AMERICAN NATIONAL STANDARD

ANSI/ISA-60079-11 (12.02.01)-2011

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

Explosive Atmospheres – Part 11: Equipment protection by intrinsic safety “i”

ISA-60079-11 approved by ISA S&P Board 6 January 2011
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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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This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through February 25, 2011. The most recent designation of ANSI/UL 60079-11 as an American National Standard (ANSI) occurred on February 25, 2011. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards. Any other portions of this ANSI/UL standard that were not processed in accordance with ANSI/UL requirements are noted at the beginning of the impacted sections.

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ISA
ANSI/ISA–60079-11
Edition 5.1

Underwriters Laboratories Inc.
ANSI/UL 60079-11
Edition 5

Explosive Atmospheres – Part 11: Equipment protection by intrinsic safety “i”

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General Notes

This is the common ISA and UL standard for Explosive Atmospheres – Part 11: Equipment Protection by Intrinsic Safety “i”. It is the Edition 5.1 of ANSI/ISA-60079–11 and the Fifth edition of ANSI/UL 60079-11, which includes an amendment to 7.5.3. This document is a modification of the IEC document and includes US deviations encompassing both additions and deletions of information.

ANSI/ISA-60079-11 and ANSI/UL 60079-11 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).

NOTE 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 September 30, 2009 all products Listed or Recognized by UL must comply with the requirements in this standard except for Clauses 7.3, 7.4.2, 7.8, 8.7 b) 3), 8.7 c) 3), 10.1.5.2, 10.5.3 b) which are effective December 31, 2012.

Between September 30, 2009 and December 31, 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 Second edition of UL 60079-11.

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

This ISA standard is based on IEC Publication 60079-11. It is the intention of the ISA12 Committee to develop an ANSI Standard that is harmonized with IEC 60079-11 to the fullest extent possible.

This preface, as well as all footnotes and annexes, is included for information purposes and is not part of ANSI/ISA-60079-11 (12.02.01)-2011.

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.

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Edition 5.1 of this standard was approved for publication by the ISA Standards and Practices Board on 6 January 2011.

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National Differences

GENERAL

National Differences from the text of International Electrotechnical Commission (IEC) Publication 60079-11, Explosive Atmospheres – Part 11: Equipment Protection by Intrinsic Safety ″i″ copyright 2006, 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 from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

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, figure, or annex. 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, figure, or annex 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, figure, or annex of the base IEC text.

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CONTENTS

Foreword

The entire text of IEC 60079-11:2006 is included in this document. U.S. National Deviations are shown by strikeout through deleted text and underlining of 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 "X." Some tables have been reformatted to allow for US standard paper sizes. There are seven annexes in this standard. Annexes A, B and F are normative and form part of the requirements of this standard. Annexes C, D, E, G and H are informative and are not considered part of this standard.

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

- introduction of level of protection “ic” (this level of protection has been introduced to allow removal of the 'energy limitation' concept from ANSI/ISA-60079-15);
- introduction of Annex F that allows reduction in segregation distance requirements when the pollution degree has been reduced by installation or enclosure;
- introduction of alternative spark test apparatus construction when used with high current circuits;
- introduction of Annex E that provides a method for transient energy test
- changes in the table of 'Temperature classification of tracks on PCB's' to allow correlation with IPC-2152;
- allowing alternative methods of rating resistors when used to limit the discharge from capacitance;
- introduction of methods to deal with the spark ignition energy consideration when high current low voltage cells and batteries are used;
- introduction of tests to measure the maximum pressure in sealed battery containers;
- introduction of methods to deal with fault application on voltage enhancement IC's;
- introduction of infallible connection methods for SMD's (surface mount devices);
- introduction of alternative methods to deal with the spark ignition energy in circuits with both inductance and capacitance;
- introduction of alternative high voltage test for transformers;
- introduction of methods to assess the reduction of effective capacitance when protected by series resistances;

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1 Scope

This standard ~~part of IEC 60079~~ specifies the construction and testing of intrinsically safe apparatus intended for use in Class I, Zone 0, 1, or 2 hazardous (classified) locations as defined by the National Electrical Code, ANSI/NFPA 70 ~~an explosive gas atmosphere~~ and for associated apparatus, which is intended for connection to intrinsically safe circuits which enter such atmospheres.

This type of protection is applicable to electrical apparatus in which the electrical circuits themselves are incapable of causing an explosion in the surrounding explosive atmospheres.

This standard is also applicable to electrical apparatus or parts of electrical apparatus located outside the explosive gas atmosphere or protected by another type of protection listed in ANSI/ISA-60079-0 ~~IEC 60079-0~~, where the intrinsic safety of the electrical circuits in the explosive gas atmosphere may depend upon the design and construction of such electrical apparatus or parts of such electrical apparatus. The electrical circuits exposed to the explosive gas atmosphere are evaluated for use in such an atmosphere by applying this standard.

~~The requirements for intrinsically safe systems are provided in IEC 60079-25.~~ The requirements for intrinsically safe concepts for fieldbus are provided in ANSI/ISA-60079-27 ~~IEC 60079-27~~.

This standard supplements and modifies the general requirements of ANSI/ISA-60079-0 ~~IEC 60079-0~~, except as indicated in Table 1. Where a requirement of this standard conflicts with a requirement of ANSI/ISA-60079-0 ~~IEC 60079-0~~, the requirements of this standard shall take precedence.

If associated apparatus is placed in the explosive gas atmosphere, it must be protected by an appropriate type of protection listed in ANSI/ISA-60079-0 ~~IEC 60079-0~~, and 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.

Table 1 – Exclusion of specific clauses of ANSI/ISA-60079-0 ~~IEC 60079-0~~

Clause or subclause of ANSI/ISA-60079-0 ~~IEC 60079-0~~		Intrinsically safe apparatus	Associated apparatus
4.2.2	Group II – Surface temperature marking	Applies	Excluded
5.3	Maximum surface temperature	Applies	Excluded
5.4	Surface temperature and ignition temperature	Applies	Excluded
5.5	Small components	Applies	Excluded
6.3	Opening times	Excluded	Excluded
7.1.1	Applicability	Applies	Excluded
7.1.2	Specification of materials	Applies	Excluded
7.1.3*	Plastic materials	Excluded	Excluded
7.2*	Thermal endurance	Excluded	Excluded
7.3	Electrostatic charges on external non-metallic materials of enclosures	Applies	Excluded
7.3.2	Avoidance of a build-up electrostatic charge	Applies	Excluded
7.4	Threaded holes	Excluded	Excluded
8.1	Material composition	Applies	Excluded