IEC 60079-0

Edition 7.0 2017-12
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Explosive atmospheres –
Part 0: Equipment – General requirements

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.260.20

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 60079-0
Edition 7.0 2017-12

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31/1455/DISH	31/1464/RVDISH

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

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Interpretation sheet of Subclause 16.6 of IEC 60079-0:2017

The TC31/CAG requested (Resolution 2 of 2018-04-19) that WG22 prepare an interpretation sheet based on IECEx Decision Sheet DS2018/002 addressing the assignment of entry point and branching point temperatures of electrical rotating machines.

Details of interpretation:

IEC 60079-0:2017 (Ed. 7), ***Explosive atmospheres – Part 0: Equipment – General requirements***

Interpretation of Subclause 16.6: Temperature at branching point and entry point:

Question: Subclause 16.6 of IEC 60079-0:2017 states “When the temperature under rated conditions is higher than 70 °C at the entry point or 80 °C at the branching point of the conductors, information shall be marked on the equipment exterior to provide guidance to the user on the proper selection of cable and cable gland or conductors in conduit.”

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IEC 60079-0:2017-12/ISH1:2019-04(en)

It is not normal practice for electrical rotating machines to be tested with the cable entry devices and cables that might be used in an actual installation, but with the cables available at the manufacturer's test area. In many cases, there will be no formal entry device as the cables will enter via the space reserved for fixing of a gland plate.

How shall the relevant entry point and branching point temperatures be determined?

Interpretation: *The use of the maximum internal air space temperature to represent the maximum service temperature of terminal box gaskets and seals, the cable branching point temperature, and the entry point temperature reflects the normal practice of testing electrical rotating machines without prior knowledge of the actual glands and cables to be used for installation. The production of heat from the electrical rotating machine connections is generally insignificant with respect to the production of heat from the machine windings and core.*

Further amplification:

1) The entry point of the cable where the temperature is measured should be sealed so far as possible to ensure that there is minimum air-circulation which can reduce the measured temperature.
2) This is not intended to apply to any gasket between the terminal box and the frame of the electrical rotating machine, where higher temperatures may be recorded, but only to the gasket between the terminal box and its lid.

Although written in the context of electrical rotating machines, there may be other types of equipment where an equivalent approach is applicable

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IEC 60079-0
Edition 7.0 2017-12

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

INTERPRETATION SHEET 2

This interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31/1469/DISH	31/1486/RVDISH

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

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Question:

How shall marking be shown for equipment covered by both the electrical and non-electrical standards (IEC 60079 and ISO 80079 series)?

Answer:

Equipment which includes both an electrical part and a non-electrical part shall have combined marking. For example:

Ex db h IIA T4 Gb

Ex h tb IIIC T135 °C Db

IEC 60079-0:2017-12/ISH2:2019-06(en-fr)

ICS 29.260.20

It will be clearer for the user that the combined risk of the electrical part and the non-electrical part, covered by a single certificate, has been assessed for the complete equipment, stating one EPL, one equipment Group and one temperature class for Gas and the same for Dust (but showing a maximum surface temperature instead of a temperature class). It is also noted that Ex Components are not marked with either a temperature class (Group II) or a maximum surface temperature (Group III).

For equipment where separate certificates have been prepared, with one for the electrical parts, and one for the non-electrical parts, it is appropriate to have separate electrical and non-electrical marking strings, each with its own associated certificate number.

NOTE Additional guidance on the marking of assemblies is given in IEC TS 60079-46.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60079-0 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This seventh edition cancels and replaces the sixth edition, published in 2011. This edition constitutes a technical revision.

The significance of the changes between IEC Standard, IEC 60079-0, Edition 6 (2011) and IEC 60079-0, Edition 7 (2017) are as listed below:

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Throughout document, “electrical equipment” replaced by “equipment” where appropriate.	Multiple	X		
Scope List of “Type of “Protection” and “Product” standards combined into one list.	1	X		
Definitions used in multiple sub-parts added. Definitions harmonized across sub-parts and added to 60079-0 where appropriate. Battery definitions updated	3	X		
Clarification of the way that information on process temperature influences can be expressed.	5.1.2	X		
Clarification regarding the determination of service temperatures when dust layers are present	5.2	X		
Clarification on the need to provide service temperature information for Ex Components in the Schedule of Limitations	5.2	X		
Relocation of EPL Da dust layer requirements from IEC 60079-18 & IEC 60079-31	5.3.2.3.1	A1		
Clarified that for EPL Db, a maximum specified dust layer of greater than 200 mm is not permitted as thicker layers have no additional effect on maximum surface temperature.	b)	X		
Added for EPL Db, a dust layer in a specified orientation, marked as T_L	c)		X	
Clarified that for EPL Dc, no dust layer tests are required.	5.3.2.3.3	X		
Clarified that the “temperature” is the temperature of the air surrounding the component	5.3.3	X		
Subdivided section dealing with higher permitted surface temperatures for “smooth” surfaces. Corrected area from 1 000 mm^2 to 10 000 mm^2.	5.3.4	X		
Clarified that the “Ex” requirements of IEC 60079 supplement those of the relevant industrial standards.	6.1	X		
Added requirement that where an adhesive is used to secure a gasket, it shall be used within its COT and shall comply with the requirements for cements.	6.5			C1
Requirements relocated to IEC 60079-28	former 6.6.2	A2		
Ultrasonic requirements updated based on latest research work	6.6.3		X	
Added reference to IEC 60079-28	6.6.4	A2		
Material identification parameters have been revised to reflect reasonably obtainable information	7.1.2.2	X		
“RTI-mechanical” has been clarified to include “RTI-mechanical strength” and “RTI-mechanical impact”	7.1.2.2	X		
Material identification parameters have been revised to reflect reasonably obtainable information	7.1.2.3	X		
Relocated information on “cements” from Clause 12.	7.1.2.4	X		
“RTI-mechanical” has been clarified to include “RTI-mechanical strength” and “RTI-mechanical impact”. Requirements for cements aligned with the requirements for elastomers.	7.2.2	X		

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Relocation of 10 K margin for EPL Gc or Dc from IEC 60079-15, IEC 60079-18 & IEC 60079-31	7.2.2	A3		
Added clarification with respect to gaskets and seals where only the outer edge is potentially exposed to light.	7.3	X		
Clarification added that one or more of the described techniques may be used	7.4.2	X		
Added additional relaxation for the case where a surface is in contact with an earthed surface on only two of four sides.	7.4.2 b)		X	
Added reference to IEC 60243-1 and IEC 60243-2 for test method to require a 4 kV DC test..	7.4.2.c)			C2
Additional guidance added with respect to the possible Specific Conditions of Use	7.4.2 e)	X		
New option added for portable, mains-powered equipment with earth-connected guard	7.4.2 f)		X	
Added option for determination of maximum transferred charge.	7.4.2 g) Table 10		X	
Added missing limits (same as 7.4.2)	7.4.3 a)	X		
Clarified that it is a dc test that is conducted	7.4.3 b)	X		
Clarified that this requirement is not applied to personal or portable equipment	7.5	X		
Clarified Group I limits	8.2	X		
Clarified Group II, EPL Ga limits	8.3	X		
Added limitation for external surfaces of >65% copper	8.5			C3
Added clarification as to what is considered a tool	9.1	X		
Clarified that the tolerance class of the set screw is not critical, only that it not protrude from the threaded hole after tightening.	9.4	X		
Information on cements transferred to Clause 7	12	X		
Required that Ex Component Certificates require a Schedule of Limitations in all cases	13.5		X	
Revised to clarified that all connection facilities may not be a “Compartment”.	14	X		
Sub-clause split to separate the requirements for protective earthing and equipotential bonding into separate sections	15.3 15.4	X		
Section split to separate secureness of electrical connections from the internal earth continuity plate.	15.6 15.7	X		
Non-threaded Group I cable glands are no longer required to be Ex Components.	16.3		X	
Non-threaded Group I blanking elements are no longer required to be Ex Components.	16.4		X	
Scope of Clause 17 clarified to define applicability	17	X		
Additional guidance notes added to address bearings	17.3	X		
Clarified applicability to disconnectors, interlocks, and maintenance switches.	18.2	X		
Fuse requirements deleted as they are addressed in the individual sub-parts	19	X		
Added requirements for EPL Gc and Dc	20.1			C4

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
The test circuit requirements for a flameproof connection have been removed as they are more completely specified in IEC 60079-1.	20.2	X		
The impact test requirements for luminaires are relocated to Table 15	21.1 Table 15	X		
Clarified interlock switch operation for flameproof luminaires	21.2	X		
Clarified that some Types of Protection permit connection of cells in parallel	23.2	X		
New cell types and data added based on latest available data	Table 13		X	
New cell types and data added based on latest available data	Table 14			C5
Clarification of what documentation is to be prepared regarding the explosion safety aspects of the equipment	24	X		
Clarification that the type tests are to take into consideration the installation instructions	26.2	X		
Clarification that the “glass” requirements also apply to “ceramic” parts	26.4.1.1	X		
Added a permission to interchange the order of tests at the “lower test temperature” and the “upper test temperature”.	26.4.1.2.2 26.4.1.2.3	X		
Clarified the construction of the impact test fixture	26.4.2	X		
Clarified the impact tests for glass parts	26.4.2	X		
Added clarification to deal with the new IPX9 ratings	26.4.5.1		X	
Clarified the test voltage for maximum surface temperature	26.5.1.3	X		
Relocation of EPL Da dust layer requirements from IEC 60079-18 & IEC 60079-31	26.5.1.3	A1		
Relocation of EPL Db specified dust layer requirements from IEC 60079-31	26.5.1.3	A4		
Added for EPL Db, a dust layer in a specified orientation, marked as T_L	26.5.1.3		B1	
Clarified that for EPL Dc, the testing is conducted without a dust layer.	26.5.1.3	X		
Relocation of thermal endurance to heat 10K relaxation for Gc equipment from IEC 60079-15, IEC 60079-18, & IEC 60079-31	Table 17	X		
Clarification of a consistent way to address elastomeric materials exposed to ultraviolet light	26.10	X		
Replacement of “oil No. 2” with the revised designation of “oil IRM 902”.	26.11	X		
Option added for testing at lower voltages when low resistance materials are encountered	26.13		X	
Transferred charge test added based on IEC TS 60079-32-2	26.17		X	
The reference to a specific instruction document instead of an “X” condition relocated to e) instead of a note giving a permission	29.3 e)	X		
Updated to reflect the additional levels of protection already shown in the sub-parts: “da”, “dc”, “eb”, “ec”, “oc”, “op is”, “op pr”, “op sh”, “pxb”, “pyb”, “pzc”, “qb”, “sa”, “sb”, and “sc”.	29.4 b)	X		

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Text added to address marking of “Ex associated equipment”	29.4		X	
Updated to reflect the additional levels of protection already shown in the sub-parts: “ic”, “op is”, “op pr”, “op sh”, “pxb”, “pyb”, “pzc”, “sa”, “sb”, and “sc”.	29.5 b)	X		
Clarified marking of EPL Da, EPL Db with no dust layer, EPL Db with a specified dust layer, and EPL Dc.	29.5 d)	X		
Introduced marking for EPL Db with a dust layer in a specified orientation	29.5 d)		X	
Text added to address marking of “Ex associated equipment”	29.5		X	
Text added to address marking of equipment intended to be installed in a boundary wall.	29.9		X	
The marking of Ex Component enclosure was aligned with the marking requirements of IEC 60079-1 and IEC 60079-7	29.10	X		
The alternate marking of EPL has been deleted.	former 29.13			C6
Marking for electric machines operated with a converter clarified	29.15	X		
Instruction material guidance clarified	30.1	X		
Additional instruction material for electric machines added	30.3			C7
Additional instruction material for cable glands added	30.5 A.5			C8
Allow ISO 10807 hose assemblies to be used with cable glands.	A.1		X	
Clarify testing with stainless steel mandrels	A.3	X		
Reduction of the time / slippage permitted	A.3.1.1		X	
Clarify impact testing of cable glands	A.3.3 Figure A.3	X		
Clarified the order of tests	A.3.4	X		
Clarified remarks	Annex B	X		
Aligned Figure with text	Figure C.1	X		
Clarified operation of electric machines from converters	Annex D (informative)	X		
Clarified temperature testing of electric machines	Annex E (informative)	X		
Flowchart for Cable Gland testing	Annex G (informative)	X		
Guidance of electric machine shaft voltages	Annex H (informative)	X		

NOTE The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance may be found by referring to the Redline Version of the standard.

Explanations:

A) Definitions

Minor and editorial changes	clarification decrease of technical requirements minor technical change editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

Extension	addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

Major technical changes	addition of technical requirements increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in clause B) below.

NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

B) Information about the background of changes

A1 The dust layer requirements for EPL Da are unchanged from what previously existed in IEC 60079-18,Ed 4 and IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

A2 IEC 60079-28 now includes all requirements for optical radiation for all EPLs.

A3 The COT requirements for EPL Gc or Dc are unchanged from what previously existed in IEC 60079-15, Ed 4, IEC 60079-18, Ed 4, and IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

A4 The dust layer requirements for EPL Db with a specified dust layer depth are unchanged from what previously existed in IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

B1 Dust layer requirements for EPL Db with a dust layer in a specified orientation have been added.

C1 It is recognized that the new requirements were, in many cases, already applied. The change is to ensure that they are uniformly and consistently applied.

C2 Require that the test be conducted at 4 kV DC.

C3 The limitation applies to external surfaces of other than cable glands, blanking elements, thread adapters and bushings.

C4 The added requirements for tool securing and marking are consistent with the approach in IEC 60079-15

C5 Voltage values were changed following additional research due to the complicated assessment and sometimes unspecified construction of Li/Ion-cells. It was found that some voltage values previously stated were too low.

C6 The now required EPL marking may be other than that permitted by the Level of Protection to account for limiting restrictions of material or plastic material surface area.

C7 Additional instruction material for electric machines required to facilitate selection, installation, and maintenance.

C8 Additional instruction material for cable glands required to facilitate selection and installation.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
31/1345/FDIS	31/1356/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the interpretation sheet 1 of April 2019 and interpretation sheet 2 of June 2019 have been included in this copy.

The contents of the corrigendum of January 2020 have been included in this copy.

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

1 Scope

This part of IEC 60079 specifies the general requirements for construction, testing and marking of ~~electrical~~ Ex Equipment and Ex Components intended for use in explosive atmospheres.

The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) under which it may be assumed that ~~electrical~~ Ex Equipment can be operated are:

- temperature –20 °C to +60 °C;
- pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar); and
- air with normal oxygen content, typically 21 % v/v.

This part of IEC 60079 and other standards supplementing this standard specify additional test requirements for Ex Equipment operating outside the standard temperature range, but further additional consideration and additional testing may be required for Ex Equipment operating outside the standard atmospheric pressure range and standard oxygen content. Such additional testing may be particularly relevant with respect to Types of Protection that depend on quenching of a flame such as 'flameproof enclosures "d"' (IEC 60079-1) or limitation of energy, 'intrinsic safety "i"' (IEC 60079-11).

NOTE 1 Although the standard atmospheric conditions above give a temperature range for the atmosphere of -20 °C to +60 °C, the normal ambient temperature range for the Ex Equipment is –20 °C to +40 °C, unless otherwise specified and marked. See 5.1.1. It is considered that –20 °C to +40 °C is appropriate for ~~most~~ many items of Ex Equipment and that to manufacture all Ex Equipment to be suitable for a standard atmosphere upper ambient temperature of +60 °C would place unnecessary design constraints.

NOTE 2 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, electromagnetic radiation, mechanically generated sparks, mechanical impacts resulting in thermite reactions, electrical arcing and static electric discharge in normal industrial environments.

~~NOTE 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 special protection. A standard for special protection "s", IEC 60079-33, is in preparation.~~

NOTE 3 Where an explosive gas atmosphere and a combustible dust atmosphere are, or ~~may~~ can be, present at the same time, the simultaneous presence of both ~~should be considered and may require~~ often warrants additional protective measures. Additional guidance on the use of Ex Equipment in hybrid mixtures (mixture of a flammable gas or vapour with a combustible dust or combustible flyings) is given in IEC 60079-14.

IEC 60079 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 4 Although outside the scope of this standard, such equipment ~~should~~ would typically 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. See ISO/IEC 80079-36.

This document is supplemented or modified by the following ~~standards concerning specific types of protection~~ parts and technical specifications:

– IEC 60079-1: Gas – Flameproof enclosures “d”;
– IEC 60079-2: Gas and dust – Pressurized enclosure~~s~~ "p";
– IEC 60079-5: Gas – Powder filling "q";
– IEC 60079-6: Gas – ~~Oil~~ Liquid immersion "o";
– IEC 60079-7: Gas – Increased safety "e";
– IEC 60079-11: Gas and dust – Intrinsic safety "i";
– IEC 60079-13: Gas and dust – Equipment protection by pressurized room “p” & artificially ventilated room “v”;
– IEC 60079-15: Gas – Type of protection “n”;
– IEC 60079-18: Gas and dust – Encapsulation "m";
– IEC 60079-25: Gas and dust – Intrinsically safe electrical systems
– IEC 60079-26: Gas – Equipment with equipment protection level (EPL) Ga
– IEC 60079-28: Gas and dust – Protection of equipment and transmission systems using optical radiation
– IEC 60079-29-1: Gas detectors – Performance requirements of detectors for flammable gases
– IEC 60079-29-4: Gas detectors – Performance requirements of open path detectors for flammable gases
– IEC/IEEE 60079-30-1: Gas and dust – Electrical resistance trace heating – General and testing requirements.
– IEC 60079-31: Dust – Protection by enclosure “t”
~~– IEC 61241-4: Dust – Pressurization “pD”.~~
– IEC 60079-33: Gas and dust – Special protection “s”
– IEC 60079-35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion
– IEC TS 60079-39: Gas – Intrinsically safe systems with electronically controlled spark duration limitation
– IEC TS 60079-40: Gas – Requirements for process sealing between flammable process fluids and electrical systems
– ISO 80079-36: Gas and dust – Non-electrical equipment for explosive atmospheres – Basic method and requirements

~~NOTE 6 Additional information on types of protection for non-electrical equipment can be found in ISO/IEC 80079-36 (to be published).~~

~~This standard is supplemented or modified by the following equipment standards:~~

~~IEC 60079-13: Explosive atmospheres – Part 13: Equipment protection by pressurized room “p”~~

~~IEC 60079-25: Explosive atmospheres – Part 25: Intrinsically safe electrical systems~~

~~IEC 60079-26: Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga~~

~~IEC 60079-28: Explosive atmospheres – Part 28: Protection of equipment and transmission systems using optical radiation~~

~~IEC 62013-1: Caplights for use in mines susceptible to firedamp – Part 1: General requirements – Construction and testing in relation to the risk of explosion~~

~~IEC 60079-30-1: Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements.~~

This document, along with the additional ~~standards~~ parts of IEC 60079 mentioned above, is not applicable to the construction of

- electromedical apparatus,
- shot-firing exploders,
- test devices for exploders, and
- shot-firing circuits.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-5, *Rotating electrical machines – Part 5: ~~Classification of~~ Degrees of protection provided by the ~~enclosures~~ integral design of rotating electrical machines (IP Code) – Classification*

~~IEC 60050-426, International Electrotechnical Vocabulary (IEV) – Chapter 426: Electrical apparatus for explosive atmospheres~~

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*

~~IEC 60079-2, Explosive atmospheres – Part 2: Equipment protection by pressurized enclosures "p"~~

~~IEC 60079-5, Explosive atmospheres – Part 5: Equipment protection by powder filling "q"~~

~~IEC 60079-6, Explosive atmospheres – Part 6: Equipment protection by oil-immersion "o"~~

~~IEC 60079-7, Explosive atmospheres – Part 7: Equipment protection by increased safety "e"~~

~~IEC 60079-11, Explosive atmospheres – Part 11: Equipment protection by intrinsic safety "i"~~

~~IEC 60079-15, Explosive atmospheres – Part 15: Equipment protection by type of protection "n"~~

~~IEC 60079-18, Explosive atmospheres – Part 18: Equipment protection by encapsulation "m"~~

IEC 60079-20-1, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification, test methods and data*

~~IEC 60079-25: Explosive atmospheres – Part 25: Intrinsically safe systems~~

IEC 60079-26: *Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga*

~~IEC 60079-28: *Explosive atmospheres – Part 28: Protection of equipment and transmission systems using optical radiation*~~

~~IEC 60079-30-1: *Explosive atmospheres – Part 30-1: Electrical resistance trace heating – General and testing requirements*~~

~~IEC 60079-31, *Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosures "t"*~~

IEC 60079-35-1, *Explosive atmospheres – Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion*

IEC 60086-1, *Primary batteries – Part 1: General*

~~IEC 60095-1, *Lead-acid starter batteries – Part 1: General requirements and methods of test*~~

IEC 60192, *Low-pressure sodium vapour lamps – Performance specifications*

IEC 60216-1, *Electrical insulating materials – ~~Properties of~~ Thermal endurance properties – Part 1: Ageing procedures and evaluation of test results*

IEC 60216-2, *Electrical insulating materials – Thermal endurance properties – Part 2: Determination of thermal endurance properties of electrical insulating materials – Choice of test criteria*

IEC 60243-1, *Electric~~al~~ strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

~~IEC 60254 (all parts), *Lead-acid traction batteries*~~

IEC 60423, *Conduit~~s~~ systems for ~~electrical purposes~~ cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

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

~~IEC 60622, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Sealed nickel-cadmium prismatic rechargeable single cells*~~

~~IEC 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*~~

IEC 60662, *High-pressure sodium vapour lamps – Performance specifications*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

~~IEC 60896-11, *Stationary lead-acid batteries – Part 11: Vented types – General requirements and methods of tests*~~

~~IEC 60896-21, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*~~

~~IEC 60952 (all parts), *Aircraft batteries*~~

~~IEC 61056-1, *General purpose lead-acid batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of tests*~~

~~IEC 61241-4, *Electrical apparatus for use in the presence of combustible dust – Part 4: Type of protection "pD"*~~

~~IEC 61427, *Secondary cells and batteries for photovoltaic energy systems (PVES) – General requirements and methods of test*~~

~~IEC 61951-1, *Secondary cells and batteries containing alkaline and other non-acid electrolytes – Portable sealed rechargeable single cells – Part 1: Nickel-cadmium*~~

~~IEC 61951-2, *Secondary cells and batteries containing alkaline and other non-acid electrolytes – Portable sealed rechargeable single cells – Part 2: Nickel-metal hydride*~~

~~IEC 61960, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary lithium cells and batteries for portable applications*~~

~~IEC 62013-1, *Caplights for use in mines susceptible to firedamp – Part 1: General requirements – Construction and testing in relation to the risk of explosion*~~

IEC 62626-1, *Low-voltage switchgear and controlgear enclosed equipment – Part 1: Enclosed switch-disconnectors outside the scope of IEC 60947-3 to provide isolation during repair and maintenance work*

ISO 48, *Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 178, *Plastics – Determination of flexural properties*

ISO 179 (all parts), *Plastics – Determination of Charpy impact properties*

ISO 262, *ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts*

ISO 273, *Fasteners – Clearance holes for bolts and screws*

~~ISO 286-2, *ISO system of limits and fits – Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*~~

ISO 527-2, *Plastics – Determination of tensile properties – Part 2: Test conditions for moulding and extrusion plastics*

ISO 965-1, *ISO general-purpose metric screw threads – Tolerances – Part 1: Principles and basic data*

ISO 965-3, ISO *general-purpose metric screw threads – Tolerances – Part 3: Deviations for constructional screw threads*

~~ISO 1817, *Rubber, vulcanized – Determination of the effect of liquids*~~

ISO 3601-1, *Fluid power systems – O-rings – Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 3601-2, *Fluid power systems – O-rings – Part 2: Housing dimensions for general applications*

ISO 4014, *Hexagon head bolts – Product grades A and B*

ISO 4017, *Hexagon head screws – Product grades A and B*

ISO 4026, *Hexagon socket set screws with flat point*

ISO 4027, *Hexagon socket set screws with cone point*

ISO 4028, *Hexagon socket set screws with dog point*

ISO 4029, *Hexagon socket set screws with cup point*

ISO 4032, *Hexagon nuts, style 1 – Product grades A and B*

ISO 4762, *Hexagon socket head cap screws*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 7380, *Hexagon socket button head screws*

ISO 14583, *Hexalobular socket pan head screws*

ANSI/UL 746B, *Polymeric Materials – Long-Term Property Evaluations*

ANSI/UL 746C, *Polymeric Materials – Used in Electrical Equipment Evaluations*

ASTM D5964, *Standard practice for rubber IRM 901, IRM 902, and IRM 903 replacement oils for ASTM No. 1, ASTM No. 2, and ASTM No. 3*

IEC 60079-0

Edition 7.0 2017-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –
Part 0: Equipment – General requirements

Atmosphères explosives –
Partie 0: Matériel – Exigences générales

IEC 60079-0:2017-12(en-fr)

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 60079-0
Edition 7.0 2017-12

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31/1455/DISH	31/1464/RVDISH

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

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Interpretation sheet of Subclause 16.6 of IEC 60079-0:2017

The TC31/CAG requested (Resolution 2 of 2018-04-19) that WG22 prepare an interpretation sheet based on IECEx Decision Sheet DS2018/002 addressing the assignment of entry point and branching point temperatures of electrical rotating machines.

Details of interpretation:

IEC 60079-0:2017 (Ed. 7), ***Explosive atmospheres – Part 0: Equipment – General requirements***

Interpretation of Subclause 16.6: Temperature at branching point and entry point:

Question: Subclause 16.6 of IEC 60079-0:2017 states “When the temperature under rated conditions is higher than 70 °C at the entry point or 80 °C at the branching point of the conductors, information shall be marked on the equipment exterior to provide guidance to the user on the proper selection of cable and cable gland or conductors in conduit.”

ICS 29.260.20

IEC 60079-0:2017-12/ISH1:2019-04(en)

It is not normal practice for electrical rotating machines to be tested with the cable entry devices and cables that might be used in an actual installation, but with the cables available at the manufacturer's test area. In many cases, there will be no formal entry device as the cables will enter via the space reserved for fixing of a gland plate.

How shall the relevant entry point and branching point temperatures be determined?

Interpretation: *The use of the maximum internal air space temperature to represent the maximum service temperature of terminal box gaskets and seals, the cable branching point temperature, and the entry point temperature reflects the normal practice of testing electrical rotating machines without prior knowledge of the actual glands and cables to be used for installation. The production of heat from the electrical rotating machine connections is generally insignificant with respect to the production of heat from the machine windings and core.*

Further amplification:

1) The entry point of the cable where the temperature is measured should be sealed so far as possible to ensure that there is minimum air-circulation which can reduce the measured temperature.
2) This is not intended to apply to any gasket between the terminal box and the frame of the electrical rotating machine, where higher temperatures may be recorded, but only to the gasket between the terminal box and its lid.

Although written in the context of electrical rotating machines, there may be other types of equipment where an equivalent approach is applicable

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 60079-0
Edition 7.0 2017-12

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

INTERPRETATION SHEET 2

This interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
31/1469/DISH	31/1486/RVDISH

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

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Question:

How shall marking be shown for equipment covered by both the electrical and non-electrical standards (IEC 60079 and ISO 80079 series)?

Answer:

Equipment which includes both an electrical part and a non-electrical part shall have combined marking. For example:

Ex db h IIA T4 Gb

Ex h tb IIIC T135 °C Db

IEC 60079-0:2017-12/ISH2:2019-06(en-fr)

ICS 29.260.20

It will be clearer for the user that the combined risk of the electrical part and the non-electrical part, covered by a single certificate, has been assessed for the complete equipment, stating one EPL, one equipment Group and one temperature class for Gas and the same for Dust (but showing a maximum surface temperature instead of a temperature class). It is also noted that Ex Components are not marked with either a temperature class (Group II) or a maximum surface temperature (Group III).

For equipment where separate certificates have been prepared, with one for the electrical parts, and one for the non-electrical parts, it is appropriate to have separate electrical and non-electrical marking strings, each with its own associated certificate number.

NOTE Additional guidance on the marking of assemblies is given in IEC TS 60079-46.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60079-0 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This seventh edition cancels and replaces the sixth edition, published in 2011. This edition constitutes a technical revision.

The significance of the changes between IEC Standard, IEC 60079-0, Edition 6 (2011) and IEC 60079-0, Edition 7 (2017) are as listed below:

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Throughout document, “electrical equipment” replaced by “equipment” where appropriate.	Multiple	X		
Scope List of “Type of “Protection” and “Product” standards combined into one list.	1	X		
Definitions used in multiple sub-parts added. Definitions harmonized across sub-parts and added to 60079-0 where appropriate. Battery definitions updated	3	X		
Clarification of the way that information on process temperature influences can be expressed.	5.1.2	X		
Clarification regarding the determination of service temperatures when dust layers are present	5.2	X		
Clarification on the need to provide service temperature information for Ex Components in the Schedule of Limitations	5.2	X		
Relocation of EPL Da dust layer requirements from IEC 60079-18 & IEC 60079-31	5.3.2.3.1	A1		
Clarified that for EPL Db, a maximum specified dust layer of greater than 200 mm is not permitted as thicker layers have no additional effect on maximum surface temperature.	b)	X		
Added for EPL Db, a dust layer in a specified orientation, marked as T_L	c)		X	
Clarified that for EPL Dc, no dust layer tests are required.	5.3.2.3.3	X		
Clarified that the “temperature” is the temperature of the air surrounding the component	5.3.3	X		
Subdivided section dealing with higher permitted surface temperatures for “smooth” surfaces. Corrected area from 1 000 mm^2 to 10 000 mm^2.	5.3.4	X		
Clarified that the “Ex” requirements of IEC 60079 supplement those of the relevant industrial standards.	6.1	X		
Added requirement that where an adhesive is used to secure a gasket, it shall be used within its COT and shall comply with the requirements for cements.	6.5			C1
Requirements relocated to IEC 60079-28	former 6.6.2	A2		
Ultrasonic requirements updated based on latest research work	6.6.3		X	
Added reference to IEC 60079-28	6.6.4	A2		
Material identification parameters have been revised to reflect reasonably obtainable information	7.1.2.2	X		
“RTI-mechanical” has been clarified to include “RTI-mechanical strength” and “RTI-mechanical impact”	7.1.2.2	X		
Material identification parameters have been revised to reflect reasonably obtainable information	7.1.2.3	X		
Relocated information on “cements” from Clause 12.	7.1.2.4	X		
“RTI-mechanical” has been clarified to include “RTI-mechanical strength” and “RTI-mechanical impact”. Requirements for cements aligned with the requirements for elastomers.	7.2.2	X		

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Relocation of 10 K margin for EPL Gc or Dc from IEC 60079-15, IEC 60079-18 & IEC 60079-31	7.2.2	A3		
Added clarification with respect to gaskets and seals where only the outer edge is potentially exposed to light.	7.3	X		
Clarification added that one or more of the described techniques may be used	7.4.2	X		
Added additional relaxation for the case where a surface is in contact with an earthed surface on only two of four sides.	7.4.2 b)		X	
Added reference to IEC 60243-1 and IEC 60243-2 for test method to require a 4 kV DC test..	7.4.2.c)			C2
Additional guidance added with respect to the possible Specific Conditions of Use	7.4.2 e)	X		
New option added for portable, mains-powered equipment with earth-connected guard	7.4.2 f)		X	
Added option for determination of maximum transferred charge.	7.4.2 g) Table 10		X	
Added missing limits (same as 7.4.2)	7.4.3 a)	X		
Clarified that it is a dc test that is conducted	7.4.3 b)	X		
Clarified that this requirement is not applied to personal or portable equipment	7.5	X		
Clarified Group I limits	8.2	X		
Clarified Group II, EPL Ga limits	8.3	X		
Added limitation for external surfaces of >65% copper	8.5			C3
Added clarification as to what is considered a tool	9.1	X		
Clarified that the tolerance class of the set screw is not critical, only that it not protrude from the threaded hole after tightening.	9.4	X		
Information on cements transferred to Clause 7	12	X		
Required that Ex Component Certificates require a Schedule of Limitations in all cases	13.5		X	
Revised to clarified that all connection facilities may not be a “Compartment”.	14	X		
Sub-clause split to separate the requirements for protective earthing and equipotential bonding into separate sections	15.3 15.4	X		
Section split to separate secureness of electrical connections from the internal earth continuity plate.	15.6 15.7	X		
Non-threaded Group I cable glands are no longer required to be Ex Components.	16.3		X	
Non-threaded Group I blanking elements are no longer required to be Ex Components.	16.4		X	
Scope of Clause 17 clarified to define applicability	17	X		
Additional guidance notes added to address bearings	17.3	X		
Clarified applicability to disconnectors, interlocks, and maintenance switches.	18.2	X		
Fuse requirements deleted as they are addressed in the individual sub-parts	19	X		
Added requirements for EPL Gc and Dc	20.1			C4

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
The test circuit requirements for a flameproof connection have been removed as they are more completely specified in IEC 60079-1.	20.2	X		
The impact test requirements for luminaires are relocated to Table 15	21.1 Table 15	X		
Clarified interlock switch operation for flameproof luminaires	21.2	X		
Clarified that some Types of Protection permit connection of cells in parallel	23.2	X		
New cell types and data added based on latest available data	Table 13		X	
New cell types and data added based on latest available data	Table 14			C5
Clarification of what documentation is to be prepared regarding the explosion safety aspects of the equipment	24	X		
Clarification that the type tests are to take into consideration the installation instructions	26.2	X		
Clarification that the “glass” requirements also apply to “ceramic” parts	26.4.1.1	X		
Added a permission to interchange the order of tests at the “lower test temperature” and the “upper test temperature”.	26.4.1.2.2 26.4.1.2.3	X		
Clarified the construction of the impact test fixture	26.4.2	X		
Clarified the impact tests for glass parts	26.4.2	X		
Added clarification to deal with the new IPX9 ratings	26.4.5.1		X	
Clarified the test voltage for maximum surface temperature	26.5.1.3	X		
Relocation of EPL Da dust layer requirements from IEC 60079-18 & IEC 60079-31	26.5.1.3	A1		
Relocation of EPL Db specified dust layer requirements from IEC 60079-31	26.5.1.3	A4		
Added for EPL Db, a dust layer in a specified orientation, marked as T_L	26.5.1.3		B1	
Clarified that for EPL Dc, the testing is conducted without a dust layer.	26.5.1.3	X		
Relocation of thermal endurance to heat 10K relaxation for Gc equipment from IEC 60079-15, IEC 60079-18, & IEC 60079-31	Table 17	X		
Clarification of a consistent way to address elastomeric materials exposed to ultraviolet light	26.10	X		
Replacement of “oil No. 2” with the revised designation of “oil IRM 902”.	26.11	X		
Option added for testing at lower voltages when low resistance materials are encountered	26.13		X	
Transferred charge test added based on IEC TS 60079-32-2	26.17		X	
The reference to a specific instruction document instead of an “X” condition relocated to e) instead of a note giving a permission	29.3 e)	X		
Updated to reflect the additional levels of protection already shown in the sub-parts: “da”, “dc”, “eb”, “ec”, “oc”, “op is”, “op pr”, “op sh”, “pxb”, “pyb”, “pzc”, “qb”, “sa”, “sb”, and “sc”.	29.4 b)	X		

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Text added to address marking of “Ex associated equipment”	29.4		X	
Updated to reflect the additional levels of protection already shown in the sub-parts: “ic”, “op is”, “op pr”, “op sh”, “pxb”, “pyb”, “pzc”, “sa”, “sb”, and “sc”.	29.5 b)	X		
Clarified marking of EPL Da, EPL Db with no dust layer, EPL Db with a specified dust layer, and EPL Dc.	29.5 d)	X		
Introduced marking for EPL Db with a dust layer in a specified orientation	29.5 d)		X	
Text added to address marking of “Ex associated equipment”	29.5		X	
Text added to address marking of equipment intended to be installed in a boundary wall.	29.9		X	
The marking of Ex Component enclosure was aligned with the marking requirements of IEC 60079-1 and IEC 60079-7	29.10	X		
The alternate marking of EPL has been deleted.	former 29.13			C6
Marking for electric machines operated with a converter clarified	29.15	X		
Instruction material guidance clarified	30.1	X		
Additional instruction material for electric machines added	30.3			C7
Additional instruction material for cable glands added	30.5 A.5			C8
Allow ISO 10807 hose assemblies to be used with cable glands.	A.1		X	
Clarify testing with stainless steel mandrels	A.3	X		
Reduction of the time / slippage permitted	A.3.1.1		X	
Clarify impact testing of cable glands	A.3.3 Figure A.3	X		
Clarified the order of tests	A.3.4	X		
Clarified remarks	Annex B	X		
Aligned Figure with text	Figure C.1	X		
Clarified operation of electric machines from converters	Annex D (informative)	X		
Clarified temperature testing of electric machines	Annex E (informative)	X		
Flowchart for Cable Gland testing	Annex G (informative)	X		
Guidance of electric machine shaft voltages	Annex H (informative)	X		

NOTE The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance may be found by referring to the Redline Version of the standard.

Explanations:

A) Definitions

Minor and editorial changes	clarification decrease of technical requirements minor technical change editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

Extension	addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

Major technical changes	addition of technical requirements increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in clause B) below.

NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

B) Information about the background of changes

A1 The dust layer requirements for EPL Da are unchanged from what previously existed in IEC 60079-18,Ed 4 and IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

A2 IEC 60079-28 now includes all requirements for optical radiation for all EPLs.

A3 The COT requirements for EPL Gc or Dc are unchanged from what previously existed in IEC 60079-15, Ed 4, IEC 60079-18, Ed 4, and IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

A4 The dust layer requirements for EPL Db with a specified dust layer depth are unchanged from what previously existed in IEC 60079-31, Ed 2, but have been relocated to IEC 60079-0 to allow consistent application in all Types of Protection.

B1 Dust layer requirements for EPL Db with a dust layer in a specified orientation have been added.

C1 It is recognized that the new requirements were, in many cases, already applied. The change is to ensure that they are uniformly and consistently applied.

C2 Require that the test be conducted at 4 kV DC.

C3 The limitation applies to external surfaces of other than cable glands, blanking elements, thread adapters and bushings.

C4 The added requirements for tool securing and marking are consistent with the approach in IEC 60079-15

C5 Voltage values were changed following additional research due to the complicated assessment and sometimes unspecified construction of Li/Ion-cells. It was found that some voltage values previously stated were too low.

C6 The now required EPL marking may be other than that permitted by the Level of Protection to account for limiting restrictions of material or plastic material surface area.

C7 Additional instruction material for electric machines required to facilitate selection, installation, and maintenance.

C8 Additional instruction material for cable glands required to facilitate selection and installation.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
31/1345/FDIS	31/1356/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the interpretation sheet 1 of April 2019 and interpretation sheet 2 of June 2019 have been included in this copy.

The contents of the corrigendum of January 2020 have been included in this copy.

EXPLOSIVE ATMOSPHERES –

Part 0: Equipment – General requirements

1 Scope

This part of IEC 60079 specifies the general requirements for construction, testing and marking of Ex Equipment and Ex Components intended for use in explosive atmospheres.

The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) under which it may be assumed that Ex Equipment can be operated are:

- temperature –20 °C to +60 °C;
- pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar); and
- air with normal oxygen content, typically 21 % v/v.

This part of IEC 60079 and other standards supplementing this standard specify additional test requirements for Ex Equipment operating outside the standard temperature range, but further additional consideration and additional testing may be required for Ex Equipment operating outside the standard atmospheric pressure range and standard oxygen content. Such additional testing may be particularly relevant with respect to Types of Protection that depend on quenching of a flame such as 'flameproof enclosures "d"' (IEC 60079-1) or limitation of energy, 'intrinsic safety "i"' (IEC 60079-11).

NOTE 1 Although the standard atmospheric conditions above give a temperature range for the atmosphere of -20 °C to +60 °C, the normal ambient temperature range for the Ex Equipment is –20 °C to +40 °C, unless otherwise specified and marked. See 5.1.1. It is considered that –20 °C to +40 °C is appropriate for many items of Ex Equipment and that to manufacture all Ex Equipment to be suitable for a standard atmosphere upper ambient temperature of +60 °C would place unnecessary design constraints.

NOTE 2 Requirements given in this standard result from an ignition hazard assessment made on equipment. The ignition sources taken into account are those found associated with this type of equipment, such as hot surfaces, electromagnetic radiation, mechanically generated sparks, mechanical impacts resulting in thermite reactions, electrical arcing and static electric discharge in normal industrial environments.

NOTE 3 Where an explosive gas atmosphere and a combustible dust atmosphere are, or can be, present at the same time, the simultaneous presence of both often warrants additional protective measures. Additional guidance on the use of Ex Equipment in hybrid mixtures (mixture of a flammable gas or vapour with a combustible dust or combustible flyings) is given in IEC 60079-14.

IEC 60079 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 4 Although outside the scope of this standard, such equipment would typically be subjected to a hazard analysis that identifies and lists all of the potential sources of ignition by the equipment and the measures to be applied to prevent them becoming effective. See ISO/IEC 80079-36.

This document is supplemented or modified by the following parts and technical specifications:

– IEC 60079-1: Gas – Flameproof enclosures "d";
– IEC 60079-2: Gas and dust – Pressurized enclosure "p";
– IEC 60079-5: Gas – Powder filling "q";
– IEC 60079-6: Gas – Liquid immersion "o";
– IEC 60079-7: Gas – Increased safety "e";

– IEC 60079-11: Gas and dust – Intrinsic safety "i";

– IEC 60079-13: Gas and dust – Equipment protection by pressurized room “p” & artificially ventilated room “v”;

– IEC 60079-15: Gas – Type of protection “n”;

– IEC 60079-18: Gas and dust – Encapsulation "m";

– IEC 60079-25: Gas and dust – Intrinsically safe electrical systems

– IEC 60079-26: Gas – Equipment with equipment protection level (EPL) Ga

– IEC 60079-28: Gas and dust – Protection of equipment and transmission systems using optical radiation

– IEC 60079-29-1: Gas detectors – Performance requirements of detectors for flammable gases

– IEC 60079-29-4: Gas detectors – Performance requirements of open path detectors for flammable gases

– IEC/IEEE 60079-30-1: Gas and dust – Electrical resistance trace heating – General and testing requirements.

– IEC 60079-31: Dust – Protection by enclosure “t”

– IEC 60079-33: Gas and dust – Special protection “s”

– IEC 60079-35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion

– IEC TS 60079-39: Gas – Intrinsically safe systems with electronically controlled spark duration limitation

– IEC TS 60079-40: Gas – Requirements for process sealing between flammable process fluids and electrical systems

– ISO 80079-36: Gas and dust – Non-electrical equipment for explosive atmospheres – Basic method and requirements

This document, along with the additional parts of IEC 60079 mentioned above, is not applicable to the construction of

- electromedical apparatus,
- shot-firing exploders,
- test devices for exploders, and
- shot-firing circuits.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-5, *Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification*

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"*

IEC 60079-20-1, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test methods and data*

IEC 60079-26, *Explosive atmospheres – Part 26: Equipment with Equipment Protection Level (EPL) Ga*

IEC 60079-35-1, *Explosive atmospheres – Part 35-1: Caplights for use in mines susceptible to firedamp – General requirements – Construction and testing in relation to the risk of explosion*

IEC 60086-1, *Primary batteries – Part 1: General*

IEC 60192, *Low-pressure sodium vapour lamps – Performance specifications*

IEC 60216-1, *Electrical insulating materials – Thermal endurance properties – Part 1: Ageing procedures and evaluation of test results*

IEC 60216-2, *Electrical insulating materials – Thermal endurance properties – Part 2: Determination of thermal endurance properties of electrical insulating materials – Choice of test criteria*

IEC 60243-1, *Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60423, *Conduit systems for cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

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

IEC 60662, *High-pressure sodium vapour lamps – Performance specifications*

IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 62626-1, *Low-voltage switchgear and controlgear enclosed equipment – Part 1: Enclosed switch-disconnectors outside the scope of IEC 60947-3 to provide isolation during repair and maintenance work*

ISO 48, *Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 178, *Plastics – Determination of flexural properties*

ISO 179 (all parts), *Plastics – Determination of Charpy impact properties*

ISO 262, *ISO general-purpose metric screw threads – Selected sizes for screws, bolts and nuts*

ISO 273, *Fasteners – Clearance holes for bolts and screws*

ISO 527-2, *Plastics – Determination of tensile properties – Part 2: Test conditions for moulding and extrusion plastics*

ISO 965-1, *ISO general-purpose metric screw threads – Tolerances – Part 1: Principles and basic data*

ISO 965-3, ISO *general-purpose metric screw threads – Tolerances – Part 3: Deviations for constructional screw threads*

ISO 3601-1, *Fluid power systems – O-rings – Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 3601-2, *Fluid power systems – O-rings – Part 2: Housing dimensions for general applications*

ISO 4014, *Hexagon head bolts – Product grades A and B*

ISO 4017, *Hexagon head screws – Product grades A and B*

ISO 4026, *Hexagon socket set screws with flat point*

ISO 4027, *Hexagon socket set screws with cone point*

ISO 4028, *Hexagon socket set screws with dog point*

ISO 4029, *Hexagon socket set screws with cup point*

ISO 4032, *Hexagon nuts, style 1 – Product grades A and B*

ISO 4762, *Hexagon socket head cap screws*

ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 7380, *Hexagon socket button head screws*

ISO 14583, *Hexalobular socket pan head screws*

ANSI/UL 746B, *Polymeric Materials – Long-Term Property Evaluations*

ANSI/UL 746C, *Polymeric Materials – Used in Electrical Equipment Evaluations*

ASTM D5964, *Standard practice for rubber IRM 901, IRM 902, and IRM 903 replacement oils for ASTM No. 1, ASTM No. 2, and ASTM No. 3*

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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ATMOSPHÈRES EXPLOSIVES –

Partie 0: Matériel – Exigences générales

AVANT-PROPOS

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La Norme internationale IEC 60079-0 a été établie par le comité d'études 31 de l'IEC: Équipements pour atmosphères explosives.

Cette septième édition annule et remplace la sixième édition parue en 2011. Cette édition constitue une révision technique.

L'importance des modifications entre l'IEC 60079-0, Édition 6 (2011) et l'IEC 60079-0, Édition 7 (2017) est indiquée ci-dessous:

		Type		
Explication de l'importance des modifications	**Article**	**Modifications mineures ou rédactionnelles**	**Extension**	**Modifications techniques majeures**
«Appareil électrique» a été remplacé par «appareil» dans l'ensemble du document, le cas échéant.	Multiples	X		
Domaine d'application Les listes des normes relatives au «mode de protection» et des normes de «produit» ont été regroupées en une liste.	1	X		
Des définitions utilisées dans différentes sous-parties ont été ajoutées. Les définitions ont été harmonisées entre les différentes sous-parties et ajoutées à l'IEC 60079-0, le cas échéant. La définition des batteries a été mise à jour.	3	X		
Clarification de la manière dont les informations sur l'influence de la température de procédé peuvent être exprimées.	5.1.2	X		
Clarification concernant la détermination des températures de service en présence de couches de poussière	5.2	X		
Clarification sur le besoin de fournir des informations relatives à la température de service pour les composants Ex dans la Liste des limitations	5.2	X		
Intégration des exigences relatives aux couches de poussière EPL Da provenant de l'IEC 60079-18 & de l'IEC 60079-31	5.3.2.3.1	A1		
Clarification du fait que, pour EPL Db, une couche maximale de poussière spécifiée supérieure à 200 mm n'est pas permise étant donné que les couches plus épaisses n'ont pas d'effet supplémentaire sur la température maximale de surface.	b)	X		
Ajout, pour EPL Db, d'une couche de poussière dans une orientation spécifiée, marquée T_L	c)		X	
Clarification du fait que, pour EPL Dc, aucun essai n'est exigé pour les couches de poussière	5.3.2.3.3	X		
Clarification du fait que la «température» est la température de l'air environnant le composant	5.3.3	X		
Section sous-divisée traitant des températures de surface supérieures admises pour les surfaces «lisses». Surfaces corrigées de 1 000 mm^2 à 10 000 mm^2.	5.3.4	X		
Clarification du fait que les exigences «Ex» de l'IEC 60079 viennent en complément de celles des normes industrielles applicables.	6.1	X		
Ajout d'une exigence selon laquelle un adhésif est utilisé afin de fixer une garniture; ledit adhésif doit être utilisé dans les limites de ses températures de fonctionnement continu (COT) et doit être conforme aux exigences relatives aux matériaux utilisés pour les scellements	6.5			C1
Exigences intégrées à l'IEC 60079-28	ancien 6.6.2	A2		
Exigences relatives aux ultrasons mises à jour d'après les travaux de recherches les plus récents	6.6.3		X	
Ajout d'une référence à l'IEC 60079-28	6.6.4	A2		

		Type		
Explication de l'importance des modifications	**Article**	**Modifications mineures ou rédactionnelles**	**Extension**	**Modifications techniques majeures**
Les paramètres d'identification des matériaux ont été révisés afin de refléter les informations pouvant être raisonnablement obtenues	7.1.2.2	X		
«IRT – choc mécanique» a été clarifié pour inclure «IRT – résistance mécanique» et «IRT – choc mécanique»	7.1.2.2	X		
Les paramètres d'identification des matériaux ont été révisés afin de refléter les informations pouvant être raisonnablement obtenues	7.1.2.3	X		
Intégration des informations relatives aux «matériaux utilisés pour les scellements» de l'Article 12.	7.1.2.4	X		
«IRT – choc mécanique» a été clarifié pour inclure «IRT – résistance mécanique» et «IRT – choc mécanique». Les exigences relatives aux matériaux utilisés pour les scellements sont en accord avec celles relatives aux élastomères.	7.2.2	X		
Intégration de la marge de 10 K pour EPL Gc ou Dc de l'IEC 60079-15, l'IEC 60079-18 & l'IEC 60079-31	7.2.2	A3		
Ajout de la clarification relative aux garnitures et aux joints d'étanchéité pour lesquels seul le bord extérieur est potentiellement exposé à la lumière.	7.3	X		
Ajout de la clarification du fait qu'une ou plusieurs des techniques décrites peut peuvent être utilisées	7.4.2	X		
Ajout d'une relaxation supplémentaire pour le cas dans lequel une surface est en contact avec une surface reliée à la terre de deux côtés sur quatre uniquement	7.4.2 b)		X	
Ajout d'une référence à l'IEC 60243-1 et à l'IEC 60243-2 relative aux méthodes d'essai exigeant un essai en courant continu de 4 kV	7.4.2.c)			C2
Ajout de recommandations supplémentaires concernant les conditions particulières d'utilisation	7.4.2 e)	X		
Ajout d'une nouvelle option pour les appareils portables, alimentés par le réseau ayant un dispositif de protection relié à la terre	7.4.2 f)		X	
Ajout d'une option pour la détermination de la charge maximale transférée	7.4.2 g) Tableau 10		X	
Ajout de limites manquantes (les mêmes qu'en 7.4.2)	7.4.3 a)	X		
Clarification du fait que l'essai réalisé est effectué en courant continu	7.4.3 b)	X		
Clarification du fait que l'exigence n'est pas appliquée à un appareil personnel ou portable	7.5	X		
Clarification des limites du Groupe I	8.2	X		
Clarification des limites du Groupe II, EPL Ga	8.3	X		
Ajout de la limitation des surfaces externes de >65 % de cuivre	8.5			C3
Ajout d'une clarification déterminant ce qui est considéré comme un outil	9.1	X		
Clarification du fait que la classe de tolérance de la vis sans tête n'est pas déterminante, dans la mesure où la vis ne dépasse pas du trou taraudé après le serrage	9.4	X		

		Type		
Explication de l'importance des modifications	**Article**	**Modifications mineures ou rédactionnelles**	**Extension**	**Modifications techniques majeures**
Informations relatives aux matériaux utilisés pour les scellements intégrés à l'Article 7	12	X		
Il est exigé que les certificats pour les composants Ex aient une Liste des limitations dans tous les cas	13.5		X	
Révision visant à clarifier le fait que tous les éléments de raccordement peuvent ne pas être des «logements».	14	X		
Segmentation de paragraphe afin de séparer les exigences relatives à la mise à la terre de protection et aux liaisons équipotentielles dans des sections respectives	15.3 15.4	X		
Segmentation de section afin de séparer la mise en sécurité des connexions électriques et la plaque interne de mise à la terre	15.6 15.7	X		
Il n'est plus exigé que les entrées de câbles non filetées du Groupe I soient des composants Ex	16.3		X	
Il n'est plus exigé que les dispositifs d'obturation non filetés du Groupe I soient des composants Ex	16.4		X	
Clarification du domaine d'application de l'Article 17 afin de définir l'applicabilité	17	X		
Ajout de recommandations en notes afin de traiter des paliers	17.3	X		
Clarification de l'applicabilité pour les sectionneurs, les dispositifs de verrouillage et les interrupteurs de maintenance	18.2	X		
Suppression des exigences relatives aux coupe-circuits à fusibles étant donné qu'elles sont traitées dans les sous-parties individuellement	19	X		
Ajout d'exigences pour EPL Gc et Dc	20.1			C4
Les exigences relatives aux circuits d'essai pour une connexion antidéflagrante ont été supprimées étant donné qu'elles sont spécifiées de manière plus exhaustive dans l'IEC 60079-1.	20.2	X		
Intégration des exigences relatives aux essais de choc mécanique pour les luminaires dans le Tableau 15	21.1 Tableau 16	X		
Clarification sur le fonctionnement du dispositif de sectionnement pour les luminaires antidéflagrants	21.2	X		
Clarification sur le fait que certains modes de protection permettent une connexion en parallèle des éléments	23.2	X		
Ajout de nouveaux types d'éléments et de données selon les données les plus récentes disponibles	Tableau 13		X	
Ajout de nouveaux types d'éléments et de données selon les données les plus récentes disponibles	Tableau 15			C5
Clarification sur le fait que la documentation doit être établie d'après les aspects de la sécurité de l'appareil vis-à-vis du risque d'explosion	24	X		
Clarification sur le fait que les essais de type doivent prendre en considération les instructions d'installation	26.2	X		
Clarification sur le fait que les exigences relatives aux parties en verre s'appliquent également aux parties en céramique	26.4.1.1	X		

		Type		
Explication de l'importance des modifications	**Article**	**Modifications mineures ou rédactionnelles**	**Extension**	**Modifications techniques majeures**
Ajout d'une permission concernant l'échange des essais à la «température d'essai inférieure» et à la «température d'essai supérieure»	26.4.1.2.2 26.4.1.2.3	X		
Clarification de la construction du montage d'essai de choc mécanique	26.4.2	X		
Clarification des essais de choc mécanique pour les parties en verre	26.4.2	X		
Ajout d'une clarification permettant de traiter des nouvelles caractéristiques assignées IPX9	26.4.5.1		X	
Clarification de la tension d'essai pour la température maximale de surface	26.5.1.3	X		
Intégration des exigences relatives aux couches de poussière EPL Da provenant de l'IEC 60079-18 & de l'IEC 60079-31	26.5.1.3	A1		
Intégration des exigences relatives à une couche de poussière EPL Db spécifique provenant de l'IEC 60079-31	26.5.1.3	A4		
Ajout, pour EPL Db, d'une couche de poussière dans une orientation spécifiée, marquée T_L	26.5.1.3		B1	
Clarification du fait que les essais des EPL Dc sont effectués sans couche de poussière	26.5.1.3	X		
Intégration de l'endurance thermique à la chaleur à une relaxation de 10 K pour l'appareil Gc de l'IEC 60079-15, l'IEC 60079-18, & de l'IEC 60079-31	Tableau 18	X		
Clarification d'une manière cohérente de traiter des élastomères exposés à la lumière ultraviolette	26.10	X		
Remplacement de «huile n° 2» par la désignation révisée «huile IRM 902».	26.11	X		
Ajout d'une option pour les essais aux tensions inférieures lorsque les matériaux de faible résistance sont pris en compte	26.13		X	
Ajout d'un essai de la charge transférée d'après l'IEC TS 60079-32-2	26.17		X	
Référence à un document d'instructions spécifique en lieu et place d'une condition «X» intégrée en e) à la place de la note donnant une permission	29.3 e)	X		
Mise à jour visant à refléter les niveaux supplémentaires de protection déjà présentés dans d'autres sous-parties: «da», «dc», «eb», «ec», «oc», «op is», «op pr», «op sh», «pxb», «pyb», «pzc», «qb», «sa», «sb», et «sc»	29.4 b)	X		
Ajout de texte visant à traiter du marquage de «l'appareil Ex associé»	29.4		X	
Mise à jour visant à refléter les niveaux supplémentaires de protection déjà présentés dans d'autres sous-parties: «ic», «op is», «op pr», «op sh», «pxb», «pyb», «pzc», «sa», «sb», et «sc»	29.5 b)	X		
Clarification du marquage pour EPL Da, EPL Db sans couche de poussière, EPL Db avec une couche de poussière spécifique, et EPL Dc	29.5 d)	X		
Introduction du marquage pour EPL Db avec une couche de poussière dans une orientation spécifique	29.5 d)		X	
Ajout de texte visant à traiter du marquage de «l'appareil Ex associé»	29.5		X	

		Type		
Explication de l'importance des modifications	**Article**	**Modifications mineures ou rédactionnelles**	**Extension**	**Modifications techniques majeures**
Ajout de texte visant à traiter du marquage de l'appareil destiné à une utilisation dans un mur de clôture	29.9		X	
Le marquage de l'enveloppe du composant Ex a été mis en concordance avec les exigences de marquage de l'IEC 60079-1 et de l'IEC 60079-7	29.10	X		
Le marquage alternatif des EPL a été supprimé.	ancien 29.13			C6
Clarification du marquage des machines électriques fonctionnant avec un convertisseur	29.15	X		
Clarification des recommandations concernant les documents d'instructions	30.1	X		
Ajout de documents d'instructions concernant les machines électriques	30.3			C7
Ajout de documents d'instructions concernant les entrées de câbles	30.5 A.5			C8
Autorisation d'utilisation des tuyauteries de l'ISO 10807 avec des entrées de câbles	A.1		X	
Clarification des essais avec des mandrins en acier inoxydable	A.3	X		
Réduction de la période / du glissement autorisé	A.3.1.1		X	
Clarification des essais de choc mécanique des entrées de câbles	A.3.3 Figure A.3	X		
Clarification de l'ordre des essais	A.3.4	X		
Clarification des remarques	Annexe B	X		
Mise en concordance de la Figure et du texte	Figure C.1	X		
Clarification du fonctionnement des machines électriques à partir de convertisseurs	Annexe D (informative)	X		
Clarification des essais de température des machines électriques	Annexe E (informative)	X		
Organigramme pour les essais des entrées de câbles	Annexe G (informative)	X		
Recommandations relatives aux tensions dans les arbres des machines électriques	Annexe H (informative)	X		

NOTE Les modifications techniques désignées incluent l'importance des modifications techniques apportées dans la version révisée de la Norme IEC, mais il ne s'agit pas d'une liste exhaustive de toutes les modifications apportées à la version précédente. Des recommandations supplémentaires peuvent être consultées dans la version Redline de la norme.

Explications:

A) Définitions

Modifications mineures et rédactionnelles	clarification réduction des exigences techniques modification technique mineure corrections rédactionnelles

Ces modifications portent sur les exigences et sont de nature rédactionnelle ou technique mineure. Elles comprennent des modifications de formulation destinées à clarifier les exigences techniques sans apporter de modification technique ni réduire le niveau actuel de l'exigence.

Extension	ajout d'options techniques

Ces modifications ajoutent de nouvelles exigences techniques ou modifient les exigences techniques existantes, de manière à fournir de nouvelles options sans toutefois augmenter les niveaux d'exigences pour tout appareil qui était totalement conforme à la norme précédente. Par conséquent, ces modifications ne devront pas être prises en compte dans le cas de produits conformes à l'édition précédente.

Modifications techniques majeures	ajout d'exigences techniques augmentation des exigences techniques

Ces modifications sont apportées aux exigences techniques (ajout, augmentation du niveau ou suppression) de telle manière qu'un produit conforme à l'édition précédente ne sera pas toujours en mesure de satisfaire aux exigences indiquées dans la dernière édition. Ces modifications doivent être prises en compte pour les produits conformes à l'édition précédente. Des informations supplémentaires relatives à ces modifications sont données à l'Article B) ci-dessous.

NOTE Ces modifications représentent les connaissances technologiques actuelles. Toutefois, il convient qu'elles n'aient aucune influence sur l'appareil déjà présent sur le marché.

B) Informations relatives aux origines des modifications

A1 Les exigences relatives aux couches de poussière pour EPL Da restent inchangées par rapport à celles précédemment établies dans l'IEC 60079-18, Éd. 4, et l'IEC 60079-31, Éd. 2. Cependant, elles ont été intégrées à l'IEC 60079-0 pour permettre une application cohérente avec tous les modes de protection.

A2 L'IEC 60079-28 inclut désormais toutes les exigences relatives au rayonnement optique pour tous les EPL.

A3 Les exigences relatives aux températures de fonctionnement continu (COT – *continuous operating temperature*) pour les EPL Gc ou Dc restent inchangées par rapport à celles précédemment établies dans l'IEC 60079-15, Éd. 4, l'IEC 60079-18, Éd. 4 et l'IEC 60079-31, Éd. 2. Cependant, elles ont été intégrées à l'IEC 60079-0 pour permettre une application cohérente avec tous les modes de protection.

A4 Les exigences relatives aux couches de poussière pour EPL Db avec une profondeur de couche de poussière spécifique restent inchangées par rapport à celles précédemment établies dans l'IEC 60079-31, Éd. 2. Cependant, elles ont été intégrées à l'IEC 60079-0 pour permettre une application cohérente avec tous les modes de protection.

B1 Des exigences relatives aux couches de poussière pour EPL Db avec une orientation spécifique ont été ajoutées.

C1 Il est reconnu que les nouvelles exigences ont, dans de nombreux cas, déjà été appliquées. La modification doit garantir que ces exigences sont appliquées de manière uniforme et cohérente.

C2 Il est exigé que l'essai soit effectué à 4 kV en courant continu.

C3 La limitation s'applique aux surfaces externes autres que les entrées de câbles, les dispositifs d'obturation, les adaptateurs filetés et les traversées.

C4 Les exigences ajoutées concernant la sécurité et le marquage des outils sont en cohérence avec l'approche de l'IEC 60079-15

C5 Les valeurs de tension ont été modifiées par suite de recherches supplémentaires en raison de la complexité de l'évaluation des éléments Li/Ion et du fait que leur construction n'est pas toujours spécifiée. Il s'est avéré que certaines valeurs de tension précédemment indiquées étaient trop basses.

C6 Désormais, le marquage exigé de l'EPL peut être différent de celui autorisé par le niveau de protection afin de prendre en compte les restrictions relatives aux matériaux ou aux surfaces en matières plastiques.

C7 Des documents d'instructions supplémentaires pour les machines électriques sont exigés afin de faciliter le choix, l'installation et l'entretien.

C8 Des documents d'instructions supplémentaires pour les entrées de câbles sont exigés afin de faciliter le choix et l'installation.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
31/1345/FDIS	31/1356/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60079, publiées sous le titre général *Atmosphères explosives,* peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. À cette date, la publication sera

- reconduite,
- supprimée,
- remplacée par une édition révisée, ou
- amendée.

Le contenu de la feuille d'interprétation 1 d'avril 2019 et la feuille d'interprétation 2 de juin 2019 a été pris en considération dans cet exemplaire.

Le contenu du corrigendum de janvier 2020 a été pris en considération dans cet exemplaire.

ATMOSPHÈRES EXPLOSIVES –

Partie 0: Matériel – Exigences générales

1 Domaine d'application

La présente partie de l'IEC 60079 spécifie les exigences générales de construction, d'essais et de marquage de l'appareil Ex et des Composants Ex destinés à être utilisés dans des atmosphères explosives.

Les conditions atmosphériques normales (relatives aux caractéristiques d'explosion de l'atmosphère) dans lesquelles, par hypothèse l'appareil Ex peut être utilisé, sont les suivantes:

- température de –20 °C à +60 °C;
- pression de 80 kPa (0,8 bar) à 110 kPa (1,1 bar); et
- air avec teneur normale en oxygène, typiquement 21 % v/v.

La présente partie de la norme IEC 60079 et les autres normes qui la complètent spécifient des exigences d'essai supplémentaires pour les appareils Ex fonctionnant hors de la plage normale de températures, une attention supplémentaire ultérieure et des essais complémentaires pouvant toutefois être exigés pour les appareils Ex fonctionnant hors de la plage normale de pressions atmosphériques et de la teneur normale en oxygène. De tels essais complémentaires peuvent se révéler pertinents, notamment pour les modes de protection qui dépendent de l'extinction d'une flamme, tels qu'une «enveloppe antidéflagrante «d»» (IEC 60079-1), ou de la limitation de l'énergie, tels que la «sécurité intrinsèque «i»» (IEC 60079-11).

NOTE 1 Bien que les conditions atmosphériques normales ci-dessus spécifient une plage de températures atmosphériques comprise entre -20 °C et +60 °C, la plage normale de températures ambiantes pour l'appareil Ex est comprise entre –20 °C et +40 °C, sauf spécification contraire dûment marquée. Voir 5.1.1. Il est considéré qu'une plage de températures comprise entre –20 °C et +40 °C convient pour la plupart des appareils Ex et que la fabrication de tous les appareils Ex en vue de leur adaptation à une température ambiante supérieure normale de +60 °C imposerait des contraintes de conception inutiles.

NOTE 2 Les exigences données dans la présente norme résultent d'une évaluation des dangers d'inflammation réalisée sur l'appareil. Les sources d'inflammation prises en compte sont celles associées à ce type d'appareil, telles que les surfaces chaudes, le rayonnement électromagnétique, les étincelles d'origine mécanique, les chocs mécaniques à l'origine de réactions thermiques, les arcs électriques et les décharges d'électricité statique dans des environnements industriels normaux.

NOTE 3 Lorsqu'une atmosphère explosive gazeuse et une atmosphère de poussières combustibles sont ou peuvent être présentes simultanément, la présence simultanée des deux atmosphères justifie souvent des mesures de protection supplémentaires. Des recommandations supplémentaires sur l'utilisation de l'appareil Ex dans les mélanges hybrides (mélange d'un gaz ou d'une vapeur inflammable et d'une poussière combustible ou de particules combustibles en suspension dans l'air) sont fournies dans l'IEC 60079-14.

L'IEC 60079 ne spécifie pas d'exigences de sécurité autres que celles directement liées au risque d'explosion.

Les sources d'inflammation, telles que la compression adiabatique, les ondes de choc, les réactions chimiques exothermiques, l'auto-inflammation des poussières, les flammes nues, les gaz et liquides chauds, ne sont pas traitées par la présente norme.

NOTE 4 Bien que cela ne relève pas du domaine d'application de la présente norme, de tels appareils seraient généralement soumis à une analyse des dangers qui identifie et dresse la liste de toutes les sources potentielles d'inflammation de l'appareil ainsi que les mesures à appliquer afin que celles-ci ne deviennent actives. Voir l'ISO/IEC 80079-36.

Le présent document est complété ou modifié par les parties et les spécifications techniques suivantes:

– IEC 60079-1: Gaz – Enveloppes antidéflagrantes «d»;
– IEC 60079-2: Gaz et poussières – Enveloppe à surpression interne «p»;
– IEC 60079-5: Gaz – Remplissage pulvérulent «q»;
– IEC 60079-6: Gaz – Immersion dans le liquide «o»;
– IEC 60079-7: Gaz – Sécurité augmentée «e»;
– IEC 60079-11: Gaz et poussières – Sécurité intrinsèque «i»;
– IEC 60079-13: Gaz et poussières – Protection du matériel par salle à surpression interne «p» & salle ventilée de façon artificielle «v»;
– IEC 60079-15: Gaz – Mode de protection «n»;
– IEC 60079-18: Gaz et poussières – Encapsulage «m»;
– IEC 60079-25: Gaz et poussières – Systèmes électriques de sécurité intrinsèque;
– IEC 60079-26: Gaz – Matériel d'un niveau de protection du matériel (EPL) Ga;
– IEC 60079-28: Gaz et poussières – Protection du matériel et des systèmes de transmission utilisant le rayonnement optique;
– IEC 60079-29-1: Détecteurs de gaz – Exigences d'aptitude à la fonction des détecteurs de gaz inflammables;
– IEC 60079-29-4: Détecteurs de gaz – Exigences d'aptitude à la fonction des détecteurs de gaz inflammables à chemin ouvert;
– IEC/IEEE 60079-30-1: Gaz et poussières – Traçage par résistance électrique – Exigences générales et d'essais;
– IEC 60079-31: Poussières – Protection par enveloppe «t»;
– IEC 60079-33: Gaz et poussières – Protection spéciale «s»;
– IEC 60079-35-1: Lampes-chapeaux utilisables dans les mines grisouteuses – Exigences générales – Construction et essais liés au risque d'explosion;
– IEC TS 60079-39: Explosive atmospheres – Intrinsically safe systems with electronically controlled spark duration limitation (disponible en anglais seulement);
– IEC TS 60079-40: Explosive atmospheres – Requirements for process sealing between flammable process fluids and electrical systems (disponible en anglais seulement);
– ISO 80079-36: Atmosphères explosives – Partie 36: Appareils non électriques destinés à être utilisés en atmosphères explosives – Méthodologie et exigences.

Le présent document et les parties complémentaires de l'IEC 60079 mentionnées ci-dessus ne s'appliquent pas à la construction:

- du matériel électromédical,
- de systèmes de mise à feu d'explosifs,
- de dispositifs d'essai pour détonateurs, et
- de circuits d'allumage d'explosifs.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60034-1, *Machines électriques tournantes – Partie 1: Caractéristiques assignées et caractéristiques de fonctionnement*

IEC 60034-5, *Machines électriques tournantes – Partie 5: Degrés de protection procurés par la conception intégrale des machines électriques tournantes (code IP) – Classification*

IEC 60079-1, *Atmosphères explosives – Partie 1: Protection du matériel par enveloppes antidéflagrantes "d"*

IEC 60079-20-1, *Atmosphères explosives – Partie 20-1: Caractéristiques des substances pour le classement des gaz et des vapeurs – Méthodes et données d'essai*

IEC 60079-26, *Atmosphères explosives – Partie 26: Matériel d'un niveau de protection du matériel (EPL) Ga*

IEC 60079-35-1, *Atmosphères explosives – Partie 35-1: Lampes-chapeaux utilisables dans les mines grisouteuses – Exigences générales – Construction et essais liés au risque d'explosion*

IEC 60086-1, *Primary batteries – Part 1: General* (disponible en anglais seulement)

IEC 60192, *Lampes à vapeur de sodium à basse pression – Prescriptions de performance*

IEC 60216-1, *Matériaux isolants électriques – Propriétés d'endurance thermique – Partie 1: Méthodes de vieillissement et évaluation des résultats d'essai*

IEC 60216-2, *Matériaux isolants électriques – Propriétés d'endurance thermique – Partie 2: Détermination des propriétés d'endurance thermique de matériaux isolants électriques – Choix de critères d'essai*

IEC 60243-1, *Rigidité diélectrique des matériaux isolants – Méthodes d'essai – Partie 1: Essais aux fréquences industrielles*

IEC 60423, *Systèmes de conduits pour la gestion du câblage – Diamètres extérieurs des conduits pour installations électriques et filetages pour conduits et accessoires*

IEC 60529, *Degrés de protection procurés par les enveloppes (Code IP)*

IEC 60662, *Lampes à vapeur de sodium à haute pression – Spécifications de performance*

IEC 60664-1, *Coordination de l'isolement des matériels dans les systèmes (réseaux) à basse tension – Partie 1: Principes, exigences et essais*

IEC 60947-1, *Appareillage à basse tension – Partie 1: Règles générales*

IEC 62626-1, *Appareillage à basse tension sous enveloppe – Partie 1: Interrupteur-sectionneur en coffret, en dehors du domaine d'application de la norme CEI 60947-3, destiné à garantir l'isolation pendant les phases de maintenance*

ISO 48, *Caoutchouc vulcanisé ou thermoplastique – Détermination de la dureté (dureté comprise entre 10 DIDC et 100 DIDC)*

ISO 178, *Plastiques – Détermination des propriétés en flexion*

ISO 179 (toutes les parties), *Plastiques – Détermination de la résistance au choc Charpy*

ISO 262, *Filetages métriques ISO pour usages généraux – Sélection de dimensions pour la boulonnerie*

ISO 273, *Éléments de fixation – Trous de passage pour vis*

ISO 527-2, *Plastiques – Détermination des propriétés en traction – Partie 2: Conditions d'essai des plastiques pour moulage et extrusion*

ISO 965-1, *Filetages métriques ISO pour usages généraux – Tolérances – Partie 1: Principes et données fondamentales*

ISO 965-3, *Filetages métriques ISO pour usages généraux – Tolérances – Partie 3: Écarts pour filetages de construction*

ISO 3601-1, *Transmissions hydrauliques et pneumatiques – Joints toriques – Partie 1: Diamètres intérieurs, sections, tolérances et codes d'identification dimensionnelle*

ISO 3601-2, *Transmissions hydrauliques et pneumatiques – Joints toriques – Partie 2: Dimensions des logements pour applications générales*

ISO 4014, *Vis à tête hexagonale partiellement filetées – Grades A et B*

ISO 4017, *Fixations – Vis à tête hexagonale entièrement filetées – Grades A et B*

ISO 4026, *Vis sans tête à six pans creux, à bout plat*

ISO 4027, *Vis sans tête à six pans creux, à bout tronconique*

ISO 4028, *Vis sans tête à six pans creux, à téton*

ISO 4029, *Vis sans tête à six pans creux, à bout cuvette*

ISO 4032, *Écrous hexagonaux, style 1 – Grades A et B*

ISO 4762, *Vis à tête cylindrique à six pans creux*

ISO 4892-2, *Plastiques – Méthodes d'exposition à des sources lumineuses de laboratoire – Partie 2: Lampes à arc au xénon*

ISO 7380, *Vis à tête cylindrique bombée plate à six pans creux*

ISO 14583, *Vis à métaux à tête cylindrique bombée large à six lobes interne*

ANSI/UL 746B, *Polymeric Materials – Long-Term Property Evaluations*

ANSI/UL 746C, *Polymeric Materials – Used in Electrical Equipment Evaluations*

ASTM D5964, *Standard practice for rubber IRM 901, IRM 902, and IRM 903 replacement oils for ASTM No. 1, ASTM No. 2, and ASTM No. 3*