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**Električne naprave za eksplozivne plinske atmosfere - 2. del: Nadtlak "p" (IEC 60079-2:2001)**

Electrical apparatus for explosive gas atmospheres – Part 2: Pressurized enclosures "p" (IEC 60079-2:2001)

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English version

**Electrical apparatus for explosive gas atmospheres**  
**Part 2: Pressurized enclosures "p"**  
(IEC 60079-2:2001)

Matériel électrique pour atmosphères  
explosives gazeuses  
Partie 2: Enveloppes à surpression  
interne "p"  
(CEI 60079-2:2001)

Elektrische Betriebsmittel für  
gasexplosionsgefährdete Bereiche  
Teil 2: Überdruckkapselung "p"  
(IEC 60079-2:2001)

This European Standard was approved by CENELEC on 2004-06-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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**CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

### Foreword

The text of the International Standard IEC 60079-2:2001, prepared by IEC TC 31, Electrical apparatus for explosive atmospheres, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60079-2 on 2004-06-01 without any modification.

This European Standard supersedes EN 50016:2002.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-06-01

Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 60079-2:2001 was approved by CENELEC as a European Standard without any modification.

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**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

The following referenced documents are indispensable for the application 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 Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-5	- <sup>1)</sup>	Rotating electrical machines Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	2001 <sup>2)</sup>
IEC 60050-151	- <sup>1)</sup>	International Electrotechnical Vocabulary (IEV) Part 151: Electrical and magnetic devices	-	-
IEC 60050-426	- <sup>1)</sup>	Chapter 426: Electrical apparatus for explosive atmospheres	-	-
IEC 60079-0	1998 <sup>3)</sup>	Electrical apparatus for explosive gas atmospheres Part 0: General requirements	-	-
IEC 60112	1979	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	HD 214 S2 <sup>4)</sup>	1980
IEC 60529	- <sup>1)</sup>	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 <sup>2)</sup> 1993
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	EN 60664-1 <sup>5)</sup>	2003

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<sup>1)</sup> Undated reference.

<sup>2)</sup> Valid edition at date of issue.

<sup>3)</sup> IEC 60079-0:2004 has been endorsed as EN 60079-0:2004.

<sup>4)</sup> HD 214 S2 is superseded by EN 60112:2003, which is based on IEC 60112:2003.

<sup>5)</sup> EN 60664-1 includes A1:2000 + A2:2002 to IEC 60664-1.

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INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC**

**60079-2**

Quatrième édition  
Fourth edition  
2001-02

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**Matériel électrique pour atmosphères explosives  
gazeuses –**

**Partie 2:  
Enveloppes à surpression interne «p»**

**Electrical apparatus for explosive gas  
atmospheres –**

**Part 2:  
Pressurized enclosures "p"**

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## CONTENTS

	Page
FOREWORD .....	9
INTRODUCTION .....	11
 Clause	
1 Scope .....	13
2 Normative references .....	13
3 Terms and definitions .....	15
4 Protection types .....	19
5 Constructional requirements for pressurized enclosures .....	25
5.1 Enclosure.....	25
5.2 Materials.....	25
5.3 Doors and covers.....	25
5.4 Mechanical strength .....	27
5.5 Apertures, partitions, compartments and internal components .....	27
5.6 Insulating materials .....	29
5.7 Sealing .....	29
5.8 Spark and particle barriers .....	29
6 Temperature limits .....	29
6.1 General.....	29
6.2 For type px or type py.....	31
6.3 For type pz.....	31
7 Safety provisions and safety devices (except for static pressurization) .....	31
8 Safety provisions and safety devices for static pressurization.....	39
9 Supply of protective gas .....	41
9.1 Type of gas .....	41
9.2 Temperature .....	41
10 Pressurized apparatus with an internal source of release.....	41
11 Release conditions.....	41
11.1 No release .....	41
11.2 Limited release of a gas or vapour.....	43
11.3 Limited release of a liquid.....	43
12 Design requirements for the containment system .....	43
12.1 General design requirements .....	43
12.2 Infallible containment system .....	43
12.3 Containment system with a limited release .....	45
13 Protective gas and pressurizing techniques .....	45
13.1 General.....	45
13.2 Pressurization with leakage compensation.....	47
13.3 Pressurization with dilution .....	49
14 Ignition-capable apparatus .....	49

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(standards.itfch.ai)

SIST EN 60079-2:2005

[https://standards.itfch.ai/catalog/standards/sist/e14c4bcf-086a-4dc4-ab24-](https://standards.itfch.ai/catalog/standards/sist/e14c4bcf-086a-4dc4-ab24-722fc2e95da5/sist-en-60079-2-2005)

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Clause	Page
15 Internal hot surfaces.....	49
16 Type verification and tests.....	51
16.1 Maximum overpressure test .....	51
16.2 Leakage test .....	51
16.3 Purging test for pressurized enclosures with no internal source of release (pressurization technique may be leakage compensation or continuous flow) and filling procedure test for static pressurization .....	51
16.4 Purging and dilution tests for a pressurized enclosure with an internal source of release.....	53
16.5 Verification of minimum overpressure.....	57
16.6 Tests for an infallible containment system .....	59
16.7 Overpressure test for a containment system with a limited release.....	59
16.8 Verifying ability of the pressurized enclosure to limit internal pressure .....	59
17 Routine tests.....	61
17.1 Functional test .....	61
17.2 Leakage test.....	61
17.3 Tests for an infallible containment system .....	61
17.4 Test for a containment system with a limited release .....	61
18 Marking.....	61
 Annex A (normative) Purging and dilution tests .....	65
Annex B (informative) Examples of functional sequence diagram .....	69
Annex C (informative) Examples of the changes in pressure in ducts and enclosures .....	73
Annex D (informative) Information to be provided to the user .....	83
Annex E (normative) Classification of the type of release within enclosures.....	87
Annex F (informative) Examples for the use of the dilution area concept .....	89
Annex G (normative) Infallibility test for containment system .....	93
 Bibliography .....	95
 Figure B.1 – State diagram of a leakage-compensation purge control system .....	69
Figure C.1 a) – Protective gas outlet without a spark and particle barrier.....	73
Figure C.1 b) – Protective gas outlet with a spark and particle barrier.....	75
Figure C.2 – Pressurized enclosures with leakage compensation, enclosures without moving parts.....	77
Figure C.3 – Pressurized enclosures with leakage compensation, rotating electrical machine with an internal cooling fan.....	79
Figure C.4 – Pressurized enclosure with a leakage compensation, rotating electrical machine with an external cooling fan.....	81

	Page
Figure F.1 – Diagram showing the use of the dilution area concept to simplify the purge and dilution test requirements .....	89
Figure F.2 – Diagram showing the use of the infallible containment system concept to simplify the purging and dilution requirements around ICA.....	91
Figure F.3 – Diagram showing the use of internal partitions around the potential source of release to simplify the purging and dilution requirements around ICA located outside the partitions .....	91
Figure G.1 – Schematic diagram of the infallibility test described in 16.6.2 a) .....	93
Table 1 – Determination of protection type .....	21
Table 2 – Design criteria based upon protection type .....	23
Table 3 – Safety devices based upon protection type .....	33
Table 4 – Protective gas requirements for a pressurized enclosure with a containment system .....	47
Table 5 – Protection types permitted within the dilution area.....	49
Table B.1 – Truth table of a leakage-compensation purge control system .....	69

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SIST EN 60079-2:2005

<https://standards.iteh.ai/catalog/standards/sist/e14e4bef-086a-4de4-ab24-722fe2e93da3/sist-en-60079-2-2005>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –****Part 2: Pressurized enclosures "p"**

## FOREWORD

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

International Standard IEC 60079-2 has been prepared by technical committee 31: Electrical apparatus for explosive atmospheres.

This fourth edition cancels and replaces the third edition which was issued as a technical report in 1983. It constitutes a technical revision and now has the status of an International Standard.

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

FDIS	Report on voting
31/344/FDIS	31/352/RVD

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

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This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

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Annexes A, E and G form an integral part of this standard.

Annexes B, C, D and F are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

## INTRODUCTION

This part of IEC 60079 gives requirements for the design, construction, testing and marking of electrical apparatus for use in potentially 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 and, where necessary,
- b) a protective gas is provided in sufficient quantity to ensure that the resultant mixture concentration around the electrical parts is maintained at a value outside the explosive limit appropriate to the particular conditions of use. The protective gas 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.

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

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## ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

### Part 2: Pressurized enclosures "p"

#### 1 Scope

**1.1** This part of IEC 60079 contains the specific requirements for the construction and testing of electrical apparatus with pressurized enclosures, of protection type "p", intended for use in explosive gas atmospheres.

The requirements contained in this standard are supplementary to those in IEC 60079-0.

**1.2** This standard specifies requirements for pressurized enclosures containing a limited release of a flammable substance.

**1.3** This standard does not contain 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 in a proportion greater than 21 %.

**1.4** This standard does not contain requirements for pressurized rooms or analyser houses; see IEC 60079-13 and IEC 60079-16.

**1.5** Due to the safety factors incorporated in the type of protection, the uncertainty of measurement inherent in good quality, regularly calibrated measurement equipment is considered to have no significant detrimental effect and need not be taken into account when making the measurements necessary to verify compliance of the apparatus with the requirements of this standard.

**1.6** When the user acts in the role of the manufacturer, it is the user's responsibility to ensure that all relevant parts of this standard are applied to the manufacturing and testing of the apparatus.

#### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60079. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60079 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60034-5, *Rotating electrical machines – Part 5: Classification of degrees of protection provided by enclosures of rotating electrical machines (IP code)*

IEC 60050(151), *International Electrotechnical Vocabulary – Chapter 151: Electrical and magnetic devices*

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

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

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

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

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

### 3 Terms and definitions

For the purposes of this standard, the terms and definitions given in IEC 60050(426) and IEC 60079-0 and the following apply

NOTE Unless otherwise specified, the terms "voltage" and "current" mean the r.m.s. values of an alternating, direct or composite voltage or current.

#### 3.1 alarm

piece of apparatus that generates a visual or audible signal that is intended to attract attention

#### 3.2 containment system

part of the apparatus containing the flammable substance that may constitute an internal source of release

#### 3.3 dilution

continuous supply of a protective gas, after purging, at such a rate that the concentration of a flammable substance inside the pressurized enclosure is maintained at a value outside the explosive limits at any potential ignition source (that is to say, outside the dilution area)

NOTE Dilution of oxygen by inert gas may result in a concentration of flammable gas or vapour above the upper explosive limit (UEL).

#### 3.4 dilution area

area in the vicinity of an internal source of release where the concentration of a flammable substance is not diluted to a safe concentration

#### 3.5 enclosure volume

volume of the empty enclosure without internal apparatus. For rotating electrical machines, the free internal volume plus the volume displaced by the rotor

#### 3.6 flammable substance

gases, vapours, liquids or mixtures thereof that are capable of being ignited

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**3.7****hermetically sealed device**

device which is so constructed that the external atmosphere cannot gain access to the interior and in which any seal is made by fusion, for example, brazing, welding or the fusion of glass to metal

**3.8****ignition-capable apparatus (ICA)**

apparatus which in normal operation constitutes a source of ignition for a specified explosive gas atmosphere. This includes electrical apparatus not protected by a type of protection listed in 7.13

**3.9****indicator**

piece of apparatus that shows whether flow or pressure is adequate and is monitored periodically, consistent with the requirement of the application

**3.10****internal source of release**

point or location from which a flammable substance in the form of a flammable gas or vapour or liquid may be released into the pressurized enclosure such that in the presence of air an explosive gas atmosphere could be formed

**3.11****leakage compensation**

providing a flow of protective gas sufficient to compensate for any leakage from the pressurized enclosure and its ducts

**3.12****overpressure**

pressure above ambient pressure within a pressurized enclosure

**3.13****pressurization**

technique of guarding against the ingress of the external atmosphere into an enclosure or room by maintaining a protective gas therein at a pressure above that of the external atmosphere.

**3.14****pressurization system**

grouping of components used to pressurize and monitor a pressurized enclosure

**3.15****pressurized enclosure**

enclosure in which a protective gas is maintained at a pressure greater than that of the external atmosphere

**3.16****protective gas**

air or inert gas used for purging and maintaining an overpressure and, if required, dilution.

NOTE For the purpose of this standard, inert gas means nitrogen, carbon dioxide, argon or any gas which, when mixed with oxygen in the ratio 4 parts inert to 1 part oxygen as found in air, does not make the ignition and flammability properties, such as explosive limits, more onerous.