INTERNATIONAL STANDARD

IEC 60079-11

Fourth edition
1999-02

Electrical apparatus for explosive gas atmospheres –

Part 11: Intrinsic safety "i"

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES – Part 11: Intrinsic safety "i"

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60079-11 has been prepared by subcommittee 31G: Intrinsically safe apparatus, of IEC technical committee 31: Electrical apparatus for explosive atmospheres.

This fourth edition cancels and replaces the third edition published in 1991 and constitutes a technical revision.

Annex B contains details of the spark test apparatus for intrinsically safe circuits and replaces IEC 60079-3, 1990.

This International Standard is to be read in conjunction with the third edition of IEC 60079-0:1998, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements.*

The text of this standard is based on the following documents:

FDIS	Report on voting
31G/65/FDIS	31G/68/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annexes A, B and D form an integral part of this standard.

Annex C is for information only.

ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES – Part 11: Intrinsic safety "i"

1 Scope

1.1 This 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 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 IEC 60079-0 then the requirements of that method of protection together with the relevant parts of 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 IEC 60079-0:1998		Clause or subclause 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 (notes 1 and 2 only)	Yes	Yes
7.3.2	Electrical apparatus of Group II (notes 1 and 2 only)	Yes	Yes
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

Clause of IEC 60079-0:1998		Clause or subclause excluded	
		Intrinsically safe apparatus	Associated apparatus
15	Connection facilities for earthing or bonding conductors	Yes	Yes
16	Cable and conduit entries	Yes	Yes
17 to 22	Supplementary requirements for certain electrical apparatus	Yes	Yes
23.4.3.1	Test for resistance to impact	Yes	Yes
23.4.3.2	Drop test (no prior impact test necessary)	No	Yes
23.4.3.3	Required results	No	Yes
23.4.5	Torque test for bushings	Yes	Yes
23.4.6.1	Temperature measurement	No	Yes
23.4.6.2	Thermal shock test	Yes	Yes
23.4.7.1 to 23.4.7.7	Tests on non-metallic enclosures	Yes	Yes
23.4.7.8	Insulation resistance test of parts of enclosures of plastics materials	No	Yes
27.7	Examples of marking	Yes	Yes
Annex B	Ex cable entries	Yes	Yes

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

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

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60079. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 6079 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60079-0:1998, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-7:1990, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety "e"*

IEC 60085:1984, *Thermal evaluation and classification of electrical insulation*

IEC 60112:1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60127-1:1988, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60127-2:1989, *Miniature fuses – Part 2: Cartridge fuse-links*

IEC 60127-3:1988, *Miniature fuses – Part 3: Sub-miniature fuse-links*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*