

**ANSI/ISA-60079-11 (12.02.01)-2013**

Supersedes ANSI/ISA-60079-11 (12.02.01)-2012

**Explosive Atmospheres –  
Part 11: Equipment protection  
by intrinsic safety “i” (Edition 6.1)**

**Approved 6 September 2013**

### **Commitment for Amendments**

This standard is issued jointly by 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.***

---

**ISBN: 978-0-876640-19-7**

**Copyright © 2013**

**By ISA**

These materials are subject to copyright claims of IEC, ANSI, and ISA. All rights reserved. Not for resale. Printed in the United States of America. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of ISA. All requests pertaining to this standard should be submitted to ISA.

---

**Copyright © 2013**

**Underwriters Laboratories Incorporated**

Revisions of this standard will be made by issuing revised or additional pages bearing their date of issue. A UL standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements.

The most recent designation of ANSI/ISA-60079-11 and ANSI/UL 60079-11 as American National Standards occurred on 6 September 2013.

This ANSI/UL Standard for Safety, which consists of the sixth 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>.

**ISA**  
**ANSI/ISA-60079-11**  
*Edition 6.1*

**Underwriters Laboratories Inc.**  
**ANSI/UL 60079-11**  
*Edition 6*



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

This page intentionally left blank.

## **General Notes**

This is the common ISA and UL standard for Explosive atmospheres - Part 11: Equipment protection by intrinsic safety “i”. It is edition 6.1 of ANSI/ISA-60079-11 (superseding ANSI/ISA-60079-11-2012) and edition 6 of ANSI/UL 60079-11.

ANSI/ISA-60079-11 and ANSI/UL 60079-11 contain identical requirements, with the publication date of. 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**

The effective date for UL is the date of publication. However, the fifth edition of UL 60079-11 will also be effective until 1 September 2018.

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

This page intentionally left blank.

## Preface (ISA)

This ISA standard is based on the 6<sup>th</sup> edition of IEC Publication 60079-11 including Corrigendum 1. 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 is included for informational purposes and is not part of ANSI/ISA-60079-11. The document is a modification of the IEC document and includes U.S. deviations encompassing both additions and deletions of information.

The entire text of IEC 60079-11:2011 is included in this document including Corrigendum 1. 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 ten annexes in this standard. Annexes A, B, D, F and G are normative and form part of the requirements of this standard. Annexes C, E, H, I and J are informative and are not considered part of this standard.

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

- Inclusion of non-edition specific references to ANSI/ISA-60079-0.
- The merging of the apparatus requirements for FISCO from ANSI/ISA-60079-27.
- The merging of the requirements for combustible dust atmospheres from ANSI/ISA-61241-11.
- Clarification of the requirements for accessories connected to intrinsically safe apparatus; such as chargers and data loggers.
- Addition of new test requirements for opto-isolators.
- Introduction of Annex H about ignition testing of semiconductor limiting power supply circuits.

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](mailto: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. IEEE/ASTM SI 10, *American National Standard for Metric Practice*, and future revisions, will be the reference guide for definitions, symbols, abbreviations, and conversion factors.

It is the policy of ISA to encourage and welcome the participation of all concerned individuals and interests in the development of ISA standards, recommended practices, and technical reports. Participation in the ISA standards-making process by an individual in no way constitutes endorsement by the employer of that

individual, of ISA, or of any of the standards, recommended practices, and technical reports that ISA develops.

**CAUTION — ISA DOES NOT TAKE ANY POSITION WITH RESPECT TO THE EXISTENCE OR VALIDITY OF ANY PATENT RIGHTS ASSERTED IN CONNECTION WITH THIS DOCUMENT, AND ISA DISCLAIMS LIABILITY FOR THE INFRINGEMENT OF ANY PATENT RESULTING FROM THE USE OF THIS DOCUMENT. USERS ARE ADVISED THAT DETERMINATION OF THE VALIDITY OF ANY PATENT RIGHTS, AND THE RISK OF INFRINGEMENT OF SUCH RIGHTS, IS ENTIRELY THEIR OWN RESPONSIBILITY.**

**PURSUANT TO ISA'S PATENT POLICY, ONE OR MORE PATENT HOLDERS OR PATENT APPLICANTS MAY HAVE DISCLOSED PATENTS THAT COULD BE INFRINGED BY USE OF THIS DOCUMENT AND EXECUTED A LETTER OF ASSURANCE COMMITTING TO THE GRANTING OF A LICENSE ON A WORLDWIDE, NON-DISCRIMINATORY BASIS, WITH A FAIR AND REASONABLE ROYALTY RATE AND FAIR AND REASONABLE TERMS AND CONDITIONS. FOR MORE INFORMATION ON SUCH DISCLOSURES AND LETTERS OF ASSURANCE, CONTACT ISA OR VISIT [WWW.ISA.ORG/STANDARDSPATENTS](http://WWW.ISA.ORG/STANDARDSPATENTS).**

**OTHER PATENTS OR PATENT CLAIMS MAY EXIST FOR WHICH A DISCLOSURE OR LETTER OF ASSURANCE HAS NOT BEEN RECEIVED. ISA IS NOT RESPONSIBLE FOR IDENTIFYING PATENTS OR PATENT APPLICATIONS FOR WHICH A LICENSE MAY BE REQUIRED, FOR CONDUCTING INQUIRIES INTO THE LEGAL VALIDITY OR SCOPE OF PATENTS, OR DETERMINING WHETHER ANY LICENSING TERMS OR CONDITIONS PROVIDED IN CONNECTION WITH SUBMISSION OF A LETTER OF ASSURANCE, IF ANY, OR IN ANY LICENSING AGREEMENTS ARE REASONABLE OR NON-DISCRIMINATORY.**

**ISA REQUESTS THAT ANYONE REVIEWING THIS DOCUMENT WHO IS AWARE OF ANY PATENTS THAT MAY IMPACT IMPLEMENTATION OF THE DOCUMENT NOTIFY THE ISA STANDARDS AND PRACTICES DEPARTMENT OF THE PATENT AND ITS OWNER.**

**ADDITIONALLY, THE USE OF THIS DOCUMENT MAY INVOLVE HAZARDOUS MATERIALS, OPERATIONS OR EQUIPMENT. THE DOCUMENT CANNOT ANTICIPATE ALL POSSIBLE APPLICATIONS OR ADDRESS ALL POSSIBLE SAFETY ISSUES ASSOCIATED WITH USE IN HAZARDOUS CONDITIONS. THE USER OF THIS DOCUMENT MUST EXERCISE SOUND PROFESSIONAL JUDGMENT CONCERNING ITS USE AND APPLICABILITY UNDER THE USER'S PARTICULAR CIRCUMSTANCES. THE USER MUST ALSO CONSIDER THE APPLICABILITY OF ANY GOVERNMENTAL REGULATORY LIMITATIONS AND ESTABLISHED SAFETY AND HEALTH PRACTICES BEFORE IMPLEMENTING THIS DOCUMENT.**

**THE USER OF THIS DOCUMENT SHOULD BE AWARE THAT THIS DOCUMENT MAY BE IMPACTED BY ELECTRONIC SECURITY ISSUES. THE COMMITTEE HAS NOT YET ADDRESSED THE POTENTIAL ISSUES IN THIS VERSION.**

The following people served as members of ISA12.2:

<b>NAME</b>	<b>COMPANY</b>
T. Adam, Chair	FM Approvals
M. Coppler*, Managing Director	Det Norske Veritas Certification Inc.
N. Abbatiello	Speer Equipment Inc.
R. Allen	Honeywell Inc.
S. Arnold	Ametek Drexelbrook
S. Czaniecki	Endress + Hauser Canada



A. Engler\*  
G. Garcha  
D. Genender  
J. Genre  
G. Kozinski  
R. Masek  
J. McCormick  
J. Miller  
A. Page  
R. Parks  
B. Saxinger  
B. Schaefer  
J. Thomas  
L. Vlaga  
T. Woods

Det Norske Veritas DNV  
GE Energy  
Pepperl + Fuchs Inc.  
Industrial Scientific Corp.  
GE Infrastructure Sensing  
CSA Group  
Siemens Process Analytics  
Detector Electronics Corp.  
Consultant  
Intertek  
BW Technologies by Honeywell  
UL LLC  
Schlumberger  
General Monitors  
GE Oil & Gas

\* One vote per company

The following people served as members of ISA12:

**NAME**

**COMPANY**

T. Schnaare, Chair  
W. Lawrence, Vice Chair  
M. Coppler, Managing Director  
R. Allen  
D. Ankele  
K. Boegli  
D. Burns  
C. Casso  
M. Dona  
T. Dubaniewicz  
D. El Tawy  
W. Fiske  
G. Garcha  
R. Holub  
P. Kovscek  
J. Kuczka  
E. Leubner  
N. Ludlam  
R. Masek  
E. Massey  
J. Miller  
A. Page  
R. Seitz  
R. Sierra  
M. Spencer  
R. Wigg

Rosemount Inc.  
FM Approvals LLC  
Det Norske Veritas Certification Inc.  
Honeywell Inc.  
UL LLC  
Phoenix Contact  
Shell P&T – Innovation / R&D  
Nabors Industries  
Santos Ltd.  
NIOSH  
Solar Turbines, Inc.  
Intertek  
GE Power & Water  
The DuPont Company Inc.  
Industrial Scientific Corporation  
Killark  
Cooper Crouse-Hinds  
FM Approvals Ltd.  
CSA Group  
Baldor Electric Company  
Detector Electronics Corporation  
Consultant  
Artech Engineering  
USCG  
Columbia Gas Transmission  
E-x Solutions International Pty. Ltd.

6 September 2013

ANSI/ISA-60079-11 - 10 - ANSI/UL 60079-11

This document was approved for publication by the ISA Standards and Practices Board on 23 August 2013.

**NAME**

**COMPANY**

E. Cosman, Vice President  
D. Bartusiak  
P. Brett  
J. Campbell  
M. Coppler  
B. Dumortier  
D. Dunn  
J. Federlein  
J. Gilsinn  
E. Icayan  
J. Jamison  
K. P. Lindner  
V. Maggioli  
T. McAviney  
V. Mezzano  
C. Monchinski  
R. Reimer  
S. Russell  
N. Sands  
H. Sasajima  
T. Schnaare  
J. Tatera  
I. Verhappen  
W. Weidman  
J. Weiss  
M. Wilkins  
D. Zetterberg

The Dow Chemical Company  
ExxonMobil Chemical Company  
Honeywell Inc.  
Consultant  
Det Norske Veritas Certification Inc.  
Schneider Electric  
Aramco Services Co.  
Federlein & Assoc. Inc.  
Kenexis Consulting  
Atkins  
Spectra Energy Ltd.  
Endress + Hauser Process Solutions AG  
Feltronics Corp.  
Instrumentation and Control Engineering, LLC  
Fluor Corp.  
Automated Control Concepts Inc.  
Rockwell Automation  
Valero Energy Corp.  
DuPont  
Azbil Corp.  
Rosemount Inc.  
Tatera & Associates Inc.  
Industrial Automation Networks Inc.  
WCW Consulting  
Applied Control Solutions LLC  
Yokogawa IA Global Marketing USMK  
Chevron Energy Technology Co.

## 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 2011, 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.

This page intentionally left blank.

## CONTENTS

1	Scope .....	17
2	<del>Normative</del> references .....	23
3	Terms and definitions .....	24
4	Grouping and classification of intrinsically safe apparatus and associated apparatus .....	30
5	Levels of protection and ignition compliance requirements of electrical apparatus .....	31
5.1	General .....	31
5.2	Level of protection "ia" .....	31
5.3	Level of protection "ib" .....	32
5.4	Level of protection "ic" .....	32
5.5	Spark ignition compliance .....	32
5.6	Thermal ignition compliance .....	33
5.7	Simple apparatus .....	36
6	Apparatus construction .....	37
6.1	Enclosures .....	37
6.2	Facilities for connection of external circuits .....	39
6.3	Separation distances .....	44
6.4	Protection against polarity reversal .....	56
6.5	Earth conductors, connections and terminals .....	56
6.6	Encapsulation .....	57
7	Components on which intrinsic safety depends .....	59
7.1	Rating of components .....	59
7.2	Connectors for internal connections, plug-in cards and components .....	59
7.3	Fuses .....	60
7.4	Primary and secondary cells and batteries .....	61
7.5	Semiconductors .....	64
7.6	Failure of components, connections and separations .....	65
7.7	Piezo-electric devices .....	67
7.8	Electrochemical cells for the detection of gases .....	67
8	Infallible components, infallible assemblies of components and infallible connections on which intrinsic safety depends .....	67
8.1	Level of Protection "ic" .....	67
8.2	Mains transformers .....	67
8.3	Transformers other than mains transformers .....	69
8.4	Infallible windings .....	70
8.5	Current-limiting resistors .....	70
8.6	Capacitors .....	71
8.7	Shunt safety assemblies .....	72
8.8	Wiring, printed circuit board tracks, and connections .....	73
8.9	Galvanically separating components .....	74
9	Supplementary requirements for specific apparatus .....	75
9.1	Diode safety barriers .....	75
9.2	FISCO apparatus .....	76

9.3	Handlights and caplights.....	76
10	Type verifications and type tests .....	76
10.1	Spark ignition test .....	76
10.2	Temperature tests .....	80
10.3	Dielectric strength tests .....	81
10.4	Determination of parameters of loosely specified components .....	81
10.5	Tests for cells and batteries.....	82
10.6	Mechanical tests .....	84
10.7	Tests for intrinsically safe apparatus containing piezoelectric devices .....	84
10.8	Type tests for diode safety barriers and safety shunts .....	85
10.9	Cable pull test .....	85
10.10	Transformer tests .....	86
10.11	Optical isolators tests .....	86
10.12	Current carrying capacity of infallible printed circuit board connections.....	88
11	Routine verifications and tests .....	89
11.1	Routine tests for diode safety barriers .....	89
11.2	Routine tests for infallible transformers.....	89
12	Marking .....	90
12.1	General.....	90
12.2	Marking of connection facilities.....	91
12.3	Warning markings .....	91
12.4	Examples of marking .....	92
13	Documentation .....	93
	Annex A (normative) Assessment of intrinsically safe circuits .....	95
	Annex B (normative) Spark test apparatus for intrinsically safe circuits .....	117
	Annex C (informative) Measurement of creepage distances, clearances and separation distances through casting compound and through solid insulation .....	125
	Annex D (normative) Encapsulation .....	129
	Annex E (informative) Transient energy test .....	137
	Annex F (normative) Alternative separation distances for assembled printed circuit boards and separation of components .....	141
	Annex G (normative) Fieldbus intrinsically safe concept (FISCO) – Apparatus requirements .....	145
	Annex H (informative) Ignition testing of semiconductor limiting power supply circuits .....	151
	Annex I (informative) Explanatory guide for the application of "ic" .....	163
	Annex J (informative) National Differences Types noted in ANSI/ISA-60079-11 United States National Differences for IEC 60079-11 .....	173
	Figure 1 – Separation of intrinsically safe and non-intrinsically safe terminals .....	42
	Figure 2 – Example of separation of conducting parts.....	48
	Figure 3 – Determination of creepage distances .....	52
	Figure 4 – Creepage distances and clearances on printed circuit boards .....	54
	Figure 5 – Examples of independent and non-independent connecting elements .....	57

Figure A.1 – Resistive circuits .....	98
Figure A.2 – Group I capacitive circuits .....	99
Figure A.3 – Group II capacitive circuits .....	100
Figure A.4 – Inductive circuits of Group II .....	101
Figure A.5 – Group I inductive circuits .....	102
Figure A.6 – Group IIC inductive circuits .....	103
Figure A.7 – Simple inductive circuit.....	104
Figure A.8 – Simple capacitive circuit.....	104
Figure A.9 – Equivalent capacitance .....	116
Figure B.1 – Spark test apparatus for intrinsically safe circuits .....	121
Figure B.2 – Cadmium contact disc .....	122
Figure B.3 – Wire holder .....	122
Figure B.4 – Example of a practical design of spark test apparatus .....	123
Figure B.5 – Arrangement for fusing tungsten wires .....	124
Figure C.1 – Measurement of clearance .....	125
Figure C.2 – Measurement of composite distances .....	126
Figure C.3 – Measurement of creepage.....	127
Figure C.4 – Measurement of composite creepage .....	127
Figure D.1 – Examples of encapsulated assemblies conforming to 6.3.5 and 6.6 .....	131
Figure D.2 – Applications of encapsulation using casting compound without an enclosure ...	133
Figure D.3 – Examples of assemblies using moulding conforming to 6.6.....	134
Figure E.1 – Example of test circuit.....	138
Figure E.2 – Example of output waveform .....	139
Figure G.1 – Typical system.....	150
Figure H.1 – Safety factor vs ignition probability .....	161
Table 1 – Applicability of specific clauses of IEC 60079-0.....	18
Table 2 – Temperature classification of copper wiring (in a maximum ambient temperature of 40 °C).....	34
Table 3 – Temperature classification of tracks on printed circuit boards (in a maximum ambient temperature of 40 °C) .....	35
Table 4 – Maximum permitted power dissipation within a component immersed in dust.....	36
Table 5 – Clearances, creepage distances and separations .....	46
Table 6 – Minimum foil thickness or minimum wire diameter of the screen in relation to the rated current of the fuse.....	68
Table 7 – Compositions of explosive test mixtures adequate for 1,0 safety factor .....	77
Table 8 – Compositions of explosive test mixtures adequate for 1,5 safety factor .....	78
Table 10 – Routine test voltages for infallible transformers .....	90
Table 11 – Text of warning markings.....	91

Table A.1 – Permitted short-circuit current corresponding to the voltage and the Equipment Group .....	105
Table A.2 – Permitted capacitance corresponding to the voltage and the Equipment Group .	110
Table A.3 – Permitted reduction of effective capacitance when protected by a series resistance .....	116
Table F.1 – Clearances, creepage distances and separations for Level of Protection "ia" and "ib" when ingress protected, and special conditions of material and installation are fulfilled .....	143
Table F.2 – Clearances, creepage distances and separations for Level of Protection "ic" when ingress is protected by an enclosure or by special conditions of installation .....	144
Table G.1 – Assessment of maximum output current for use with 'ia' and 'ib' FISCO rectangular supplies .....	146
Table G.2 – Assessment of maximum output current for use with 'ic' FISCO rectangular supplies .....	146
Table H.1 – Sequence of tests .....	154
Table H.2 – Safety factor provided by several explosive test mixtures that may be used for the tests in Table H.1 .....	156
Table H.3 – Example of a Group I circuit with characteristics described by Curve II of Figure H.1 – This passes the test sequence of Table H.1 .....	157
Table H.4 – Example of a Group I circuit with characteristics described by Curve III of Figure H.1 – This does not pass the test sequence of Table H.1 .....	159



## EXPLOSIVE ATMOSPHERES –

### Part 11: Equipment protection by intrinsic safety "i"

#### 1 Scope

This standard ~~part of IEC 60079~~ specifies the construction and testing of intrinsically safe apparatus intended for use in an explosive 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 equipment in which the electrical circuits themselves are incapable of causing an explosion in the surrounding explosive atmospheres.

This standard is also applicable to electrical equipment or parts of electrical equipment located outside the explosive 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 atmosphere may depend upon the design and construction of such electrical equipment or parts of such electrical equipment. The electrical circuits exposed to the explosive atmosphere are evaluated for use in such an atmosphere by applying this standard.

The requirements for intrinsically safe systems are provided in ISA-60079-25 ~~IEC 60079-25~~.

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 requirements in this standard are applicable to both intrinsically safe apparatus and associated apparatus the term “apparatus” is used throughout the standard.

This standard is for electrical equipment only; therefore the term “equipment” used in the standard always means “electrical equipment”.

If associated apparatus is placed in the explosive atmosphere, it shall 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.