### BS EN 60079-26:2015



## **BSI Standards Publication**

# **Explosive atmospheres**

Part 26: Equipment with Equipment Protection Level (EPL) Ga



...making excellence a habit."

#### National foreword

This British Standard is the UK implementation of EN 60079-26:2015. It is identical to IEC 60079-26:2014. It supersedes BS EN 60079-26:2007 which is withdrawn.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.

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

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**English Version** 

### Explosive atmospheres -Part 26: Equipment with Equipment Protection Level (EPL) Ga (IEC 60079-26:2014)

Atmosphères explosives -Partie 26: Matériel d'un niveau de protection du matériel (EPL) Ga (IEC 60079-26:2014) Explosionsgefährdete Bereiche -Teil 26: Betriebsmittel mit Geräteschutzniveau (EPL) Ga (IEC 60079-26:2014)

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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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#### Foreword

The text of document 31/1146/FDIS, future edition 3 of IEC 60079-26, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-26:2015.

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)	2015-09-02
•	latest date by which the national standards conflicting with the	(dow)	2017-12-02

document have to be withdrawn

This document supersedes EN 60079-26:2007.

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 60079-26:2014 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 60079-7	NOTE	Harmonized as EN 60079-7.
IEC 60079-14	NOTE	Harmonized as EN 60079-14.
IEC 60079-18	NOTE	Harmonized as EN 60079-18.

## 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	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	-	-
IEC 60079-1	-	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"	EN 60079-1	-
IEC 60079-11	-	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-

### 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 (partly), 1.0.2 (partly), ER 1.0.3 to ER 1.0.6
- ER 1.1.1, ER 1.1.2
- ER 1.2.1, ER 1.2.3, ER 1.2.5 (partly), ER 1.2.8, ER 1.2.9
- ER 1.3.1 (partly), ER 1.3.3, ER 1.3.4
- ER 1.4.1, ER 1.4.2
- ER 2.1.1
- ER 2.1.1.1, ER 2.1.1.2 (partly)

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 60079-26:2007

This European Standard supersedes EN 60079-26:2007.

The significant changes with respect to EN 60079-26:2007 are as listed below.

			Туре	
Changes	Clause	Minor and editorial changes	Extension	Major technical changes
Notes deleted	1	х		
Reference to associated apparatus deleted	1	Х		
Additional normative references included	3	Х		
Requirements against mechanical and electrostatic ignition hazards deleted (now covered in EN 60079-0)	4.1	Х		
Requirement for separation element detailed regarding external influences	4.1.3.2	X		
Intrinsic safety Ex ia as single type of protection including associated apparatus deleted (now covered by EPL)	4.2.2 (ed.2)	X		
Encapsulation Ex ma as single type of protection deleted (now covered by EPL)	4.2.3 (ed.2)	X		
Conditions a) and b) linked with an "and", therefore requirement of "flameproof joint" deleted in following clause. Both requirements already covered by separation elements and standardised process connections.	4.3	Х		
Process connection requires a sufficiently tight joint: IP66 added alternatively to IP67	4.3		х	
Requirement for isolated conductive components deleted (now covered in EN 60079-0)	4.4 (ed.2)	X		
Requirements for non-conductive enclosures deleted (now covered in EN 60079-0)	4.5 (ed.2)	X		
Test of partition walls according to 4.1.3.2 b) is specified in more detail	5.2			C1
Marking example for associated apparatus deleted	6.2 b)	х		
Note 3 with an additional example added	6.2	х		
Specification of material of partition wall required in instructions (also required in 4.1.3.2)	7	Х		
Alternative risk assessment method deleted (is now generally introduced)	Annex A (ed.2)	X		

NOTE The technical changes referred to include the significance of technical changes in the revised EN standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance may be found by referring to the Redline Version of the standard.

#### Explanations:

#### A) Definitions

#### 1) Minor and editorial changes:

- clarification
- decrease of technical requirements
- minor technical change
- editorial corrections

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

#### 2) Extension: Addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

#### 3) Major technical change:

- addition of technical requirements
- increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in Clause B) below.

NOTE: These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

#### B) Information about the background of 'Major Technical Changes'

C1 – Introduction of type tests for separation elements according to "4.1.3.2 b)"

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#### **EXPLOSIVE ATMOSPHERES –**

# Part 26: Equipment with Equipment Protection Level (EPL) Ga

#### 1 Scope

This part of IEC 60079 specifies alternative requirements for construction, test and marking for electrical equipment that provides Equipment Protection Level (EPL) Ga when single standardised Types of Protection (e.g. Ex "ia", Ex "ma", Ex "da") cannot be applied. This standard also applies to equipment mounted across a boundary where different Equipment Protection Levels may be required.

EXAMPLE: Equipment installed in the wall of a storage vessel containing Zone 0 (requiring EPL Ga) inside an area defined as Zone 1 (requiring EPL Gb).

This electrical equipment, within the operational parameters specified by the manufacturer, ensures a very high Level of Protection that includes rare malfunctions related to the equipment or two malfunctions occurring independently of each other.

NOTE 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, are regarded as occurring together to form a rare malfunction.

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 takes precedence.

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

IEC 60079-1, *Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d"* 

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

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

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

#### 3 Terms and definitions

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

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

#### 3.1

#### separation element

mechanical element inside the equipment, which separates different parts of the equipment with different EPLs

Note 1 to entry: A separation element consists of a mechanical partition wall, which may be combined with a flameproof joint or a natural ventilation

#### 4 Requirements for design and construction

#### 4.1 Protection measures against ignition hazards of the electrical circuits

#### 4.1.1 General

The equipment shall comply with the requirements of 4.1.2 or 4.1.3 in the event of a failure of one equipment means of protection, by the provision of a second independent means of protection.

NOTE 1 Types of Protection according to EPL Ga do not require a second independant means of protection, e.g. Ex "ia" (IEC 60079-11), Ex "ma" (IEC 60079-18), Ex "da" (IEC 60079-1).

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 a cable suitable for EPL Gb containing non-Ex "ia" circuits additionally protected by a flameproof conduit or a cable suitable for EPL Gb provided with earth leakage protection.

NOTE 2 Detailed cable and installation requirements for Types of Protection accepted as achieving EPL Ga beyond intrinsically safe circuits are under consideration in IEC 60079-14.

NOTE 3 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 4.1.2 and 4.1.3 is commonly applied along with minimizing the effect of transient fault currents in the potential equalization network by the use of electrical protection equipment such as sensitive earth leakage monitors.

#### 4.1.2 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. Combined types of protection providing EPL Gb shall depend on different physical protection principles.

NOTE 1 An example of a common mode of failure is if an Ex "d" enclosure containing arcing components is installed inside an Ex "e" enclosure. Should the Ex "d" enclosure be compromised, it would also compromise the Ex "e" enclosure.

NOTE 2 The combination of Ex "d" and Ex "q" both depend on the avoidance of flame propagation (same physical protection principle) and may not be useful in combination. In practice, some combinations may not be useful, for example the combination of oil immersion "o" and powder filling "q".

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. Thermal dissipation shall be considered in case of a fault of one Type of protection.

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When using two Types of Protection, which both rely 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.

If two Types of Protection are combined which both rely on the enclosure, one of the following shall be met:

- a) if two enclosures are used (one totally enclosed within the other), each enclosure shall comply with the requirements of the respective Type of Protection; or
- b) if only one enclosure is used, the enclosure and the cable glands shall meet the impact test requirements of IEC 60079-0, using the Group I values.

Examples of relevant combinations of two independent Types of Protection are as follows:

- inductive transmitters (for example proximity switches, electrical position sensors) with intrinsic safety "ib" enclosed by encapsulation "mb". The connections to intrinsically safe "ib" circuits can be protected by the increased safety "e";
- a luminaire designed as increased safety "e"may be included in a flameproof enclosure "d":
- measuring transducers with intrinsic safety "ib" and a flameproof enclosure "d";
- equipment with electrical circuits of intrinsic safety "ib", additionally protected by powder filling "q";
- electromagnetic valves with encapsulation "mb", enclosed by a flameproof enclosure "d";
- increased safety "e", with pressurized equipment "pxb".

#### 4.1.3 Application of a Type of Protection providing EPL Gb and a separation element

#### 4.1.3.1 General

Equipment which is mounted through or forms part of the boundary wall to an area requiring EPL Ga and contains electrical circuits which do not comply with EPL Ga shall comply with at least one of the Types of Protection providing EPL Gb. Additionally, it shall contain a mechanical separation element as part of the equipment to separate the electrical circuits of the equipment from the area requiring EPL Ga.

If the Type of Protection fails, the separation element shall:

- a) prevent flame propagation through the equipment into the area requiring EPL Ga,
- b) maintain its safety characteristics,
- c) not exceed the maximum surface temperature of the specified temperature class of the equipment (see 5.3).

#### 4.1.3.2 Partition walls

Partition walls shall be constructed of either:

- a) corrosion-resistant metals, glass or ceramics,
- b) other materials which can be verified to provide the same level of safety. In this case, the certificate number shall include the "X" suffix in accordance with the marking requirements of IEC 60079-0.

If the wall thickness is less than 1 mm, the certificate number shall include the "X" suffix in accordance with the marking requirements of IEC 60079-0 and the Specific Conditions of Use

listed on the certificate shall indicate that the material shall not be subject to environmental conditions which might adversely affect the partition wall.

If the partition wall is under constant vibrational stress (for example vibrating membranes), the minimum endurance limit at maximum amplitude shall be defined in the documentation (see Clause 7). Due to specified process pressure, loads or temperature, the separation element shall not impair the Type of Protection.

A wall thickness less than 1 mm is only permitted in combination with intrinsic safety "ib", or a flameproof joint or natural ventilation (see 4.1.3.3). For glass or ceramics, a minimum thickness of 1/10 of the diameter/maximum dimension but not less than 1 mm is required.

In addition to the requirements of 4.1.3.1 to 4.1.3.3, metallic partition walls with a thickness  $\geq$  1 mm may be provided with suitable conductor bushings (see Figure 1).

To avoid a critical concentration of explosive gas atmosphere diffusing from the area requiring EPL Ga into the enclosure containing the electrical circuits, the leakage rate through the bushing shall be low compared to the leakage rate from the enclosure into the free atmosphere. For example this could be done using a standard enclosure with an IP67 rating according to IEC 60529, a bushing with a leakage rate equivalent to a helium-leakage rate less than  $10^{-2}$  Pa×I/s ( $10^{-4}$  mbar × I/s) at a pressure difference of  $10^{5}$  Pa (1 bar). This can be achieved, for example, by using a glass or ceramic bushing as shown in Figure 1.



Figure 1 – Example of a partition wall with a conductor bushing considered as gas diffusion tight

#### 4.1.3.3 Requirements depending on the thickness of the partition wall

The combinations of separation elements and additional protective measures depend on the wall thickness, *t*, of the partition wall as described below and shown in Table 1:

- i) For homogeneous partition walls with a thickness ≥3 mm, no additional protection measures are required.
- ii) For homogeneous partition walls with a thickness of 3 mm > t ≥ 1 mm, one EPL Gb type of protection is required (see example a) of Table 1). A homogeneous part of the enclosure of an equipment with a EPL Gb type of protection may form the partition wall, even for types of protection which rely on the enclosure, provided the equipment does not contain an ignition capable source, for example exposed contacts (see example a) of Table 1). If

the equipment contains a source of ignition in normal operation, either a flameproof joint (example b) of Table 1) or a ventilated air gap (example c) of Table 1) is also required.

iii) Behind partition walls of 1 mm >  $t \ge 0.2$  mm, one of the following protective measures is required:

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- Type of Protection intrinsic safety "ib" according to IEC 60079-11 (example a) of Table 1); or
- one EPL Gb Type of Protection in combination with a flameproof joint (example b) of Table 1); or
- one EPL Gb Type of Protection in combination with a ventilated air-gap and a flameproof joint (example c) of Table 1).
- iv) For a partition wall with t < 0.2 mm (for example membranes), a flameproof joint and one EPL Gb Type of Protection are required (example b) of Table 1). If the equipment contains a source of ignition in normal operation (for example by exposed contacts), a ventilated air gap is also required (type c) of Table 1).

NOTE In the context of this clause, 'homogeneous' means a membrane constructed of a single piece of material without any insertions such as feed-throughs, bushings.



#### Table 1 – Separation elements

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#### 4.1.3.4 Partition wall combined with a flameproof joint

Joints supplementing partition walls shall comply with either:

- a) the requirements in IEC 60079-1; to determine the joint characteristics, the free volume of the enclosure containing the electrical circuits shall be considered; or
- b) a construction, where the same level of safety as for a) can be demonstrated.

NOTE For example, a cylindrical PTFE-bushing pressed form-fit into a metallic enclosure at a length  $\geq$  40 mm. A permanently compressed joint with a length of at least 17 mm is also suitable (for example using a conical PTFE-bushing compressed by a spring).

Non-metallic components in separation elements shall meet the requirements of IEC 60695-11-10, flammability category V-0 and have a chemical resistivity equivalent, for example to that of glass, ceramics, non-regenerated PTFE or epoxy resin for petrochemical applications.

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#### 4.1.3.5 Partition wall combined with an airgap with natural ventilation

The ventilation shall ensure that under the most arduous process conditions specified by the manufacturer and the anticipated leakages, an accumulation of flammable materials in the equipment is prevented. Under atmospheric process conditions, the ventilation is sufficient for all gases, vapours and mists, if the length of the air-gap is  $\geq 10$  mm and the effective perforation in the circumference is at least 50 %. In addition to the requirements of 4.1.3.1 to 4.1.3.3, metallic partition walls with a thickness  $\geq 1$  mm and a suitable air-gap may be provided, for example with a cylindrical flameproof shaft joint according to IEC 60079-1 (see Figure 2). In this case, the ventilation air gap shall have a minimum length of 10 mm or a length equal to the diameter of the shaft, whichever is greater.



<sup>a</sup> Required for sufficient ventilation.

NOTE The cylindrical shaft joint inside the partition wall as shown in Figure 2 is not a supplementing joint as referred to in 4.1.3.4.

### Figure 2 – Example of a separation element with a cylindrical shaft joint and natural ventilation

#### 4.2 Equipment with moving parts

#### 4.2.1 Frictional heating

If the equipment contains moving parts, temperature rise due to frictional heating may occur under normal operation or fault condition. It shall be taken into consideration when determining the maximum surface temperature.

#### 4.2.2 Damage arising from failure of moving parts

In case of a failure of moving parts, the Types of Protection shall not be adversely affected.

#### 4.2.3 Light metals

Operational friction or impact between equipment parts made of light metals or their alloys (with concentrations above the limits given in IEC 60079-0) with equipment parts made of iron/steel is not permitted. Operational friction or impact between two light metals is permitted.

NOTE Light metals include for example aluminium, magnesium, titanium or zirconium.

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#### 4.3 **Process connection**

If the equipment is mounted across the boundary wall between an area requiring EPL Ga and a less hazardous area, the construction shall ensure that under normal operation conditions:

- a) explosive gas atmospheres cannot be released from an area requiring EPL Ga creating an explosive atmosphere in the surrounding area; and
- b) that in case of an ignition of an explosive gas atmosphere in the surrounding area there is no flame propagation into the area requiring EPL Ga.

The equipment shall be designed to allow installation in a manner that will result in a sufficiently tight joint (IP 66 or IP 67) or a flameproof joint according to IEC 60079-1 (joints specified for a volume  $\leq$  100 cm<sup>3</sup>) between the less hazardous area and area requiring EPL Ga.

NOTE 1 For example, equipment with an integrated separation element according to 4.1.3 or with an IP67 rating according to IEC 60529 between the area requiring EPL Ga and the less hazardous area is suitable.

Process connections shall comply with an international or equivalent national standard.

NOTE 2 Examples of process connections which are considered as suitable include:

- a) gas-tight standardized industry flange;
- b) gas-tight standardized tube fitting;
- c) gas-tight standardized thread connection.

If, for functional purposes, an opening is required in the boundary wall of the area requiring EPL Ga (for example chemical sampling at the open nozzle, rope guide for probes), instructions for the user are required to indicate the risk of flammable gas release and flame entrance (see Clause 7).

#### 5 Type tests

#### 5.1 Standardized types of protection

Equipment in which EPL Gb Types of Protection are applied shall be submitted to type verifications and tests as specified in the respective standards. If the combination of two EPL Gb Types of Protection according to 4.1.2 are applied, both Types of Protection shall be tested independently.

#### 5.2 Separation elements

Separation elements in accordance with 4.1.3 shall be tested in such a way that the operational parameters (for example pressure or temperature limits) stated by the manufacturer are verified.

Partition walls according to "4.1.3.2b)"

- which are exposed to operational pressure shall be subject to the thermal endurance test of IEC 60079-0 followed by the pressure test. The pressure test shall be performed at maximum operational pressure for 1 min without leakage;
- which are exposed to constant vibrational stress the specified vibrational endurance limit (cycles) shall be verified at the maximum amplitude and at the specified temperature limits.

#### 5.3 Temperature evaluation

For the temperature evaluation, two independent faults shall be taken into account.

This applies also to separation elements of any thickness combined with or partly formed by equipment with one EPL Gb type of protection.

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#### 6 Marking

#### 6.1 General

The equipment shall be marked with the EPL and according to the Type of Protection as defined in the applicable standard.

Equipment intended for installation in the boundary wall between an area requiring EPL Ga and a less hazardous area shall have both EPLs marked on the label separated by a slash "/". If the equipment group or temperature class differ for the two Types of Protection, the complete designation of each rating shall be used and separated by a space.

Where more than one Type of Protection is used in accordance with 4.1.2, the symbols for the Types of Protection shall be joined with a "+".

#### 6.2 Examples of marking

a) Equipment protected by two Types of Protection which is intended to be completely installed inside the area requiring EPL Ga for example:

Ex d+e IIB T4 Ga

b) Equipment which is installed in the boundary wall between an area requiring EPL Ga and the less hazardous area, both EPLs are marked on the label separated by a slash "/", for example:

Ex d IIC T6 Ga/Gb

or

Ex ia/d IIC T6 Ga/Gb

NOTE 1 Intrinsic safety "ia" equipment providing EPL Ga with a flameproof "d" compartment providing EPL Gb.

or

Ex d+e / d IIB T4 Ga/Gb

NOTE 2 Two independent Types of Protection flameproof "d" and increased safety "e" providing EPL Ga with a flameproof "d" compartment providing EPL Gb.

or

Ex ia IIC T4 / Ex d IIB T6 Ga/Gb

NOTE 3 An intrinsically safe sensor providing EPL Ga suitable for Group IIC and having a temperature class T4 and a flameproof compartment providing EPL Gb suitable for Group IIB, having a temperature class T6.

#### 7 Instructions

#### 7.1 Separation elements:

For equipment according to 4.1.3 the instructions according to IEC 60079-0 shall additionally specify the following details, to enable the user to confirm its suitability for the particular application:

- the material of the partition wall;
- if the wall thickness is less than 1 mm, the instructions shall indicate that the material shall not be subject to environmental conditions which might adversely affect the partition wall;
- if the partition wall is under constant vibrational stress (for example vibrating membranes), the minimum endurance limit at maximum amplitude;

- for partition walls according to 4.1.3.2 b): the material and its mechanical and thermal properties;
- for separation elements according to 0: the material of non metallic components in the separation element and its mechanical and thermal stress limits;
- for separation elements according to 4.1.3.5 to avoid obstruction of the natural ventilation e.g. by presence of dust.

#### 7.2 **Process connection:**

If an opening is required in the boundary wall of the area requiring EPL Ga the risk of flammable gas release and flame entrance shall be specified.

#### 7.3 EPL allocation

If the marking indicates several EPLs for the equipment (e.g. Ga/Gb), it shall be specified which parts of the equipment comply with the different EPLs.

### Bibliography

– 16 –

IEC 60050-426, International Electrotechnical Vocabulary – Part 426: Equipment for explosive atmospheres

IEC 60079-7, Explosive atmospheres – Part 7: Equipment protection by increased safety "e"

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection* 

IEC 60079-18, *Explosive atmospheres – Part 18: Equipment protection by encapsulation "m"* 

Part 18: Equipm

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389 Chiswick High Road London W4 4AL UK

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#### **Useful Contacts:**

Customer Services Tel: +44 845 086 9001 Email (orders): orders@bsigroup.com Email (enquiries): cservices@bsigroup.com

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