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**Električne naprave za eksplozivne plinske atmosfere - 1. del: Neprodorni okrovi "d" (IEC 60079-1:2003)**

Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures 'd'

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ICS 29.260.20

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EUROPEAN STANDARD

**EN 60079-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2004

ICS 29.260.20

Supersedes EN 50018:2000 + A1:2002

English version

**Electrical apparatus for explosive gas atmospheres**  
**Part 1: Flameproof enclosures 'd'**  
(IEC 60079-1:2003)

Matériel électrique pour atmosphères  
explosives gazeuses  
Partie 1: Enveloppes antidéflagrantes 'd'  
(CEI 60079-1:2003)

Elektrische Betriebsmittel für  
gasexplosionsgefährdete Bereiche  
Teil 1: Druckfeste Kapselung 'd'  
(IEC 60079-1:2003)

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This European Standard was approved by CENELEC on 2004-03-01. 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.

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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 document 31A/114/FDIS, future edition 5 of IEC 60079-1, prepared by SC 31A, Flameproof enclosures, of IEC TC 31, Electrical apparatus for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-1 on 2004-03-01.

This European Standard supersedes EN 50018:2000 + A1:2002.

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

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) 2004-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-03-01

Annex ZA has been added by CENELEC.

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## iTeh STANDARD PREVIEW Endorsement notice (standards.iteh.ai)

The text of the International Standard IEC 60079-1:2003 was approved by CENELEC as a European Standard without any modification.

[SIST EN 60079-1:2004](https://standards.iteh.ai/catalog/standards/sist/c41a776a-353-482eb5c8-10784ee494d2/sist-en-60079-1-2004)

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 61508      NOTE      Harmonized in EN 61508 series (not modified).

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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 When 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 60034-1 (mod)	1996	Rotating electrical machines Part 1: Rating and performance	EN 60034-1 + corr. February + A11	1998 2000 2002
IEC 60061 (mod)	series	Lamp caps and holders together with gauges for the control of interchangeability and safety	EN 60061	series
IEC 60079-0	1998 <sup>1)</sup>	Electrical apparatus for explosive gas atmospheres Part 0: General requirements	-	-
IEC 60079-1-1	2002	Electrical apparatus for explosive gas atmospheres Part 1-1: Flameproof enclosures "d" - Method of test for ascertainment of maximum experimental safe gap	-	-
IEC 60079-7	2001	Part 7: Increased safety "e"	EN 60079-7	2003
IEC 60079-11	1999	Part 11: Intrinsic safety "i"	-	-
IEC 60086-1	2000	Primary batteries Part 1: General	EN 60086-1	2001
IEC 60112	1979	Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions	HD 214 S2 <sup>2)</sup>	1980
IEC 60127	series	Miniature fuses	EN 60127	series
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993

<sup>1)</sup> IEC 60079-0:1998 is superseded by IEC 60079-0:2004, which has been harmonized as EN 60079-1:2004.

<sup>2)</sup> HD 214 S2 is superseded by EN 60112:2003, which is based on IEC 60112:2003.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60707	1981	Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source	HD 441 S1 <sup>3)</sup>	1983
ISO 185	1988	Grey cast iron - Classification	-	-
ISO 965-1	1998	ISO general-purpose metric screw threads - Tolerances Part 1: Principles and basic data	-	-
ISO 965-3	1998	Tolerances – Part 3: Deviations for constructional threads	-	-
ISO 1210	1982	Plastics - Determination of flammability characteristics of plastics in the form of small specimens in contact with a small flame	-	-
ISO 2738	1999	Sintered metal materials, excluding hard metals - Permeable sintered metal materials - Determination of density, oil content and open porosity	EN ISO 2738	1999
ISO 4003	1977	Permeable sintered metal materials - Determination of bubble test pore size	EN 24003	1993
ISO 4022	1987	Permeable sintered metal materials - Determination of fluid permeability	-	-
ISO 6892	1998	Metallic materials - Tensile testing at ambient temperature	-	-
ASME B1.20.1	1983	Pipe threads, general purpose (inch)	-	-

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<sup>3)</sup> HD 441 S1 is superseded by EN 60707:1999, which is based on IEC 60707:1999.

NORME  
INTERNATIONALE

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STANDARD

**60079-1**

Cinquième édition  
Fifth edition  
2003-11

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**Matériel électrique pour atmosphères  
explosive gazeuses –**

**Partie 1:  
Enveloppes antidéflagrantes «d»**

**Electrical apparatus for explosive  
gas atmospheres –**

**Part 1:  
Flameproof enclosures "d"**

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

## Part 1: Flameproof enclosures “d”

## 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 60079-1 has been prepared by subcommittee 31A: Flameproof enclosures, of IEC technical committee 31: Electrical apparatus for explosive atmospheres.

This fifth edition cancels and replaces the fourth edition published in 2001 and constitutes a technical revision. <https://standards.iteh.ai/catalog/standards/sist/c41a776a-f353-482f-b5c8-10784ee494d2/sist-en-60079-1-2004>

This edition contains the following significant technical changes with regard to the previous edition:

- a) revisions to Clause 5 regarding the use of corrosion inhibiting grease, and regarding electroplating of joint surfaces;
- b) revisions to Clause 5 regarding gaps whose dimensions are less than required in the tables, and regarding taper threaded joints;
- c) revisions to Clause 13 regarding entries for flameproof enclosures;

- d) revisions to Clause 13 regarding cable glands and conduit entries;
- e) revisions to Clause 14 regarding test voltage for motors;
- f) revisions to Clause 15 regarding type tests for apparatus used at an ambient temperature below  $-20\text{ °C}$ , or at an ambient temperature above  $60\text{ °C}$ ;
- g) revisions to Clause 16 regarding routine tests for apparatus used at an ambient temperature below  $-20\text{ °C}$ ;
- h) revisions to Clause 19 regarding non-metallic enclosures;
- i) revisions to Annex C regarding Ex blanking elements and thread adapters;
- j) addition of a new normative Annex D regarding empty flameproof enclosures as Ex components; and
- k) addition of a new normative Annex E regarding cells and batteries.

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

FDIS	Report on voting
31A/114/FDIS	31A/115/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.

This standard is to be read in conjunction with IEC 60079-0, the requirements of which apply to electrical apparatus with flameproof enclosures.

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.

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# ELECTRICAL APPARATUS FOR EXPLOSIVE GAS ATMOSPHERES –

## Part 1: Flameproof enclosures “d”

### 1 Scope

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

### 2 Normative references

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.

IEC 60034-1:1996, *Rotating electrical machines – Part 1: Rating and performance*

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

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

IEC 60079-1-1:2002, *Electrical apparatus for explosive gas atmospheres – Part 1-1: Flameproof enclosures “d” – Method of test for ascertainment of maximum experimental safe gap*

IEC 60079-7:2001, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety “e”*

IEC 60079-11:1999, *Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety “i”*

IEC 60086-1:2000, *Primary batteries – Part 1: General*

IEC 60112:1979, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127 (all parts), *Miniature fuses*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60707:1981, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods*

ISO 185:1988, *Grey cast iron – Classification*

ISO 965-1:1998, *ISO general-purpose metric screw threads – Tolerances – Part 1: Principles and basic data*

ISO 965-3:1998, *ISO general-purpose metric screw threads – Tolerances – Part 3: Deviations for constructional threads*

ISO 1210:1982, *Plastics – Determination of the burning behaviour of horizontal and vertical specimens in contact with a small-flame ignition source*

ISO 2738:1999, *Sintered metal materials, excluding hard metals – Permeable sintered metal materials – Determination of density, oil content and open porosity*

ISO 4003:1977, *Permeable sintered metal materials – Determination of bubble test pore size*

ISO 4022:1987, *Permeable sintered metal materials – Determination of fluid permeability*

ISO 6892:1998, *Metallic materials – Tensile testing at ambient temperature*

ANSI/ASME B1.20.1-1983 (R2001), *Pipe threads, general purpose (inch)*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions, in addition to those given in IEC 60079-0, apply.

#### 3.1

##### **flameproof enclosure “d”**

enclosure in which the parts which can ignite an explosive atmosphere are placed and which can withstand the pressure developed during an internal explosion of an explosive mixture, and which prevents the transmission of the explosion to the explosive atmosphere surrounding the enclosure

#### 3.2

##### **volume**

total internal volume of the enclosure. However, for enclosures in which the contents are essential in service, the volume to be considered is the remaining free volume

NOTE For luminaires, the volume is determined without lamps fitted.

#### 3.3

##### **flameproof joint**

place where the corresponding surfaces of two parts of an enclosure, or the conjunction of enclosures, come together, and which prevents the transmission of an internal explosion to the explosive atmosphere surrounding the enclosure

#### 3.4

##### **width of flameproof joint**

*L*

shortest path through a flameproof joint from the inside to the outside of an enclosure

#### 3.5

##### **distance**

*l*

shortest path through a flameproof joint, when the width of the joint *L* is interrupted by holes intended for the passage of fasteners for assembling the parts of the flameproof enclosure

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**3.6****gap of flameproof joint***i*

distance between the corresponding surfaces of a flameproof joint when the electrical apparatus enclosure has been assembled

NOTE For cylindrical surfaces, forming cylindrical joints, the gap is the difference between the diameters of the bore and the cylindrical component.

**3.7****maximum experimental safe gap (for an explosive mixture)****MESG**

maximum gap of a joint of 25 mm in width which prevents any transmission of an explosion during 10 tests made under the conditions specified in IEC 60079-1-1

**3.8****shaft**

part of circular cross-section used for the transmission of rotary movement

**3.9****operating rod**

part used for the transmission of control movements which may be rotary or linear or a combination of the two

**3.10****pressure-piling**

results of an ignition, in a compartment or subdivision of an enclosure, of a gas mixture pre-compressed, for example, due to a primary ignition in another compartment or subdivision

**3.11****quick-acting door or cover**

door or cover provided with a device which permits opening or closing by a simple operation, such as the movement of a lever or the rotation of a wheel. The device is arranged so that the operation has two stages:

- one for locking or unlocking;
- another for opening or closing

**3.12****door or cover fixed by threaded fasteners**

door or cover, the opening or closing of which requires the manipulation of one or more threaded fasteners (screws, studs, bolts or nuts)

**3.13****threaded door or cover**

door or cover which is assembled to a flameproof enclosure by a threaded flameproof joint

**3.14****breathing device**

integral or separable part of a flameproof enclosure designed to permit exchange between the atmosphere inside the enclosure and the surrounding atmosphere

**3.15****draining device**

integral or separable part of a flameproof enclosure designed to permit water formed by condensation to escape from the enclosure