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BSI Standards Publication

Explosive atmospheres

Part 1: Equipment protection by flameproof enclosures "d"

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National foreword

This British Standard is the UK implementation of EN 60079-1:2014. It is identical to IEC 60079-1:2014, incorporating corrigenda September 2018 and June 2020. It supersedes BS EN 60079-1:2007, which is withdrawn.

BSI, as a member of CENELEC, is obliged to publish EN 60079-1 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK voted against its approval as a European Standard. The reason for this disapproval was that the pass criteria for the test relating to cemented joints in Subclause 6.1.2 are considered to be not as robust when compared with the previously published edition.

Other National Standards Bodies have also recorded a negative vote on the document, citing the identical concern in the difference between the 2007 edition and the 2014 edition. Many manufacturers had no difficulty in complying with the previous requirement when choosing appropriate cements, and the UK committee did not see any justification for revising the requirement.

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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2014.

Amendments/corrigenda issued since publication

Date	Text affected
30 September 2018	Implementation of IEC corrigendum June 2018: Clause C.2.3.3 amended
30 June 2020	Implementation of IEC interpretation sheet 1: June 2020

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English Version

Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d" (IEC 60079-1:2014)

Atmosphères explosives - Partie 1: Protection du matériel
par enveloppes antidéflagrantes "d"
(IEC 60079-1:2014)

Explosionsgefährdete Bereiche - Teil 1: Geräteschutz
durch druckfeste Kapselung "d"
(IEC 60079-1:2014)

This European Standard was approved by CENELEC on 2014-08-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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The text of document 31/11111/FDIS, future edition 7 of IEC 60079-1, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-1:2014.

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) 2015-05-01
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-01

This document supersedes EN 60079-1:2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] 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.

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

Endorsement notice

The text of the International Standard IEC 60079-1:2014 was approved by CENELEC as a European Standard without any modification.

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(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60061	-	Lamp caps and holders together with gauges for the control of interchangeability and safety	-	-
IEC 60079-0 (mod)	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-7	-	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"	+A11 EN 60079-7	2013
IEC 60079-11	-	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60079-15	-	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"	EN 60079-15	-
IEC 60127	series	Miniature fuses	EN 60127	series
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 2738	-	Sintered metal materials, excluding hardmetals - Permeable sintered metal materials - Determination of density, oil content and open porosity	EN ISO 2738	-
ISO 4003	-	Permeable sintered metal materials - Determination of bubble test pore size	EN 24003	-
ISO 4022	-	Permeable sintered metal materials - Determination of fluid permeability	EN ISO 4022	-
ANSI/ASME B 1.20.1 -	-		-	-

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Significant changes between this European Standard and EN 60079-1:2007

This European Standard supersedes EN 60079-1:2007.

The significant changes with respect to EN 60079-1:2007 are as listed below.

Significant Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
<i>Normative references</i> (Removal of the edition date from the reference for 60079-0)	2	X		
<i>Requirements for level of protection "da"</i> (Catalytic sensors for combustible gas detectors)	4.2		X	
Requirements for level of protection "dc" (“Enclosed break” devices from IEC 60079-15)	4.4, 15.5	X		
Flameproof joints, General requirements (Documentation clarification and examples of corrosion inhibiting grease)	5.1	X		
Flameproof joints, General requirements (Specific Conditions of Use that joints are not intended to be repaired)	5.1		X	
Flameproof joints, General requirements (Electroplating more than 0.008 mm think)	5.1		X	
Non-threaded joints, Gap (<i>i</i>) (Intentional gaps between surface for flanged joints)	5.2.2	X		
Serrated joints (Use and test requirements)	5.2.8	X		
Multi-step joints (Not less than 3 adjacent segments and two path changes)	5.2.9		X	
Minimum width of joint and maximum gap for enclosures of groups IIA and IIB (Maximum gaps for flanged, cylindrical or spigot joints of 9,5 mm minimum width and volume greater than 2,000 cm ³)	Table 2		X	
Minimum width of joint and maximum gap for enclosures of groups I, IIA, IIB and IIC (ISO 80000-1 for constructional value rounding)	Table 2, Table 3	X		
Cylindrical threaded joints (ISO 965-1 standard in respect of thread form or quality of fit)	Table 4	X		
Taper threaded joints (External and internal thread construction)	Table 5	X		
Cemented joints (Supplemental mechanical means of securement)	6.1.2			C1
Cemented joints (Evaluation criteria if there is leakage)	6.1.2		X	
Fused glass joints (Glass-to-metal joints)	6.2		X	

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Significant changes	Clause	Minor and editorial changes	Extension	Major technical changes
Thermal tests of breathing and draining devices (Temperature class based on external surface temperature after the 10 min test period)	10.9.3.2	X		
Test of the ability of the breathing and draining device to withstand pressure (Relocated from before thermal tests to after the non-transmission test)	10.9.3.4	X		
Ex component certificate (Service temperature range for non-metallic enclosures per IEC 60079-0)	10.9.4	X		
Fasteners and openings (Relocation of blanking element content to Clauses 13.8 and C.2.3)	11	X		
Fasteners and openings, Property class or yield stress (Certificate specific condition of use)	11.3	X		
Fasteners and openings (Openings in the wall of the enclosure)	11.8	X		
Materials (Material limitation in acetylene atmospheres)	12.8			C2
Entries for flameproof enclosures, General (Metric and NPT threaded entries)	13.1	X		
Entries for flameproof enclosures, General (Group I non-threaded joints)	13.1		X	
Entries for flameproof enclosures, Non-threaded holes (Group I application)	13.3		X	
Entries for flameproof enclosures, Cable glands (Group I application)	13.4		X	
Cable glands, Conduit sealing devices (Documentation to facilitate mounting)	13.4,13.5	X		
Plugs and sockets and cable couplers (Load requirement for arc-quenching test)	13.6.4			C3
Bushings (Documentation to facilitate mounting)	13.7	X		
Blanking elements (Relocated from Clause 11)	13.8	X		
Verification and tests (Maximum surface temperature conditions)	Table 6	X		
Type tests (Sequence and number of samples for tests)	15	X		
Determination of explosion pressure, General (Devices that can cause turbulence)	15.2.2.2	X		
Determination of explosion pressure, General (Number of tests for Group IIC)	15.2.2.2	X		
Determination of explosion pressure, General (Pressure pilling for Group IIB)	15.2.2.4	X		
Determination of explosion pressure, General (Equipment marked for a single gas)	15.2.2.5	X		
Overpressure test, General (Low ambient overpressure tests not required)	15.2.3	X		

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Significant changes	Clause	Minor and editorial changes	Extension	Major technical changes
Overpressure test – First method (static) (3 times option when routine batch testing)	15.2.3.2		X	
Overpressure test – First method (static) (Adjustment for low ambient due to small size of equipment)	15.2.3.2		X	
Overpressure test – Second method (dynamic) (Number of tests to be made)	15.2.3.3	X		
Test for non-transmission of an internal ignition (Clarification regarding grease)	15.3	X		
Reduction in length of a threaded joint for non-transmission test (ISO 965-1 and 965-3 standards in respect of thread form and quality of fit)	Table 9	X		
Test factors to increase pressure or test gap (Group IIC adjustments for elevated ambients)	Table 10	X		
Test for non-transmission of an internal ignition, Groups I, IIA and IIB (Number of tests to be made)	15.3.2.3	X		
Test for non-transmission of an internal ignition, Group IIC testing by increased gap (Number of tests to be made)	15.3.3.2	X		
Test for non-transmission of an internal ignition, Group IIC (Oxygen enrichment of test gases)	15.3.3.4		X	
Thermal tests of enclosures with breathing and draining devices (Temperature class based on external surface temperature after the 10 min test period)	15.4.3.1	X		
Tests for "dc" devices (“Enclosed break” devices from IEC 60079-15)	15.5		X	
Routine tests, General (Adjustment for low ambient due to small size of equipment)	16.1.2		X	
Routine tests, General (Options when second method is chosen)	16.1.3	X		
Routine tests, General (Welded joint inspection options)	16.3		X	
Routine tests, General (Allowance for batch testing)	16.6		X	
Switchgear for Group I (Clarifying need for compliance with EPL Mb types of protection)	17.2.2, 17.2.3	X		
Non-metallic enclosures and non-metallic parts of enclosures, General (Exception for cemented joints)	19.1	X		
Non-metallic enclosures and non-metallic parts of enclosures, Resistance to tracking and creepage distances (Reference to both IEC 60079-7 and or IEC 60079-15)	19.2		X	
Non-metallic enclosures and non-metallic parts of enclosures, Requirements for type tests (Clarification of test sequence)	19.3	X		

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Significant changes	Clause	Minor and editorial changes	Extension	Major technical changes
Instructions (Indication that repair of flamepaths is not intended)	21		X	
Bushings (Documentation regarding numbers of cores)	C.2.1.4	X		
Bushings (Criteria for non-transmission test)	C.2.1.4	X		
Bushings (Evaluation criteria if there is leakage)	C.2.1.4		X	
Flameproof joints, Threaded joints (Requirement options)	C.2.2.1	X		
Flameproof joints, Non-threaded joints (Group I application)	C.2.2.2		X	
Constructional requirements for Ex blanking elements (Relocated from Clause 11)	C.2.3.1	X		
Constructional requirements for Ex blanking elements (Metric and NPT Ex blanking elements)	C.2.3.2, C.2.3.3	X		
Constructional requirements for Ex blanking elements (Group I non-threaded construction)	C.2.3.4		X	
Sealing test, General (Allowance for re-tightening)	C.3.1.1	X		
Cable glands and conduit sealing devices with sealing ring (Mandrel to be corrosion-resistant metal)	C.3.1.2	X		
Type tests for Ex blanking elements, Torque test (Test-block to be steel)	C.3.3.1	X		
Tightening torque values (Addition of < 16 mm thread size)	Table C.1		X	
Tightening torque values (Addition of NPT thread sizes)	Table C.2		X	
Ex component enclosure requirements (Markings content)	D.3.8			C4
Ex component enclosure requirements (Certificate content)	D.3.10		X	
Utilization of an Ex component enclosure certificate to prepare an equipment certificate, Procedure (Devices that can create significant turbulence)	D.4.1		X	
Acceptable primary cells (Addition of Type B cells)	Table E.1		X	
Acceptable primary cells (Removal of Type T cells)	Table E.1			C5
Acceptable secondary cells (Addition of Lithium type cells)	Table E.2		X	
Prevention of excessive temperature and cell damage (Application of IEC 60079-11 requirement)	E.4.1.2	X		
Prevention of inadvertent charging of a battery by other voltage sources in the enclosure (Construction not requiring additional protection)	E.4.3		X	

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Significant Changes	Clause	Minor and editorial changes	Extension	Major technical changes
Recharging of secondary cells inside flameproof enclosures (Additional battery options)	E.5.1		X	
Introduction of an alternative risk assessment method encompassing equipment protection levels' for Ex equipment (Removal of previous Informative Annex)	Annex G	X		
Additional requirements for Flameproof enclosures with an internal source of release (containment system) (Addition of new Normative Annex)	Annex G		X	
Requirements for machines with flameproof "d" enclosures fed from converters (Addition of new Normative Annex)	Annex H		X	

Explanation of the Types of Significant Changes:

A) Definitions

1. 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.

2. 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.

3. Major technical changes:

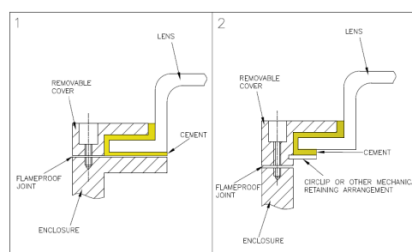
- addition of technical requirements
- increase of technical requirements

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 'Major technical changes'

C1 – Supplemental mechanical means of securing the cemented joint shall not be defeated by the opening of doors or covers that are intended to be opened during installation or maintenance. For example, in the images below for a luminaire incorporating a cemented joint between the lens and the enclosure cover, the construction shown in the second image would be in accordance with this requirement, while the construction shown in the first image would not.



C2 – Addition of material limitations of enclosures of equipment and enclosures of Ex components for external mounting, if constructed of copper or copper alloys, when used in explosive gas atmospheres containing acetylene (12.8).

C3 – Addition of power factor requirement for evaluating the ability of a plug and socket to remain flameproof during the arc-quenching period while opening a test circuit (13.6.4).

C4 – Addition of marking requirements for Ex component enclosures, in addition to the requirements for marking of Ex components given in IEC 60079-0 (D.3.8).

C5 – Removal of Type T cells as acceptable primary cells (Table E.1).

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(informative)

Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers only the following essential requirements out of those given in Annex II of the EC Directive 94/9/EC:

- ER 1.0.1, ER 1.0.2 (partly), ER 1.0.3, ER 1.0.4 (partly), ER 1.0.5, ER 1.0.6
- ER 1.1
- ER 1.2.1 (partly), ER 1.2.2 (partly), ER 1.2.3, ER 1.2.6, ER 1.2.7, ER 1.2.8, ER 1.2.9
- ER 1.3.1, ER 1.3.4
- ER 1.4
- ER 1.5
- ER 1.6.4
- ER 2.0
- ER 2.1
- ER 2.2.1
- ER 2.3

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive[s] concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC 60079-1
Edition 7.0 2014-06

EXPLOSIVE ATMOSPHERES –

Part 1: Equipment protection by flameproof enclosures "d"

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
31/1536/DISH	31/1542/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.

IEC 60079-1:2014 Edition 7.0, Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"

Question 1:

The requirements given in 13.1 of IEC 60079-1:2014 (Edition 7) restrict threaded entries for flameproof enclosures to only metric and NPT. Does this restriction represent a major technical change between IEC 60079-1:2014 (Edition 7) and IEC 60079-1:2007 (Edition 6)?

Answer 1:

Yes, the restriction to only metric and NPT regarding threaded entries for flameproof enclosures does represent a major technical change between IEC 60079-1:2014 (Edition 7) and IEC 60079-1:2007 (Edition 6). The requirements given in Clause 13 of IEC 60079-1:2007 (Edition 6) had no such normative restriction, with reference to metric and NPT only as examples of threaded entries for flameproof enclosures.

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While IEC 60079-1:2014 (Edition 7) only permits the use of metric and NPT threads for entry into flameproof enclosures, cable glands/conduit entry devices, thread adapters and blanking elements are permitted to use other thread forms (see Annex C of IEC 60079-1:2014 (Edition 7)).

NOTE 1 The intention of the restriction to only metric and NPT regarding threaded entries for flameproof enclosures is to minimize the mismatch of thread forms in enclosure entries.

NOTE 2 In the Foreword of IEC 60079-1:2014 (Edition 7), the table detailing the significance of the changes between IEC 60079-1:2014 (Edition 7) and IEC 60079-1:2007 (Edition 6) mistakenly did not identify this metric and NPT restriction as a major technical change. Unfortunately, the IEC Directives do not permit a corrigendum to be issued to correct errors in non-normative text such as the table detailing the significance of changes.

Question 2:

Where a thread adapter is fitted and assessed as a factory-assembled part of the flameproof enclosure, what are the permitted thread forms?

Answer 2:

A thread adapter may use thread forms other than metric and NPT, whether as an Ex Equipment thread adapter or as a thread adapter fitted and assessed as a factory-assembled part of the flameproof enclosure (see Annex C of IEC 60079-1:2014 (Edition 7)).

Question 3:

Can a blanking element be installed in a thread adapter which is fitted and assessed as a factory-assembled part of the flameproof enclosure?

Answer 3:

Yes, the requirements given in Clause 13 of IEC 60079-1:2014 (Edition 7) regarding thread adapters are for separately certified Ex equipment thread adapters, not those fitted and assessed as a factory-assembled part of the flameproof enclosure.

Question 4:

What is the required marking when a thread adapter is fitted and assessed as a factory-assembled part of the flameproof enclosure?

Answer 4:

Clause 13 of IEC 60079-1:2014 (Edition 7) requires identification of the specific thread type and size of threaded entries into flameproof enclosures. In the case where the thread adapter is fitted and assessed as a factory-assembled part of the flameproof enclosure, the requirement for identification applies to the thread form of the adapter for the field wiring connection.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 1: Equipment protection by flameproof enclosures “d”

FOREWORD

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International Standard IEC 60079-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This seventh edition cancels and replaces the sixth edition, published in 2007, and constitutes a technical revision.

The significance of the changes between IEC 60079-1, Edition 7.0 (2014) and IEC 60079-1 Edition 6.0 (2007) (including Corrigendum 1 (2008)), is as listed below:

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Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Normative references (Removal of the edition date from the reference for IEC 60079-0)	2	X		
Requirements for level of protection "da" (Catalytic sensors of portable combustible gas detectors)	4.2		X	
Requirements for level of protection "dc" (“Enclosed break” devices from IEC 60079-15)	4.4, 15.5	X		
Flameproof joints, General requirements (Documentation clarification and examples of corrosion inhibiting grease)	5.1	X		
Flameproof joints, General requirements (Specific Conditions of Use that joints are not intended to be repaired)	5.1		X	
Flameproof joints, General requirements (Electroplating more than 0,008 mm thick)	5.1		X	
Non-threaded joints, Gap (<i>i</i>) (Intentional gaps between surface for flanged joints)	5.2.2	X		
Serrated joints (Use and test requirements)	5.2.8	X		
Multi-step joints (Not less than 3 adjacent segments and two path changes)	5.2.9		X	
Minimum width of joint and maximum gap for enclosures of groups IIA and IIB (Maximum gaps for flanged, cylindrical or spigot joints of 9,5 mm minimum width and volume greater than 2 000 cm ³)	Table 2		X	
Minimum width of joint and maximum gap for enclosures of groups I, IIA, IIB and IIC (ISO 80000-1 for constructional value rounding)	Table 2, Table 3	X		
Cylindrical threaded joints (ISO 965-1 standard in respect of thread form or quality of fit)	Table 4	X		
Taper threaded joints (External and internal thread construction)	Table 5	X		
Cemented joints (Supplemental mechanical means of securement)	6.1.2			C1
Cemented joints (Evaluation criteria if there is leakage)	6.1.2		X	
Fused glass joints (Glass-to-metal joints)	6.2		X	
Thermal tests of breathing and draining devices (Temperature class based on external surface temperature after the 10 min test period)	10.9.3.2	X		
Test of the ability of the breathing and draining device to withstand pressure (Relocated from before thermal tests to after the non-transmission test)	10.9.3.4	X		

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Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Ex component certificate (Service temperature range for non-metallic enclosures per IEC 60079-0)	10.9.4	X		
Fasteners and openings (Relocation of blanking element content to 13.8 and C.2.3)	11	X		
Fasteners and openings, Property class or yield stress (Certificate specific condition of use)	11.3	X		
Fasteners and openings (Openings in the wall of the enclosure)	11.8	X		
Materials (Material limitation in acetylene atmospheres)	12.8			C2
Entries for flameproof enclosures, General (Metric and NPT threaded entries)	13.1	X		
Entries for flameproof enclosures, General (Group I non-threaded joints)	13.1		X	
Entries for flameproof enclosures, Non-threaded holes (Group I application)	13.3		X	
Entries for flameproof enclosures, Cable glands (Group I application)	13.4		X	
Cable glands, Conduit sealing devices (Documentation to facilitate mounting)	13.4,13.5	X		
Plugs and sockets and cable couplers (Load requirement for arc-quenching test)	13.6.4			C3
Bushings (Documentation to facilitate mounting)	13.7	X		
Blanking elements (Relocated from Clause 11)	13.8	X		
Verification and tests (Maximum surface temperature conditions)	Table 6	X		
Type tests (Sequence and number of samples for tests)	15	X		
Determination of explosion pressure, General (Devices that can cause turbulence)	15.2.2.2	X		
Determination of explosion pressure, General (Number of tests for Group IIC)	15.2.2.2	X		
Determination of explosion pressure, General (Pressure pilling for Group IIB)	15.2.2.4	X		
Determination of explosion pressure, General (Equipment marked for a single gas)	15.2.2.5	X		
Overpressure test, General (Low ambient overpressure tests not required)	15.2.3	X		
Overpressure test – First method (static) (3 times option when routine batch testing)	15.2.3.2		X	

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Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Overpressure test – First method (static) <i>(Adjustment for low ambient due to small size of equipment)</i>	15.2.3.2		X	
Overpressure test – Second method (dynamic) <i>(Number of tests to be made)</i>	15.2.3.3	X		
Test for non-transmission of an internal ignition <i>(Clarification regarding grease)</i>	15.3	X		
Reduction in length of a threaded joint for non-transmission test <i>(ISO 965-1 and 965-3 standards in respect of thread form and quality of fit)</i>	Table 9	X		
Test factors to increase pressure or test gap <i>(Group IIC adjustments for elevated ambients)</i>	Table 10	X		
Test for non-transmission of an internal ignition, Groups I, IIA and IIB <i>(Number of tests to be made)</i>	15.3.2.3	X		
Test for non-transmission of an internal ignition, Group IIC testing by increased gap <i>(Number of tests to be made)</i>	15.3.3.2	X		
Test for non-transmission of an internal ignition, Group IIC <i>(Oxygen enrichment of test gases)</i>	15.3.3.4		X	
Thermal tests of enclosures with breathing and draining devices <i>(Temperature class based on external surface temperature after the 10 min test period)</i>	15.4.3.1	X		
Tests for "dc" devices <i>("Enclosed break" devices from IEC 60079-15)</i>	15.5		X	
Routine tests, General <i>(Adjustment for low ambient due to small size of equipment)</i>	16.1.2		X	
Routine tests, General <i>(Options when second method is chosen)</i>	16.1.3	X		
Routine tests, General <i>(Welded joint inspection options)</i>	16.3		X	
Routine tests, General <i>(Allowance for batch testing)</i>	16.6		X	
Switchgear for Group I <i>(Clarifying need for compliance with EPL Mb types of protection)</i>	17.2.2, 17.2.3	X		
Non-metallic enclosures and non-metallic parts of enclosures, General <i>(Exception for cemented joints)</i>	19.1	X		
Non-metallic enclosures and non-metallic parts of enclosures, Resistance to tracking and creepage distances <i>(Reference to both IEC 60079-7 and or IEC 60079-15)</i>	19.2		X	
Non-metallic enclosures and non-metallic parts of enclosures, Requirements for type tests <i>(Clarification of test sequence)</i>	19.3	X		

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Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Instructions <i>(Indication that repair of flamepaths is not intended)</i>	21		X	
Bushings <i>(Documentation regarding numbers of cores)</i>	C.2.1.4	X		
Bushings <i>(Criteria for non-transmission test)</i>	C.2.1.4	X		
Bushings <i>(Evaluation criteria if there is leakage)</i>	C.2.1.4		X	
Flameproof joints, Threaded joints <i>(Requirement options)</i>	C.2.2.1	X		
Flameproof joints, Non-threaded joints <i>(Group I application)</i>	C.2.2.2		X	
Constructional requirements for Ex blanking elements <i>(Relocated from Clause 11)</i>	C.2.3.1	X		
Constructional requirements for Ex blanking elements <i>(Metric and NPT Ex blanking elements)</i>	C.2.3.2, C.2.3.3	X		
Constructional requirements for Ex blanking elements <i>(Group I non-threaded construction)</i>	C.2.3.4		X	
Sealing test, General <i>(Allowance for re-tightening)</i>	C.3.1.1	X		
Cable glands and conduit sealing devices with sealing ring <i>(Mandrel to be corrosion-resistant metal)</i>	C.3.1.2	X		
Type tests for Ex blanking elements, Torque test <i>(Test-block to be steel)</i>	C.3.3.1	X		
Tightening torque values <i>(Addition of < 16 mm thread size)</i>	Table C.1		X	
Tightening torque values <i>(Addition of NPT thread sizes)</i>	Table C.2		X	
Ex component enclosure requirements <i>(Markings content)</i>	D.3.8			C4
Ex component enclosure requirements <i>(Certificate content)</i>	D.3.10		X	
Utilization of an Ex component enclosure certificate to prepare an equipment certificate, Procedure <i>(Devices that can create significant turbulence)</i>	D.4.1		X	
Acceptable primary cells <i>(Addition of Type B cells)</i>	Table E.1		X	
Acceptable primary cells <i>(Removal of Type T cells)</i>	Table E.1			C5
Acceptable secondary cells <i>(Addition of Lithium type cells)</i>	Table E.2		X	
Prevention of excessive temperature and cell damage <i>(Application of IEC 60079-11 requirement)</i>	E.4.1.2	X		

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Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Prevention of inadvertent charging of a battery by other voltage sources in the enclosure <i>(Construction not requiring additional protection)</i>	E.4.3		X	
Recharging of secondary cells inside flameproof enclosures <i>(Additional battery options)</i>	E.5.1		X	
Introduction of an alternative risk assessment method encompassing equipment protection levels' for Ex equipment <i>(Removal of previous Informative Annex)</i>	Annex G	X		
Additional requirements for Flameproof enclosures with an internal source of release (containment system) <i>(Addition of new Normative Annex)</i>	Annex G		X	
Requirements for machines with flameproof "d" enclosures fed from converters <i>(Addition of new Normative Annex)</i>	Annex H		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 can 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.

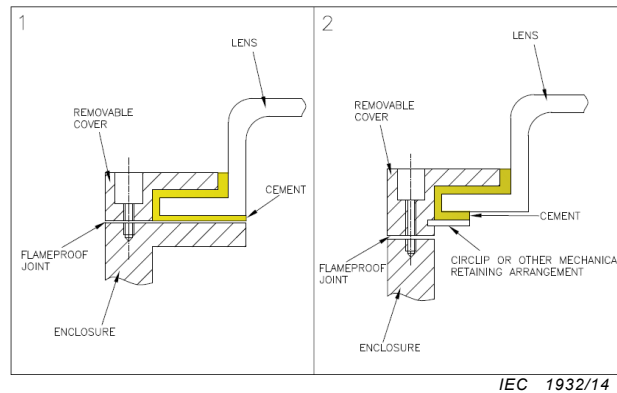
NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

B) Information about the background of 'Major Technical Changes'

C1 – Supplemental mechanical means of securing the cemented joint shall not be defeated by the opening of doors or covers that are intended to be opened during

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installation or maintenance. For example, in the images below for a luminaire incorporating a cemented joint between the lens and the enclosure cover, the construction shown in the second image would be in accordance with this requirement, while the construction shown in the first image would not.



- C2 – Addition of material limitations of enclosures of equipment and enclosures of Ex components for external mounting, if constructed of copper or copper alloys, when used in explosive gas atmospheres containing acetylene (12.8).
- C3 – Addition of power factor requirement for evaluating the ability of a plug and socket to remain flameproof during the arc-quenching period while opening a test circuit (13.6.4).
- C4 – Addition of marking requirements for Ex component enclosures, in addition to the requirements for marking of Ex components given in IEC 60079-0 (D.3.8).
- C5 – Removal of Type T cells as acceptable primary cells (Table E.1).

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

FDIS	Report on voting
31/1111/FDIS	31/1125/RVD

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

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

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

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

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

The contents of the corrigendum of June 2018 and Interpretation sheet of May 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 document using a colour printer.

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EXPLOSIVE ATMOSPHERES –

Part 1: Equipment protection by flameproof enclosures “d”

1 Scope

This part of IEC 60079 contains specific requirements for the construction and testing of electrical equipment with the type of protection flameproof enclosure “d”, intended for use in explosive gas atmospheres.

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of this standard will take precedence.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60061 (all parts), *Lamp caps and holders together with gauges for the control of interchangeability and safety*

IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

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 60127 (all parts), *Miniature fuses*

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 2738, *Sintered metal materials, excluding hardmetals – Permeable sintered metal materials – Determination of density, oil content and open porosity*

ISO 4003, *Permeable sintered metal materials – Determination of bubble test pore size*

ISO 4022, *Permeable sintered metal materials – Determination of fluid permeability*

ANSI/ASME B1.20.1, *Pipe threads, general purpose (inch)*