0~~ also apply to the associated apparatus. The list of exclusions which follows is directly applicable to associated apparatus intended for use in situations where there is no potentially explosive atmosphere and in other circumstances should be used in combination with the requirements of the other methods of protection.

| **Clause of ANSI/ISA-60079-0 ~~IEC 60079-0 1998~~** | | **Clause excluded** | |
|---|---|---|---|
| | | **Intrinsically safe apparatus** | **Associated apparatus** |
| 3.1 | Electrical apparatus | Yes | Yes |
| 4.2.2 | Marking of maximum surface temperature | No | Yes |
| 5.1 | Maximum surface temperature | No | Yes |
| 5.3 | Surface temperature and ignition temperature | No | Yes |
| 6.2 | Enclosure opening delay | Yes | Yes |
| 7.1.1 | Definition of plastics material | No | Yes |
| 7.1.2 | Requirement of plastics material | Yes | Yes |
| 7.1.3 | Verification of plastics material compliance | No | Yes |
| 7.2 | Thermal endurance | Yes | Yes |
| 7.3 | Electrostatic charges on plastics enclosures | No | Yes |
| ~~7.3.1~~ | ~~Electrical apparatus of Group I~~ | ~~Yes~~ | ~~Yes~~ |
| | ~~(notes 1 and 2 only)~~ | | |
| 7.3.2 | Electrical apparatus of Group II | Yes | Yes |
| | (notes 1 and 2 only) | | |
| 7.4 | Threaded holes in plastics | Yes | Yes |
| 8.1 | Light metal enclosure materials | No | Yes |
| 8.2 | Threaded holes in light metals | Yes | Yes |
| 9 | Fasteners | Yes | Yes |
| 10 | Interlocking devices | Yes | Yes |
| 11 | Bushings | Yes | Yes |
| 12 | Materials used for cementing | Yes | Yes |
| 14 | Connection facilities and terminal compartments | Yes | Yes |
| 15 | Connection facilities for earthing or bonding conductors | Yes | Yes |