

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Explosive atmospheres –  
Part 1: Equipment protection by flameproof enclosures “d”**

**Atmosphères explosives –  
Partie 1: Protection du matériel par enveloppes antidéflagrantes «d»**



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ELECTROTECHNICAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**EXPLOSIVE ATMOSPHERES –****Part 1: Equipment protection by flameproof enclosures “d”**

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

This sixth edition cancels and replaces the fifth edition published in 2003 and constitutes a technical revision.

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

- a) revisions to Clause 5 regarding markings and conditions of safe use when a dimension of a flameproof joint is other than the relevant minimum or maximum;
- b) revisions to Table 1 regarding maximum gap for flanged, cylindrical or spigot joints;
- c) revisions to Table 4 regarding requirements for taper threaded joints;
- d) revisions to Clause 10 regarding volume restrictions and test conditions associated with breathing and draining devices;
- e) revisions to Clause 11 regarding requirements for fasteners, associated holes and blanking elements;
- f) revisions to Clause 12 regarding material restrictions associated with zinc and zinc alloys;

- g) revisions to Table 5 regarding conditions for the determination of maximum surface temperatures;
- h) revisions to Clause 15 regarding the determination of explosion pressure (reference pressure);
- i) revisions to Table 6 regarding the reduction in length of a threaded joint for non-transmission testing;
- j) revisions to Table 7 regarding the test factors to increase pressure or test gap ( $i_E$ );
- k) revisions to Table 8 regarding the minimum distance of obstructions from flange openings;
- l) revisions to Clause 19 regarding tests for flameproofness;
- m) revisions to Clause 20 regarding a tabulated collection of marking requirements;
- n) revisions to Annex C regarding additional requirements for flameproof entry devices;
- o) revisions to Annex D regarding empty flameproof enclosures as Ex components;
- p) addition of a new Annex F regarding mechanical properties for screws and nuts; and
- q) addition of a new Annex G regarding equipment protection levels for Ex equipment.

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

FDIS	Report on voting
31/680/FDIS	31/692/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 standard is to be read in conjunction with IEC 60079-0:2004, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*.

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

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the new edition.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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 September 2008 have been included in this copy.



## 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.

NOTE Equipment protection by flameproof enclosures “d” provides Equipment Protection Level (EPL) Gb. For further information, see Annex G.

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

IEC 60079-0:2004, *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-1-1, *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, *Explosive atmospheres – Part 7: Equipment protection by increased safety “e”*

IEC 60079-11, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”*

IEC 60079-14:2002, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in hazardous areas (other than mines)*

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

IEC 60112, *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 60623:2001, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 60662:1980, *High-pressure sodium vapour lamps*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 61951-1:2003, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 1: Nickel-cadmium*

IEC 61951-2:2003, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Portable sealed rechargeable single cells – Part 2: Nickel-metal hydride*

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

ISO 3864: 1984, *Safety colours and safety signs*

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

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

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.

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

#### 3.1

##### **flameproof enclosure “d”**

enclosure in which the parts which can ignite an explosive gas 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 gas 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 luminaries, the volume is determined without lamps fitted.

#### 3.3

##### **flameproof joint or flamepath**

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 gas 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

NOTE This definition does not apply to threaded joints.