BS EN IEC 60079-0:2018+A11:2024
Incorporating corrigendum January 2020

BSI Standards Publication

Explosive atmospheres

Part 0: Equipment — General requirements

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Full document details: BS EN IEC 60079-0:2018+A11:2024

National foreword

This British Standard is the UK implementation of EN IEC 60079-0:2018+A11:2024. It is derived from IEC 60079-0:2018, incorporating corrigendum January 2020. It supersedes BS EN IEC 60079-0:2018, which will be withdrawn on 16 January 2027.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum January 2020 is indicated in the text by ⟦AC1⟩ ⟨AC1⟧.

The UK participation in its preparation was entrusted to Technical Committee EXL/31, Equipment for explosive atmospheres.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Amendments/corrigenda issued since publication

Date	Text affected
31 March 2020	Implementation of IEC corrigendum January 2020
29 February 2024	Implementation of CENELEC amendment A11:2023

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60079-0:2018+A11

January 2024

ICS 29.260.20

Supersedes EN 60079-0:2012

English Version

Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2017)

Atmosphères explosives - Partie 0: Matériel - Exigences générales
(IEC 60079-0:2017)

Explosionsgefährdete Bereiche - Teil 0: Betriebsmittel - Allgemeine Anforderungen
(IEC 60079-0:2017)

This European Standard was approved by CENELEC on 2017-12-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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Ref. No. EN IEC 60079-0:2018 E

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European foreword

The text of document (31/1345/FDIS), future edition 7 of IEC 60079-0, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60079-0:2018.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2019-01-06
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2021-07-06

This document supersedes EN 60079-0:2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60079-0:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC/TS 60034-25	NOTE	Harmonized as CLC/TS 60034-25.
IEC 60034-29	NOTE	Harmonized as EN 60034-29.
IEC 60079-2	NOTE	Harmonized as EN 60079-2.
IEC 60079-5	NOTE	Harmonized as EN 60079-5.
IEC 60079-6	NOTE	Harmonized as EN 60079-6.
IEC 60079-7	NOTE	Harmonized as EN 60079-7.
IEC 60079-10-1	NOTE	Harmonized as EN 60079-10-1.
IEC 60079-10-2	NOTE	Harmonized as EN 60079-10-2.
IEC 60079-11	NOTE	Harmonized as EN 60079-11.
IEC 60079-13	NOTE	Harmonized as EN 60079-13.
IEC 60079-14	NOTE	Harmonized as EN 60079-14.
IEC 60079-15	NOTE	Harmonized as EN 60079-15.
IEC 60079-17	NOTE	Harmonized as EN 60079-17.
IEC 60079-18	NOTE	Harmonized as EN 60079-18.
IEC 60079-19	NOTE	Harmonized as EN 60079-19.
IEC 60079-25	NOTE	Harmonized as EN 60079-25.
IEC 60079-28	NOTE	Harmonized as EN 60079-28.
IEC 60079-29-1	NOTE	Harmonized as EN 60079-29-1.

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IEC 60079-29-4	NOTE	Harmonized as EN 60079-29-4.
IEC/IEEE 60079-30-1	NOTE	Harmonized as EN 60079-30-1.
IEC 60079-31	NOTE	Harmonized as EN 60079-31.
IEC/TS 60079-32-1	NOTE	Harmonized as CLC/TR 60079-32-1.
IEC/TS 60079-39	NOTE	Harmonized as CLC/TS 60079-39 [1]).
IEC 60254 (series)	NOTE	Harmonized in EN 60254 series.
IEC 60623	NOTE	Harmonized as EN 60623.
IEC 60896-11	NOTE	Harmonized as EN 60896-11.
IEC 60896-21	NOTE	Harmonized as EN 60896-21.
IEC 60952 (series)	NOTE	Harmonized in EN 60952 series.
IEC 61056-1	NOTE	Harmonized in EN 61056-1.
IEC 61427 (series)	NOTE	Harmonized in EN 61427 series.
IEC 61951-1	NOTE	Harmonized as EN 61951-1.
IEC 61951-2	NOTE	Harmonized as EN 61951-2.
IEC 61960 (series)	NOTE	Harmonized in EN 61960 series.
ISO/IEC 80079-20-2	NOTE	Harmonized as EN ISO/IEC 80079-20-2.
ISO/IEC 80079-34	NOTE	Harmonized as EN ISO/IEC 80079-34.
ISO/IEC 80079-36	NOTE	Harmonized as EN ISO/IEC 80079-36.
ISO/IEC 17000	NOTE	Harmonized as EN ISO/IEC 17000.

European foreword to Amendment A11

This document (EN IEC 60079-0:2018/A11:2024) consists of the text of IEC 60079-0:2017/ISH1:2019 and IEC 60079-0:2017/ISH2:2019, prepared by IEC/TC 31 "Equipment for explosive atmospheres".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-01-16
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2027-01-16

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Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standards IEC 60079-0:2017/ISH1:2019 and IEC 60079-0:2017/ISH2:2019 was approved by CENELEC as a European Standard without any modification.

[1]) Under preparation. Stage at the time of publication: CLC/FprTS 60079-39:2017.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60034-1	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1 [2])	-
IEC 60034-5	-	Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	2001
IEC 60079-1	-	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"	EN 60079-1	2014
IEC 60079-20-1	-	Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data	EN 60079-20-1	2010
IEC 60079-26	-	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga	EN 60079-26	2015
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	EN 60079-35-1	2011
			+AC	2011
IEC 60086-1	-	Primary batteries - Part 1: General	EN 60086-1	2015
IEC 60192	-	Low pressure sodium vapour lamps - Performance specifications	EN 60192	2001
IEC 60216-1	-	Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2013
IEC 60216-2	-	Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria	EN 60216-2	2005
IEC 60243-1	-	Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies	EN 60243-1	2013
IEC 60423	-	Conduit systems for cable management - Outside diameters of conduits for electrical installations and threads for conduits and fittings	EN 60423	2007
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
			+EN 60529:1991/corrigendum May 1993	1993

[2]) Under preparation. Stage at the time of publication: FprEN 60034-1:2017.

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IEC 60662 (mod)	-	High pressure sodium vapour lamps - Performance specifications	EN 60662 +prAA	2012 2017
IEC 60664-1	-	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60947-1	-	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	2007
IEC 62626-1	-	Low-voltage switchgear and controlgear enclosed equipment - Part 1: Enclosed switch outside the scope of IEC 60947-3 for various applications, to provide isolation of electrical equipment during repair and maintenance work	EN 62626-1	2014
ISO 48	-	Rubber, vulcanized or thermoplastic_- Determination of hardness (hardness between 10 IRHD and 100 IRHD)	-	-
ISO 178	-	Plastics - Determination of flexural properties	EN ISO 178	2010
ISO 179	series	Plastics - Determination of Charpy impact properties	EN ISO 179	series
ISO 262	-	ISO general purpose metric screw threads- Selected sizes for screws, bolts and nuts	-	-
ISO 273	-	Fasteners - Clearance holes for bolts and screws	EN 20273	1991
ISO 527-2	-	Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics	EN ISO 527-2	2012
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	EN ISO 4014	2011
ISO 4017	-	Fasteners - Hexagon head screws - Product grades A and B	EN ISO 4017	2014
ISO 4026	-	Hexagon socket set screws with flat point	EN ISO 4026	2003
ISO 4027	-	Hexagon socket set screws with cone point	EN ISO 4027	2003
ISO 4028	-	Hexagon socket set screws with dog point	EN ISO 4028	2003
ISO 4029	-	Hexagon socket set screws with cup point	EN ISO 4029	2003
ISO 4032	-	Hexagon regular nuts (style 1) - Product grades A and B	EN ISO 4032	2012
ISO 4762	-	Hexagon socket head cap screws	EN ISO 4762	2004
ISO 4892-2	-	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	2013
ISO 7380	-	Hexagon socket button head screws	EN ISO 7380	2011
ISO 14583	-	Hexalobular socket pan head screws	EN ISO 14583	2011
ANSI/UL 746B	-	Polymeric Materials - Long-Term Property Evaluations	-	-
ANSI/UL 746C	-	Standard for Polymeric Materials - Use in Electrical Equipment Evaluations	-	-
ASTM D 5964	-	Standard Practice for Rubber IRM 901, IRM 902, and IRM 903 Replacement Oils for ASTM No. 1, ASTM No. 2, ASTM No. 3 Oils, and IRM 905 formerly ASTM No. 5 Oil	-	-

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Annex ZY
(informative)

Additional Information relating to the European ATEX Directive 2014/34/EU

ZY.1 Equipment Groups and Categories

In all cases Equipment Protection Levels (EPL) as defined by EN IEC 60079-0 are related to the corresponding Equipment Groups and Equipment Categories according to table ZY.1. The same applies if a standard makes reference to the intended use of equipment in Zones according to the definitions in EN 60079-10-1 and EN 60079-10-2.

Table ZY.1

EN IEC 60079-0		*Directive 2014/34/EU*		*EN 60079-10-X*
EPL	***Group***	***Equipment Group***	***Equipment Category***	***Zones***
Ma	*I*	*I*	*M1*	*Not Applicable*
Mb			*M2*	
Ga	*II*	*II*	*1G*	*0*
Gb			*2G*	*1*
Gc			*3G*	*2*
Da	*III*		*1D*	*20*
Db			*2D*	*21*
Dc			*3D*	*22*

ZY.2 Instructions

The manufacturer or his authorized representative in the Community is to draw up the instructions for use in the required Community languages.

In clause 30.1 under: “instructions for safety addressing the following areas – installation and erection;”

“Information other than the general requirements given in IEC 60079-14”

Is replaced by

“Information other than the general requirements given in EN 60079-14 and EN 50628”

NOTE EN 50628 - Erection of electrical installations in underground mines

ZY.3 Marking

ZY.3.1

The marking according to this standard is to be supplemented by the marking according to Directive 2014/34/EU. Examples are given below.

European marking examples

Directive part	**Standard part**	**Equipment example**
I M2	**Ex db I Mb**	Mining equipment,

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Type of Protection flameproof enclosure “d”

II 2G	**Ex eb IIB T4 Gb**	Gas explosion protected equipment Type of Protection increased safety “e”
II 1D	**Ex ma IIIC 120°C Da**	Dust explosion protected equipment, Type of Protection encapsulation “m”

NOTE 1 Attention is drawn to the requirement in 29.3 f):

“The Ex marking for explosive gas atmospheres and explosive dust atmospheres shall be separate and not combined;”

II 1 G **Ex ia IIB T4 Ga**

II 1 D **Ex ia IIIC T120°C Da**

Alternatively, the directive part of the marking may be combined and the standard part of the marking kept separate, as follows:

II 1 GD **Ex ia IIB T4 Ga**
Ex ia IIIC T120°C Da

NOTE 2 For Ex Equipment intended to be put on the market in the EEA, CE marking is applicable. For Ex Components intended to be put on the market in the EEA, CE marking is not applicable.

ZY.3.2

Contrary to 29.3 a) the marking is to always include the manufacturer’s name (not trademark) and address. The address is to be sufficient to identify the physical location of the manufacturer. An address used for postal purposes, without identifying the physical location, is not sufficient.

ZY.4 Fans

Clause 17.2.5 “Room ventilating fans” is to be supplemented by the requirements given in EN 14986 “Design of fans working in potentially explosive atmospheres”

ZY.5 Significant changes between this European Standard and EN 60079-0:2012+A11:2013

This European Standard supersedes EN 60079-0:2012+A11:2013.

Table ZY.2 – Significant changes with respect to EN 60079-0:2012+A11:

		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		

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		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
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	7.2.2	X		

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		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
impact". Requirements for cements aligned with the requirements for elastomers.				
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	16.4		X	

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		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
longer required to be Ex Components.				
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
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	

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Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
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		
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

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		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
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

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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.

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Annex ZZ
(informative)

Relationship between this European Standard and the Essential Requirements of 2014/34/EU [2014 OJ L96] aimed to be covered

This European Standard has been prepared under a Commission's standardisation request M/BC/CEN/92/46 to provide one voluntary means of conforming to Essential Requirements of 2014/34/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (recast).

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive, and associated EFTA regulations.

Table ZZ.1 – Correspondence between this European Standard and Annex II of Directive 2014/34/EU [2014 OJ L96]

Essential Requirements of 2014/34/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1.0.1.	Entire standard	Second indent only
1.0.2.	Entire standard including Annex ZY	By reference to appropriate EPLs
1.0.3.	3.84 and related references throughout document	In particular, use of "X" marking and related Specific Conditions of Use for Ex Equipment or Schedule of Limitations for Ex Components
1.0.4.	5 / 6.1	
1.0.5.	28.3 / 29 / Annex ZY	
1.0.6.	30	
1.1.1.	7 / 8	
1.1.2.	8.5	
1.1.3.	6.3 / 7 / 8	
1.2.1.	Entire standard	
1.2.2.	Entire standard	
1.2.3.	Not covered	
1.2.4.	5.3.2.3	
1.2.5.	Not covered	
1.2.6.	6.3	
1.2.7.	6.1	
1.2.8.	Not covered	
1.2.9.	Not covered	See EN 60079-1

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Essential Requirements of 2014/34/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1.3.1.	(in part) 5 / 6.6	
1.3.2.	7.4	
1.3.3.	6.4	
1.3.4.	Not covered	See EN ISO 80079-36
1.3.5.	Not covered	
1.4.1.	6.1	
1.4.2.	6.1	
1.5.	Not covered	
1.6.1.	Not covered	
1.6.2.	Not covered	
1.6.3.	Not covered	
1.6.4.	15 / Annex A	
1.6.5.	Not covered	
2.0.1.	Throughout document	Multiple requirements for Group I, EPL Ma
2.0.2.	Throughout document	Multiple requirements for Group I, EPL Mb
2.1.1.	Throughout document	Multiple requirements for Group II, EPL Ga
2.1.2.	Throughout document	Multiple requirements for Group III, EPL Da
2.2.1.	Throughout document	Multiple requirements for Group II, EPL Gb
2.2.2	Throughout document	Multiple requirements for Group III, EPL Db
2.3.1.	Throughout document	Multiple requirements for Group II, EPL Gc
2.3.2.	Throughout document	Multiple requirements for Group III, EPL Dc
3.	Not covered	

NOTE To confer a presumption of conformity with the relevant essential requirements of Directive 2014/34/EU, this standard has to be applied together with at least one of the supplemental standards giving the requirements for a specific Type of Protection. See Clause 1.

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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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.

_____

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)

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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.

_____

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

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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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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.

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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		

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		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

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		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		

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		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.

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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.

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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.

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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";

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– 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*

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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*

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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*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

NOTE Additional definitions applicable to explosive atmospheres can be found in IEC 60050-426.

3.1
ambient temperature
temperature of the air or other media, in the immediate vicinity of the equipment or component

Note 1 to entry: This does not refer to the temperature of any process media, unless the equipment or component is totally immersed in the process media. See 5.1.1.

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Note 2 to entry: If Ex Equipment or an Ex Component is located inside or adjacent to another piece of equipment, the “ambient temperature” is the temperature of the air or other media surrounding the Ex Equipment or Ex Component and may be higher than the ambient air surrounding the complete equipment due to the additional heat dissipated within the complete equipment.

Note 3 to entry: The ambient temperature referred to in the IEC 60079 series is only related to the explosion safety of the Ex Equipment or Ex Component.

3.2
area, hazardous
area in which an explosive atmosphere is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment

3.3
area, non-hazardous
area in which an explosive atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of equipment

3.4
associated apparatus
electrical apparatus which contains both intrinsically safe and non-intrinsically safe circuits and is constructed so that the non-intrinsically safe circuits cannot adversely affect the intrinsically safe circuits

Note 1 to entry: Associated apparatus is either:

a) additionally protected by a Type of Protection suitable for use in the appropriate explosive atmosphere, or

b) not protected by a Type of Protection suitable for use in the appropriate explosive atmosphere and therefore is not to be used within an explosive atmosphere

3.5
Ex associated equipment
auxiliary equipment used in conjunction with explosion-protected equipment to maintain specific aspects of the Type of Protection of the explosion-protected equipment

Note 1 to entry: Examples include special time/current relays for increased safety motors, pressurization control systems, power limits for encapsulated Ex Equipment, and the like.

Note 2 to entry: Ex associated equipment is either:

a) additionally protected by a Type of Protection suitable for use in the appropriate explosive atmosphere; or

b) not protected by a Type of Protection suitable for use in the appropriate explosive atmosphere and therefore is not to be used within an explosive atmosphere,

Note 3 to entry: A similar concept is applied to intrinsic safety where it is referred to as “associated apparatus”. See 3.4. A single piece of equipment may include both Ex associated equipment and associated apparatus.

3.6
auto-ignition temperature
AIT
lowest temperature (of a surface) at which, under specified conditions (according to IEC 60079-20-1), an ignition of a flammable gas or vapour in mixture with air or air/inert gas occurs

3.7
cells and batteries

3.7.1
battery
one or more cells fitted with devices necessary for use, for example, terminals, marking and protective devices

Note 1 to entry: See Figure 1 for examples of typical battery constructions.

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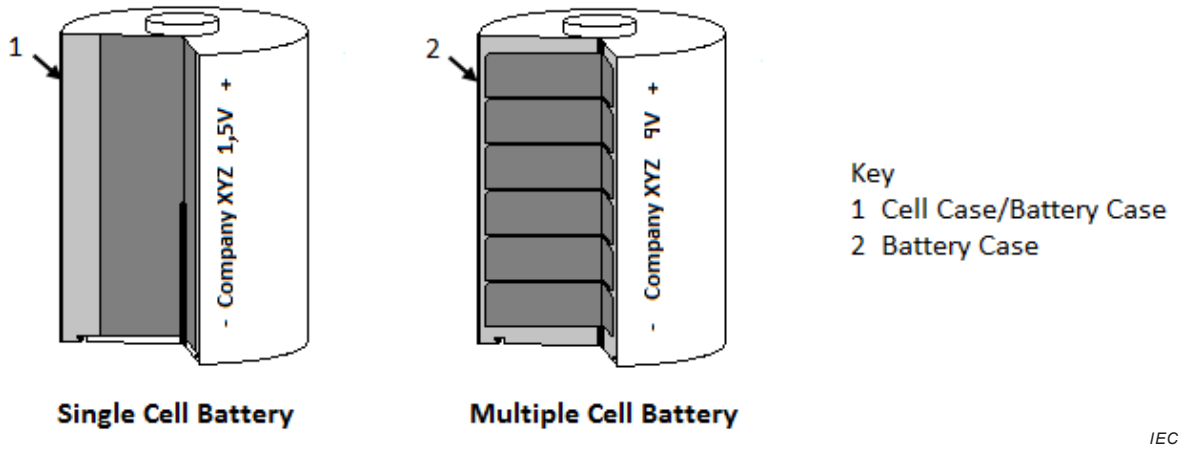

Figure 1 – Typical battery examples

3.7.2
capacity
electric charge which a battery or cell can deliver under specified discharge conditions

Note 1 to entry: The SI unit for electric charge, or quantity of electricity, is the coulomb (1 C = 1 A × s) but in practice, capacity is usually expressed in ampere hours (Ah).

3.7.3
cell
basic functional unit, consisting of an assembly of electrodes, electrolyte, case, terminals and usually separators, that is a source of electric energy obtained by direct conversion of chemical energy

Note 1 to entry: See primary cell and secondary cell.

3.7.4
charging
operation during which a secondary cell or battery is supplied with electric energy from an external circuit which results in chemical changes within the cell and thus the storage of energy as chemical energy

3.7.5
deep discharge
event which reduces a cell voltage below that recommended by the cell or battery manufacturer

3.7.6
maximum open-circuit voltage
<cell or battery>
voltage of a new primary battery or of a fully charged secondary battery when the discharge current is zero

Note 1 to entry: See Table 13 and Table 14 which show the maximum open-circuit voltage for acceptable cells.

3.7.7
nominal voltage
<cell or battery>
suitable approximate value of the voltage used to designate or identify a cell or battery or an electrochemical system

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3.7.8
vented cell or battery
secondary cell, or battery, having a cover provided with an opening through which gaseous products may escape

3.7.9
primary cell or battery
cell or battery which is not designed to be electrically recharged

3.7.10
reverse charging
act of forcing current through either a primary cell or secondary cell in the same direction as the normal flow, generally due to the reverse polarity in an expired cell of a series connected battery

3.7.11
sealed cell
secondary cell which remains closed and does not release either gas or liquid when operated within the limits specified by the cell manufacturer

Note 1 to entry: A sealed cell is often equipped with a safety device to protect against a dangerously high internal pressure and is designed to operate during its life in its original sealed state.

3.7.12
valve-regulated cell or battery
cell or battery which is closed under normal conditions but which has an arrangement which allows the escape of gas if the internal pressure exceeds a pre-determined value

Note 1 to entry: The cell cannot normally receive an addition to the electrolyte.

3.7.13
secondary cell or battery
cell which is designed to be electrically recharged

Note 1 to entry: The recharge is accomplished by way of a reversible chemical reaction.

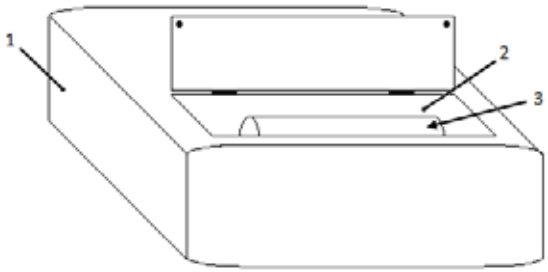
3.7.14
battery compartment
compartment of the equipment that accommodates one or more cells and batteries

Note 1 to entry: The battery compartment is an integral part of the equipment.

Note 2 to entry: A battery compartment may be a battery container

3.7.15
battery container
enclosure to contain one or more cells or batteries

Note 1 to entry: See Figure 2 for examples of typical battery constructions.



Key
1 Equipment
2 Battery Compartment
3 Cell/Battery/Replaceable Battery Pack

IEC

Figure 2 – Typical battery compartment

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3.7.16
battery case
cell case
cell or battery enclosure that is an integral part of the construction of the cell or battery

Note 1 to entry: The case can be sealed, valve-regulated, or vented.

3.7.17
replaceable battery pack
assembly consisting of one or more interconnected cells, along with any integrated protective components, which form a complete replaceable battery

Note 1 to entry: See Figure 3 for examples of typical replaceable battery pack construction.

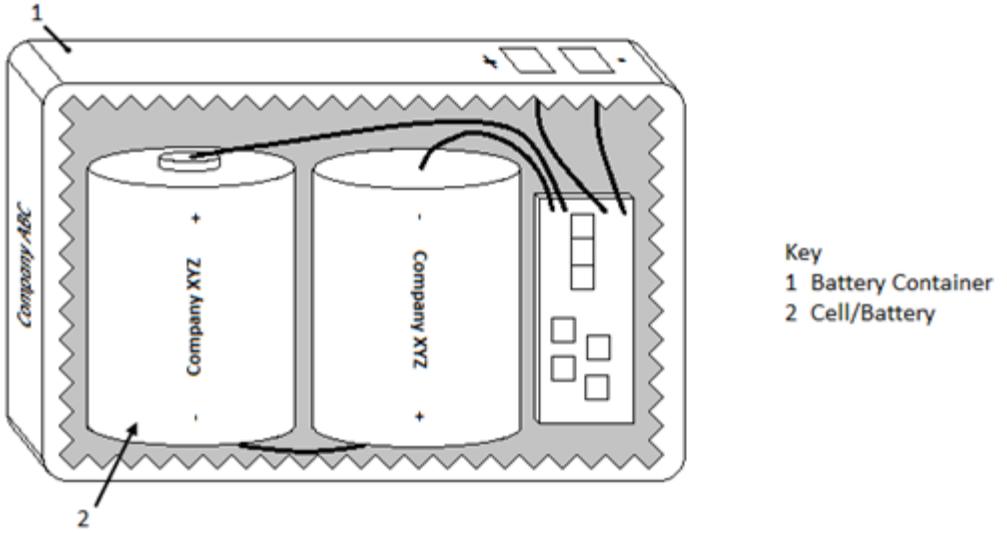

Figure 3 – Typical replaceable battery pack

3.8
breathing device
device which permits an exchange between the atmosphere within an enclosure and the surrounding atmosphere and which maintains the integrity of the Type of Protection

3.9
bushing
device carrying one or more conductors, insulated or bare, through an internal or external wall of an enclosure

3.10
cable gland
device permitting the introduction of one or more electric or fibre optic cables into an electrical Ex Equipment enclosure so as to maintain the relevant Type of Protection and provide a degree of strain relief

Note 1 to entry: See Figure A.1 for illustration of the terms used for cable glands.

3.10.1
clamping device
<cable gland>
element of a cable gland for preventing tension or torsion in the cable from being transmitted to the connections

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3.10.2
compression element
<cable gland>
element of a cable gland compressing or displacing the sealing ring

3.10.3
sealing ring
<cable gland>
element used in a cable gland to ensure the sealing between the cable gland and the cable

3.10.4
Ex Equipment cable gland
<cable gland>
cable gland tested separately from the equipment enclosure but having an Ex Equipment certificate and which is intended to be fitted to an Ex Equipment enclosure

Note 1 to entry: This does not preclude an Ex Component certificate for cable glands.

3.10.5
cable transit device
<cable gland>
an entry device, intended for one or more electric or fibre optic cables, with a seal made up of one or more separate elastomeric modules or parts of modules (modular internal seal), which are compressed together when the device is assembled and mounted as intended

Note 1 to entry: Cable transit devices serve as Ex Equipment Blanking Elements when the elastomeric modules provided allow for this function.

3.11
casting
<non-metallic compound>
process of pouring a liquid compound at normal ambient pressure into a cast

3.12
certificate
document that conveys the assurance of the conformity of a product, process, system, person, or organization with specified requirements

Note 1 to entry: The certificate is either the supplier's declaration of conformity or the purchaser's recognition of conformity or certification (as a result of action by a third party) as defined in ISO/IEC 17000.

3.12.1
Ex Component Certificate
certificate prepared for an Ex Component (see 3.36)

3.12.2
Ex Equipment Certificate
certificate prepared for Ex Equipment

3.13
coating
material applied to a surface

3.14
conformal coating
electrical insulating material applied as a coating to loaded printed circuit boards to produce a thin layer conforming to the surface in order to provide a protective barrier against deleterious effects from environmental conditions

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3.15
compound
<for encapsulation>
any thermosetting, thermoplastic, epoxy resin or elastomeric materials with or without fillers and/or additives, in their solid state

3.16
conduit entry
means of introducing a conduit into Ex Equipment so as to maintain the relevant Type of Protection

3.17
connection facilities
terminals, screws or other parts, used for the electrical connection of conductors

3.18
connections, factory
terminations intended for connection during a manufacturing process under controlled conditions

3.19
connections, field-wiring
terminations intended for connection by the installer in the field

3.20
continuous operating temperature
COT
temperature range which ensures the stability and integrity of the material for the expected life of the equipment, or part, in its intended application

3.21
converter
<for use with electric machines>
unit for electronic power conversion, changing one or more electrical characteristics and comprising one or more electronic switching devices and associated components, such as transformers, filters, commutation aids, controls, protections, and auxiliaries, if any

Note 1 to entry: A converter is also known by other terms. For example, a frequency converter, a converter drive, an inverter drive, a variable speed drive, an adjustable speed drive (ASD), or a variable frequency drive (VFD).

3.21.1
converter, soft-start
<for use with electric machines>
converter which limits the input current to the electric machine during the starting process

Note 1 to entry: It is intended that the soft-start converter is used only during the starting process and is then isolated from the power system or bypassed when the electric machine is running.

3.22
degree of protection of enclosure
IP
numerical classification according to IEC 60529 or IEC 60034-5 (as applicable) preceded by the symbol IP applied to the enclosure of equipment to provide:

– protection of persons against contact with, or approach to, live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure,
– protection of the equipment against ingress of solid foreign objects, and
– where indicated by the classification, protection of the equipment against harmful ingress of water

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Note 1 to entry: The detailed test requirements for rotating electric machines are in IEC 60034-5.

Note 2 to entry: The enclosure which provides the degree of protection IP is not necessarily the same as the equipment enclosure providing the Type of Protection listed in Clause 1.

Note 3 to entry: An enclosure which provides the degree of protection required by one of the types of protection listed in Clause 1 will have been subjected to other tests prior to the tests for degree of protection. See 26.4.

3.23
draining device
device which permits liquids to flow out from an enclosure and which maintains the integrity of the Type of Protection

3.24
dust
generic term including both combustible dust and combustible flyings

3.24.1
combustible dust
finely divided solid particles, 500 µm or less in nominal size, which may form explosive mixtures with air at standard atmospheric pressure and temperatures

Note 1 to entry: This includes dust and grit as defined in ISO 4225.

Note 2 to entry: The term solid particles is intended to address particles in the solid phase and not the gaseous or liquid phase, but does not preclude a hollow particle.

3.24.1.1
conductive dust
combustible dust with electrical resistivity equal to or less than 1 kΩ·m

Note 1 to entry: ISO/IEC 80079-20-2 contains the test method for determining the electrical resistivity of dusts.

3.24.1.2
non-conductive dust
combustible dust with electrical resistivity greater than 1 kΩ·m

Note 1 to entry: ISO/IEC 80079-20-2 contains the test method for determining the electrical resistivity of dusts.

3.24.2
combustible flyings
solid particles, including fibres, where one dimension is greater than 500 µm in nominal size, which may form an explosive mixture with air at standard atmospheric pressure and temperature

Note 1 to entry: One dimension has a high ratio when compared to the other two dimensions

Note 2 to entry: Examples of flyings include carbon fibre, rayon, cotton (including cotton linters and cotton waste) sisal, jute, hemp, cocoa fibre, oakum and baled waste kapok.

3.25
dust-tight enclosure
enclosure capable of excluding the ingress of observable dust particle deposits

3.26
dust-protected enclosure
enclosure in which the ingress of dust is not totally excluded, but is unlikely to enter in sufficient quantity to interfere with the safe operation of the equipment and does not accumulate in a position within the enclosure where it is liable to cause an ignition hazard

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3.27
duty cycle
repetitive variation of load in which the cycle time is too short for thermal equilibrium to be attained in the first cycle

[SOURCE: IEC 60050-411:1996, 411-51-7]

3.28
elastomer
a macromolecular material which returns rapidly to approximately its initial dimensions and shape after substantial deformation by a weak stress and release of the stress

Note 1 to entry: The definition applies to room temperature test conditions.

[SOURCE: IEC 60050-212:2010, 212-14-05]

3.29
encapsulation
process of applying a compound to enclose an electrical device(s) by suitable means

3.30
enclosure
all the walls, doors, covers, cable glands, rods, spindles, shafts, etc. which contribute to the Type of Protection or the degree of protection IP of the equipment

3.31
equipment
general term including apparatus, fittings, devices, components, and the like used as a part of, or in connection with, an installation

3.31.1
equipment, electrical
items applied as a whole or in part for the utilization of electrical energy

Note 1 to entry: These include, amongst others, items for the generation, transmission, distribution, storage, measurement, regulation, conversion and consumption of electrical energy and items for telecommunications.

3.31.2
equipment, fixed
equipment fastened to a support, or otherwise secured in a specific location when energized

3.31.3
equipment, personal
equipment intended to be worn by and in contact with a person’s body during operation

3.31.4
equipment, portable
equipment intended to be carried by a person during operation

Note 1 to entry: Portable equipment carried by a person during operation is sometimes referred to as hand-held equipment.

3.31.5
equipment, transportable
equipment not intended to be carried by a person during operation nor intended for fixed installation

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