BS EN 60079-2:2014



BSI Standards Publication

Explosive atmospheres

Part 2: Equipment protection by pressurized enclosure “p”

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National foreword

This British Standard is the UK implementation of EN 60079-2:2014. It is identical to IEC 60079-2:2014. It supersedes BS EN 60079-2:2007 and BS EN 61241-4:2006 which are withdrawn.

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 secretary.

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Explosionsgefährdete Bereiche - Teil 2: Geräteschutz durch Überdruckkapselung "p" (IEC 60079-2:2014)

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Foreword

The text of document 31/1119/FDIS, future edition 6 of IEC 60079-2, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-2:2014.

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) 2015-06-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-08-25

This document supersedes EN 60079-2:2007 and EN 61241-4:2006.

The State of the Art is included in Annex ZY “Significant changes between this European Standard and EN 60079-2:2007”.

For the significant changes with respect to EN 60079-2:2007, see Annex ZY.

This standard is to be read in conjunction with EN 60079-0.

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(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 60079-2:2014 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 60051	NOTE	Harmonized in EN 60051 series.
IEC 60079-1	NOTE	Harmonized as EN 60079-1.
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 60079-13	NOTE	Harmonized as EN 60079-13.
IEC 60079-18	NOTE	Harmonized as EN 60079-18.
IEC 60079-20-1	NOTE	Harmonized as EN 60079-20-1.
IEC 60079-26	NOTE	Harmonized as EN 60079-26.
IEC 60079-28	NOTE	Harmonized as EN 60079-28.
IEC 61511	NOTE	Harmonized in EN 61511 series.

Annex ZA
(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.

Publication	Year	Title	EN/HD	Year
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	-
IEC 60050	series	International Electrotechnical Vocabulary	-	-
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
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 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	-
IEC 60127	series	Miniature fuses	EN 60127	series
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60664-1	-	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	-

Annex ZZ
(informative)

Coverage of Essential Requirements of EU 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 EU Directive 94/9/EC:

– ER 1.0.1 to ER 1.0.6;

– ER 1.2.1, ER 1.2.2 (partly), ER 1.2.3, ER 1.2.4 (partly), ER 1.2.6 to ER 1.2.8;

– ER 1.3.1, ER 1.3.5;

– ER 1.4.1 (partly);

– ER 1.5.1 to ER 1.5.8;

– ER 1.6.2 (partly), ER 1.6.3 to ER 1.6.5;

– ER 2.0.2.1, ER 2.0.2.2;

– ER 2.2.1, ER 2.2.1.1 to ER 2.2.1.3;

– ER 2.2.2.1 to 2.2.2.4;

– ER 2.3.1, ER 2.3.1.1, ER 2.3.1.2;

– ER 2.3.2.1 to 2.3.2.3.

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

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

Annex ZY
(informative)

Significant changes between this European Standard and EN 60079-2:2007

This European Standard supersedes EN 60079-2:2007.

The significant changes with respect to EN 60079-2:2007 are as listed below.

Table ZY.1

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Scope Expanded to include combustible dust	1		X	
Protective Gas Replaced “apparatus” with “equipment”	3			
Protective Gas Revised to show that purging is not required for explosive dust atmospheres	3.16	X		
Level of Protection “pxb” Term and definitions revised to reflect EPL and level of protection	3.21	X		
Level of Protection “pyb” Term and definitions revised to reflect EPL and level of protection	3.22	X		
Level of Protection “pzc” Term and definitions revised to reflect EPL and level of protection	3.23	X		
Lower Flammable Limit Term and definition revised to agree with 60079-0	3.26	X		
Upper Flammable Limit Term and definition revised to agree with 60079-0	3.27	X		
Table 1 – Determination of protection level Revised to use EPL terminology	Table 1	X		
Table 2 – Design Criteria based upon level of protection Revised to use EPL terminology	Table 2	X		
Enclosure Requirements relaxed for specific designs	5.1		X	
Group II and Group III pressurized enclosures Text revised to use EPL terminology	5.3.3	X		
Group II and Group III Level of Protection “pxb” Added that warning also applies for explosive dust atmospheres	5.3.5		X	

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Group II and Group III door and cover warning Added that warning also applies for explosive dust atmospheres	5.3.6		X	
Group II and Group III door and cover warning Revised warning from atmosphere “may be present” to “is present”	5.3.6	X		
Mechanical Strength Removed reference to 60079-0 by clause number for “X” condition	5.4	X		
Spark and particle barriers Removed reference to 60079-0 by clause number for “X” condition	5.9	X		
Cells and batteries Added requirements for cells and batteries	5.10			C1
For Level of Protection “pxb” or Level of Protection “pyb” Revised Table to use terminology consistent with EPLs	6.2	X		
Suitability of safety devices for hazardous area Word “explosion” changed to “ignition” to reflect UFL/LFL terms	7.1	X		
Integrity of safety devices Added requirement for detecting fan failure	7.2			C2
Table 3 – Safety devices based upon Level of Protection Revised column labels to use Level of Protection terminology	Table 3	X		
Provider of safety devices Remove reference to 60079-0 by clause number for “X” condition	7.3	X		
Pressurization System evaluated as associated equipment Added requirements for pressurization systems	7.4			C3
Sequence diagram for Level of Protection “pxb” Revised text to use Level of Protection terminology	7.5	X		
Group I and Group II purging automated for Level of Protection “pxb” Revised text to use Level of Protection terminology	7.7	X		
Group I and Group II purging automated for Level of Protection “pxb” Added text specifying that for “pxb”, control must be automated	7.7			C4
Group I or Group II – purging criteria Revised text to use Level of Protection terminology	7.8	X		
Group III – cleaning Added text for cleaning enclosures used in explosive dust atmospheres	7.9		X	
Safety devices to detect minimum overpressure Add word “minimum” to clause title to be consistent with text	7.11	X		

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Safety devices to detect minimum overpressure Revised text to use Level of Protection terminology	7.11 d)	X		
Value of minimum overpressure Added word “minimum” to clause title to be consistent with text	7.12	X		
Value of minimum overpressure Revised text to use Level of Protection terminology	7.12	X		
Value of minimum overpressure Added text to reflect a note in Annex C	7.12		X	
Pressurizing multiple enclosures Revised text to use Level of Protection terminology	7.13	X		
Safety devices on doors and covers Revised text to use Level of Protection terminology	7.14	X		
Equipment that may remain energized Revised text to use EPL and level of protection terminology	7.15	X		
Equipment permitted within Level of Protection “pyb” Revised text to use EPL and level of protection terminology	7.16	X		
Group I and Group II Filling procedure Allow filling in a hazardous location if tested as non-hazardous	8.4		X	
Group III Filling Procedure Added static pressurization filling procedure for combustible dust	8.5		X	
Safety devices Revised text to use Level of Protection terminology	8.6			
Equipment that may remain energized Revised text to use EPL terminology	8.7	X		
Overpressure Removed reference to 60079-0 by clause number	8.8	X		
Backup supply Added requirements for a backup supply of protective gas	9.1			C5
Independent supplies Provided requirements for independence of pressurization	9.2			C6
Release Conditions Removed reference to 60079-0 by clause number for “X” condition	11.1.2	X		
Containment system with a limited release Removed reference to 60079-0 by clause number for “X” condition	12.3	X		
13.3.3 Limited release of a gas or vapour Revised text to reflect UFL/LFL terms	13.3.3	X		
Ignition-capable equipment Revised text to use Level of Protection terminology	14	X		
Type verification and tests Edition 5 clauses 16.1 to 16.7 moved to Edition 6 clauses 16.2 to 16.8	16	X		

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Determining the maximum overpressure rating Added requirements to determine maximum overpressure	16.1			C7
Maximum overpressure test Moved Maximum overpressure test to 16.2	16.2			C7
Maximum overpressure test Moved Maximum overpressure test to 16.2	16.3.2		X	
Tests for an infallible containment system Clarify the rating used for the test	16.7.1			C8
Tests for an infallible containment system Modified test for infallible containment	16.7.2			C9
Edition 5 − Verifying ability of the pressurized enclosure to limit internal pressure Eliminated test	16.8			C7
Functional test Clarified that applies only to safety devices provided with enclosures	17.1	X		
Tests for an infallible containment system Waived helium leak tests for liquid systems	17.3		X	
Supplementary marking Allowed continued use of type of protection marking	18.3			
Pressurization systems Clarified use of Ex [p] and [Ex p] marking	18.6	X		
Warnings required in other clauses Added table number	18.7	X		
Warnings required in other clauses Added warning from 7.9	18.7		X	
Warnings required in other clauses Added warnings from Annex G and Annex H	18.7			C1
Instructions Added requirements for Group III	19		X	
Edition 5 Annex G – Infallibility test for containment system Deleted and replaced	Annex G	X		
Edition 5 Annex H – Introduction of an alternative risk assessment method encompassing “equipment protection levels” Deleted and replaced	Annex H	X		
Annex G – Internal Cells and Batteries for Level of Protection “pxb” and Level of Protection “pyb” Added requirements for cells and Batteries			X	
Annex H – Internal Cells and Batteries for Level of Protection “pzc” Added requirements for cells and Batteries			X	

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INTRODUCTION

This part of IEC 60079 gives requirements for the design, construction, testing and marking of electrical equipment for use in explosive atmospheres in which

a) a protective gas maintained at a pressure above that of the external atmosphere is used to guard against the formation of an explosive gas atmosphere within enclosures which do not contain an internal source of release of flammable gas or vapour;

b) a protective gas maintained at a pressure above that of the external atmosphere is used to guard against the formation of an explosive gas atmosphere within enclosures and is supplied to an enclosure containing one or more internal sources of release in order to guard against the formation of an explosive gas atmosphere; or

c) a protective gas maintained at a pressure above that of the external atmosphere, is used to prevent the entry of combustible dust which might otherwise lead to the formation of an explosive dust atmosphere within enclosures, but only where there is no internal source of release of combustible dust.

This standard includes requirements for the equipment and its associated equipment including the inlet and exhaust ducts, and also for the auxiliary control equipment necessary to ensure that pressurization and/or dilution is established and maintained.

EXPLOSIVE ATMOSPHERES –

Part 2: Equipment protection by pressurized enclosure "p"

1 Scope

This part of IEC 60079 contains the specific requirements for the construction and testing of electrical equipment with pressurized enclosures, of type of protection “p”, intended for use in explosive gas atmospheres or explosive dust atmospheres. It also includes the requirements for pressurized enclosures containing a limited release of a flammable substance.

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 requirements of this standard take precedence.

This standard does not include the requirements for:

- pressurized enclosures where the containment system may release
  a) air with an oxygen content greater than normal, or
  b) oxygen in combination with inert gas where the oxygen is in a proportion greater than 21 %.
- pressurized rooms or analyser houses; see IEC 60079-13;
- pressurized enclosures used where “explosives” or pyrotechnics are present;
- pressurized enclosures used where hybrid mixtures of gas/vapour and combustible dust are present;
- pressurized enclosures used where pyrophoric substances such as explosives or propellants containing their own oxidizers are present
- pressurized enclosures with an internal source of release of combustible dust.

NOTE When the user acts in the role of the manufacturer, it is typically the user’s responsibility to ensure that all relevant parts of this standard are applied to the manufacturing and testing of the equipment.

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

IEC 60050 (all parts), *International Electrotechnical Vocabulary*

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

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"*