

Explosive atmospheres —

Part 26: Equipment with equipment protection level (EPL) Ga

ICS 13.230; 29.260.20

National foreword

This British Standard is the UK implementation of EN 60079-26:2007. It is identical with IEC 60079-26:2006, incorporating corrigendum March 2009. It supersedes BS EN 60079-26:2004, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/31, Equipment for explosive atmospheres.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

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

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Date	Comments
31 July 2011	Implementation of IEC corrigendum March 2009: Modification of Subclause 6.2

English version

**Explosive atmospheres -
Part 26: Equipment with equipment protection level (EPL) Ga
(IEC 60079-26:2006)**

Atmosphères explosives -
Partie 26: Matériel d'un niveau
de protection du matériel (EPL) Ga
(CEI 60079-26:2006)

Explosionsfähige Atmosphäre -
Teil 26: Betriebsmittel
mit Geräteschutzniveau (EPL) Ga
(IEC 60079-26:2006)

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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

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Foreword

The text of document 31/630/FDIS, future edition 2 of IEC 60079-26, prepared by IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-26 on 2006-10-01.

This European Standard supersedes EN 60079-26:2004.

The significant changes with respect to EN 60079-26:2004 are:

- changes concerning the accessible chargeable surfaces of the equipment;
- requirements of a partition wall combined with an air-gap with natural ventilation;
- introduction of equipment protection levels (EPL) and substitution of the references to zones (see explanation in Annex A);
- change of heading from “Mechanical connection” to “Process connection” together with a clarification of requirement for any release from Zone 0 of explosive gas atmospheres.

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) 2007-10-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2009-10-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 94/9/EC. See Annex ZZ.

This European Standard covers Category 1G and combined Category 1/2G electrical equipment.

NOTE Other EC Directives may be applicable

To be in line with the requirements given in Directive 94/9/EC the text given in the body of the standard should be interpreted as given in the following table.

Text given in EN 60079-26	Adaptation to Directive 94/9/EC
Part 26: Equipment with equipment protection level (EPL) Ga	Part 26: Construction, test and marking of Group II Category 1G electrical equipment
EPL Ga equipment	Category 1G equipment
EPL Gb type of protection	Category 2G type of protection

Instead of the marking requirements given in Clause 6 of this standard, the apparatus shall be marked according to the requirements of the Directive 94/9/EC for equipment Group II, Category 1G.

Apparatus intended for installation in the boundary wall between areas requiring different categories shall have both categories marked on the label separated by a “/” (see examples below). Additionally, the apparatus shall be marked according to the type of protection as defined in Clause 6.

Examples of marking in compliance with Directive 94/9/EC

- a) Apparatus which is intended to be completely installed inside the Zone 0 area for example:

 II 1G

- b) Associated apparatus, which is installed outside the hazardous area and providing external electrical circuits protected by intrinsic safety “ia” according to EN 60079-11, which can be connected to Category 1 apparatus, for example:

 II (1)G

NOTE No designation of the temperature class is required, as this apparatus is located outside the hazardous area.

- c) Equipment which is installed in the boundary wall between areas requiring different categories, both categories are marked on the label separated by a slash for example:

 II 1/2G

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60079-26:2006 was approved by CENELEC as a European Standard without any modification.

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EXPLOSIVE ATMOSPHERES –

Part 26: Equipment with equipment protection level (EPL) Ga

1 Scope

This part of IEC 60079 specifies the particular requirements for construction, test and marking for electrical equipment that provides equipment protection level (EPL) Ga. This electrical equipment, within the operational parameters specified by the manufacturer, ensures a very high level of protection that includes rare faults related to the equipment or two faults occurring independently of each other.

NOTE 1 A malfunction may result from a failure of the component parts of the electrical equipment or from anticipated externally applied influences. Two independent malfunctions which may occur more frequently and which, separately, would not create an ignition hazard but which, in combination, could create a potential ignition hazard, should be regarded as occurring together to form a rare fault.

NOTE 2 This electrical equipment is intended for use in zone 0 hazardous areas, in which explosive gas atmospheres caused by mixtures of air and gases, vapours or mists under normal atmospheric conditions are present continuously, for long periods or frequently.

This standard also applies to equipment mounted across a boundary where different protection levels may be required.

EXAMPLE: In the wall of a storage vessel containing zone 0 with an ambient defined as zone 1.

This standard also applies to equipment installed in an area requiring a lower protection level, but electrically connected to equipment with equipment protection level (EPL) Ga (associated apparatus).

This standard supplements the general requirements in IEC 60079-0 and the requirements of the standardized types of protection, in accordance with the IEC 60079 series, to adapt the level of safety provided by those standards in order to provide EPL Ga.

NOTE 3 In designing equipment for operation in explosive gas atmospheres under conditions other than the atmospheric conditions given in IEC 60079-0, this standard may be used as a guide. However, additional testing is recommended related specifically to the intended conditions of use. This is particularly important when the types of protection 'Flameproof enclosures' (IEC 60079-1) and 'Intrinsic safety' (IEC 60079-11) are applied.

NOTE 4 The classification of hazardous areas in zones is defined in IEC 60079-10.

NOTE 5 There may be other non-electrical sources of ignition (for example ultrasonic, optical or ionizing radiation) that are not addressed by this standard; these should also be taken into consideration (see, for example, EN 1127-1).

NOTE 6 This concept provides equipment protection level (EPL) Ga. For further information, see Annex A.

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

IEC 60079-1, *Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosures "d"*

IEC 60079-10, *Electrical apparatus for explosive gas atmospheres – Part 10: Classification of hazardous areas*

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

IEC 60079-18, *Electrical apparatus for explosive gas atmospheres – Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 apply, together with the following abbreviation.

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

3.1 EPL

abbreviation of equipment protection level as defined in Annex A

4 Requirements for design and construction

4.1 General

The equipment shall comply with the requirements of 4.2 for the electrical circuits and with the requirements of 4.3 to 4.6 for mechanical and electrostatic ignition hazards.

4.2 Protection measures against ignition hazards of the electrical circuits

4.2.1 General

The equipment shall comply with the requirements of either

- a) 4.2.2 or 4.2.3 in the event of two faults occurring independently of each other in a single equipment means of protection; or
- b) 4.2.4 or 4.2.5 in the event of a failure of one equipment means of protection, by the provision of a second independent means of protection.

Electrical connections and permanently connected cables of the equipment sited within an area requiring EPL Ga equipment shall comply with the same level of protection required by this standard, for example an Ex “e” cable containing non-Ex ia circuits additionally protected by a flameproof conduit or an Ex “e” cable provided with an earth leakage protection.

NOTE 1 Detailed cable and installation requirements for non-intrinsically safe circuits providing EPL Ga are in consideration in IEC 60079-14.

NOTE 2 Because of ignition hazards which can arise from faults and/or transient circulating currents in the potential equalization system, galvanic isolation in the power and signal connections to the equipment according to 4.2.2, 4.2.3 and 4.2.4 is preferred. Consideration should also be given to minimize the effect of transient fault currents in the potential equalization network by the use of electrical protection equipment such as sensitive earth leakage monitors.

4.2.2 Intrinsic safety as a sole means of protection

Intrinsically safe electrical equipment providing EPL Ga and intrinsically safe electrical circuits of associated apparatus entering an area requiring EPL Ga shall comply with the requirements of IEC 60079-11, intrinsic safety “ia”.

NOTE Intrinsic safety “ib” in accordance with IEC 60079-11 may be considered as one of two independent means of protection according to 4.2.4.

4.2.3 Encapsulation as a sole means of protection

Electrical equipment which is protected by encapsulation providing EPL Ga shall comply with the requirements of IEC 60079-18, encapsulation “ma”.

NOTE Encapsulation “mb” in accordance with IEC 60079-18 may be considered as one of two independent means of protection according to 4.2.4.

4.2.4 Application of two independent types of protection providing EPL Gb

Electrical equipment shall comply with the requirements of two independent types of protection that provide EPL Gb. If one type of protection fails, the other type of protection shall continue to function. The independent types of protection shall not have a common mode of failure, except as specified in this clause.

An example of a common mode failure is if an Ex “d” enclosure with arcing contacts inside it is used inside an Ex “e” enclosure. If the Ex “d” enclosure is compromised, then arcing inside the enclosure will also compromise the Ex “e” enclosure.

NOTE Combined types of protection providing EPL Gb should depend on different physical protection principles. For example the combination of Ex “d” and Ex “q” both depend on the avoidance of flame propagation and may not be useful in combination. In practice, some combinations may not be useful, for example the combination of oil and powder filling.

Where combined types of protection are used, it shall be possible for each type of protection to be tested individually (see 5.1).

Both types of protection shall be assessed using the most arduous fault condition of the other type of protection. When combining intrinsic safety, type of protection “ib”, with other types of protection, the second type of protection shall be assessed, with the most arduous fault condition applied to the intrinsically safe circuit.

When using two types of protection, which rely both on the same parameter (for example, the creepage distance combining Ex “ib” with Ex “e”), the most stringent requirement of both types of protection shall be applied.