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BSI Standards Publication

Explosive atmospheres

Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"
(ISO 80079-37:2016)

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National foreword

This British Standard is the UK implementation of EN ISO 80079-37:2016. It supersedes BS EN 13463-5:2011, BS EN 13463-6:2005 and BS EN 13463-8:2003, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EXL/23, Explosion and fire precautions in industrial and chemical plant.

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

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Amendments/corrigenda issued since publication

Date	Text affected
30 June 2016	Annex A page format errors corrected

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 80079-37

April 2016

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Supersedes EN 13463-5:2011, EN 13463-6:2005, EN 13463-8:2003

English Version

Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety ''c'', control of ignition sources ''b'', liquid immersion ''k'' (ISO 80079-37:2016)

Atmosphères explosives - Partie 37: Appareils non électriques destinés à être utilisés en atmosphères explosives - Mode de protection non électrique par sécurité de construction "c", par contrôle de la source d'inflammation "b", par immersion dans un liquide "k" (ISO 80079-37:2016)

Explosionsgefährdete Bereiche - Teil 37: Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen - Schutz durch konstruktive Sicherheit 'c', Zündquellenüberwachung 'b', Flüssigkeitskapselung 'k' (ISO 80079-37:2016)

This European Standard was approved by CEN on 8 February 2016.

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European Foreword

This document (EN ISO 80079-37:2016) has been prepared by Technical Committee ISO/TMBG "Technical Management Board - groups" in collaboration with Technical Committee CEN/TC 305 “Potentially explosive atmospheres - Explosion prevention and protection” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

The significant changes with respect to EN 13463-5:2011, EN 13463-6:2005 and EN 13463-8:2003 are included in Annex ZB “*Significant changes between this European Standard and* EN 13463-5:2011, EN 13463-6:2005 *and* EN 13463-8:2003".

This document supersedes EN 13463-5:2011, EN 13463-6:2005, EN 13463-8:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of 2014/34/EU.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Extensions to the marking scheme described in the Directive are found in the ATEX Guidelines published by the European Commission. These are particularly useful for equipment that conforms to more than one category.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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The text of ISO 80079-37:2016 has been approved by CEN as EN ISO 80079-37:2016 without any modification.

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Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2014/34/EU

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2014/34/EU.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 94/9/EC

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of 2014/34 EU	Qualifying remarks/Notes
4	1.1.1 1.1.3	
5.1	1.3.4 1.4.1	See also 80079-36 Clause has some limited relevance to ESR 1.2.4
5.2	1.1.1	
5.3.1	1.3.1	See also 80079-36
5.3.2	1.2.3	See also 80079-36
5.4	1.3.1	See also 80079-36
5.6.1	1.0.6a 1.1.3	Not much additional information
5.6.2	1.3.4	See also 80079-36
5.6.3	1.3.1	See also 80079-36
5.7.1	1.0.6a 1.0.6c 1.2.1	
5.7.2	1.3.1	See also 80079-36
5.7.3	1.1.3	
5.8.1	1.1.3 1.3.1 1.3.4	See also 80079-36 Limited information in respect of 1.1.3
5.8.2.1	1.3.1	See also 80079-36
5.8.2.2	1.3.1	See also 80079-36

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Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of 2014/34 EU	Qualifying remarks/Notes
	1.3.2	
5.8.2.3	1.3.4	See also 80079-36
5.8.2.4	1.3.4	See also 80079-36
5.8.5.1	1.3.4	See also 80079-36
5.9.3	1.3.4	See also 80079-36
6.1	1.3.1	See also 80079-36
6.2	1.0.6a 1.1.3 1.2.1 1.3.4 1.4.1	See also 80079-36 Clause has some limited relevance to ESR 1.2.4
6.3	1.0.6a 1.2.1	
6.4	1.0.6a 1.2.1	
6.5	1.0.6a 1.2.1	
7.1	1.0.6a 1.2.1 1.3.2 1.3.4 1.4.1	See also 80079-36 Clause has some limited relevance to ESR 1.2.4
7.2	1.0.6a 1.2.1	
7.3	1.0.6a 1.1.3 1.2.1	
7.3.3	1.3.1	
7.3.4	1.2.3 1.3.2	See also 80079-36

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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Annex ZB
(informative)

Significant changes between this European Standard and EN 13463-5:2011, EN 13463-6:2005 and EN 13463-8:2003

This European Standard supersedes EN 13463-5:2011, EN 13463-6:2005 and EN 13463-8:2003.

Table ZB.1 — Significant changes between this European Standard and EN 13463-5:2011, EN 13463-6:2005 and EN 13463-8:2003

Clauses of this European Standard		Type		
		Minor and formal changes	Extension	Substantial change regarding ESRs
Introduction of new definitions and slight redefinitions concerning ignition sources to improve ignition hazard assessment (EN 13463-5, EN 13463-6, EN 13463-8 Clause 3)	Clause 3	X	X	
Differentiation in requirements for ingress prevention for dust and liquids (EN 13463-5, Clause 4.3.4)	5.2.2	X		
Changing note to normative text (EN 13463-5, Clause 4.4.3)	5.3.3	X	X	
Note 2 deleted and moved to 5.6 (EN 13463-5, Clause 4.6)	5.5	X		
Additional requirement listed (2nd clause) (from EN 13463-5, Clause 4.6)	5.6	X	X	
Additional measure listed (EN 13463-5, Clause 5.3)	5.6.3	X	X	
Changing of wording regarding information for instructions (EN 13463-5, Clause 6.1)	5.7.1	X		
Changing of wording regarding information for instructions (EN 13463-5, Clause 6.2)	5.7.2	X		
Additional requirement New reference regarding electrostatic requirements (EN 13463-5, note in 7.2.2) New note	5.8.2.2	X		
Changing of wording (EN 13463-5, Clause 7.6.5)	5.8.2.5	X		
Changing to clarify dependency of requirements (EN 13463-5, Clause 7.3.2)	5.10	X		
Differentiation to clarify dependency of	5.11.1	X	X	

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Clauses of this European Standard		Type		
		Minor and formal changes	Extension	Substantial change regarding ESRs
requirements (EN 13463-5, Clause 8.1)				
Additional requirement (EN 13463-5, Clause 10.3)	5.13.3	X		
Editorial modification for clarification (EN 13463-6, Clause 6.1)	Clause 6	X	X	
Editorial modification for clarification (EN 13463-8, Clause 5.1)	7.1	X		
Editorial modification for clarification (EN 13463-8, Clause 7.2)	7.3.2	X		
Additional example (EN 13463-8, Clause 7.4)	7.3.4	X		
Editorial modification for clarification (EN 13463-8, Clause 7.8)	7.3.6	X		
Introduction of new definitions for marking	Clause 10	X	X	

NOTE 1 The technical changes referred include the significant technical changes from the EN revised but is not an exhaustive list of all modifications from the previous version.

Explanations:

A) Definitions

Minor and editorial changes clarification

decrease of technical requirements

minor technical change

editorial corrections

Changes in a standard classified as 'Minor and editorial changes' refer to changes regarding the previous standard, which modify requirements in an editorial or a minor technical way. Also changes of the wording to clarify technical requirements without any technical change are classified as 'Minor and editorial changes'.

A reduction in level of existing requirement is also classified as 'Minor and editorial changes'

Extension addition of technical options

Changes in a standard classified as 'extension' refers to changes regarding the previous standard, 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 'extensions' will not have to be considered for products in conformity with the preceding edition.

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Major technical changes	addition of technical requirements increase of technical requirements

Changes in a standard classified as 'Major technical change' refer to changes regarding the previous standard, which add new or increase the level of existing technical requirements, in a way that a product in conformity with the preceding standard will not always be able to fulfil the requirements given in the standard. 'Major technical changes' have to be considered for products in conformity with the preceding edition. For every change classified as 'Major Technical Change' additional information is provided in clause B) of the Annex ZB.

NOTE 2 These changes represent current technological knowledge[1]. 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'

None

[1] see also ATEX Guide 10.3 and Annex ZA.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHÈRES –

Part 37: Non-electrical equipment for explosive atmospheres – Non electrical type of protection constructional safety “c”, control of ignition source “b”, liquid immersion “k”

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 ISO 80079-37 has been prepared by IEC sub-committee 31M: Non-electrical equipment and protective systems for explosive atmospheres, of IEC 31: Equipment for explosive atmospheres.

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

FDIS	Report on voting
31M/104/FDIS	31M/110/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. In ISO, the standard has been approved by 15 P members out of 20 having cast a vote.

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

"A list of all parts in the IEC 60079 series, under the general title *Explosive atmospheres*, as well as the International Standard 80079 series, can be found on the IEC website."

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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EXPLOSIVE ATMOSPHERES –

Part 37: Non-electrical equipment for explosive atmospheres – Non electrical type of protection constructional safety “c”, control of ignition source “b”, liquid immersion “k”

1 Scope

This part of ISO/IEC 80079 specifies the requirements for the design and construction of non-electrical equipment, intended for use in explosive atmospheres, protected by the types of protection constructional safety “c”, control of ignition source “b” and liquid immersion “k”.

This part of ISO/IEC 80079 supplements and modifies the requirements in ISO 80079-36. Where a requirement of this standard conflicts with the requirement of ISO 80079-36 the requirement of this standard takes precedence.

Types of Protection “c”, “k” and “b” are not applicable for Group I, EPL Ma without additional protective precautions.

The types of ignition protection described in the standard can be used either on their own or in combination with each other to meet the requirements for equipment of Group I, Group II, and Group III depending on the ignition hazard assessment in ISO 80079-36.

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 TS 60079-32-1, *Explosive atmospheres – Part 32-1: Electrostatic hazards, Guidance*

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

ISO 281, *Rolling bearings – Dynamic load ratings and rating life*

ISO 1813, *Belt drives – V-ribbed belts, joined V-belts and V-belts including wide section belts and hexagonal belts – Electrical conductivity of antistatic belts: Characteristics and methods of test*

ISO 9563, *Belt drives – Electrical conductivity of antistatic endless synchronous belts – Characteristics and test method*

ISO 4413, *Hydraulic fluid power – General rules and safety requirements for systems and their components*

ISO 4414, *Pneumatic fluid power – General rules and safety requirements for systems and their components*

ISO 19353, *Safety of machinery – Fire prevention and protection*

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ISO 80079-36: 2016, *Explosive atmospheres – Non-electrical equipment for explosive atmospheres – Part 1: Basic method and requirements*[1]

EN 13237, *Potentially explosive atmospheres – Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres*

EN 13501-1, *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 80079-36, IEC 60079-0 and the following apply.

3.1
constructional safety "c"
ignition protection where constructional measures are applied so as to protect against the possibility of ignition from hot surfaces, sparks and adiabatic compression generated by moving parts

3.2
mechanically generated sparks
sparks produced by mechanical impact or friction burning particles, as well as showers of particles, produced by impact or friction between two solid materials

3.3
control of ignition source "b"
ignition protection where mechanical or electrical devices are used in conjunction with non-electrical equipment to manually or automatically reduce the likelihood of a potential ignition source from becoming an effective ignition source

Note 1 to entry: This might for example be a level sensor used to indicate loss of oil, a temperature sensor to indicate a hot bearing or a speed sensor to indicate over-speed.

3.3.1
automatic control measure
action taken without manual intervention, to reduce the likelihood of a potential ignition source from becoming an effective ignition source

3.3.2
manual control measure
action taken by a person as a result of a warning, indication, or alarm, to reduce the likelihood of a potential ignition source from becoming an effective ignition source

3.3.3
ignition prevention devices/systems
arrangement that converts signals from one or more sensors into an action, or indication, to reduce the likelihood of a potential ignition source from becoming an effective ignition source

[1] To be published.

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3.3.4
safety devices
devices intended for use inside or outside explosive atmospheres but required for or contributing to the safe functioning of equipment and protective systems with respect to the risks of explosion

3.4
liquid immersion "k"
type of protection where potential ignition sources are made ineffective or separated from the explosive atmosphere by either totally immersing them in a protective liquid, or by partially immersing and continuously coating their active surfaces with a protective liquid in such a way that an explosive atmosphere which may be above the liquid, or outside the equipment enclosure, cannot be ignited

3.4.1
protective liquid
a liquid which prevents the explosive atmosphere from making direct contact with potential ignition sources and thereby ensures the explosive atmosphere cannot be ignited

3.4.2
equipment with a sealed enclosure
totally enclosed equipment that limits the ingress of an external atmosphere during the expansion and contraction of the internally contained protective liquid during use in service

Note 1 to entry: Such equipment includes any pipework associated with it and often contains an overpressure relief device.

3.4.3
equipment with a vented enclosure
enclosed equipment that allows the ingress and egress of an external atmosphere through a breathing device or constricted opening during the expansion and contraction of the internally contained protective fluid during normal operation

Note 1 to entry: Such equipment includes any pipework associated with it.

3.4.4
open equipment
equipment that is immersed, or has its components immersed, in a protective liquid that is open to the external atmosphere

Note 1 to entry: For example, an open top vessel with immersed moving components. Such equipment includes any pipework associated with it.

4 Determination of suitability

Before a decision is made to protect equipment or parts of equipment for use as an assembly, including interconnecting parts, by the measures described in this standard, it shall have been subjected to the ignition hazard assessment in accordance with ISO 80079-36.

5 Requirements for equipment with Type of Protection constructional safety "c"

5.1 General requirements

Equipment designed and constructed according to the applicable safety requirements of the relevant industrial standards is intended to be capable of functioning in conformity with the operational parameters established by the manufacturer, including any mechanical and thermal stresses that they are intended to be subjected to.

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This also applies to interconnecting parts of equipment including joints (e.g. cemented, soldered, or welded joints).

NOTE This is accomplished by using one or more of the following documents:

- International standards or Technical Specifications
- FDIS of International standards or Technical Specifications
- National Standards or Technical Specifications
- Technical specifications or Test Reports issued by an Ex accredited Test Laboratory
- Technical specifications of industrial associations.

5.2 Ingress protection

5.2.1 General

The degree of ingress protection (IP) as specified in IEC 60529 provided by the outer enclosures of equipment depends upon its intended duty and the type of environment it is designed to be used in. An appropriate rating shall be determined as part of the ignition hazard assessment (see Clause 4) and, if relevant for ignition protection, shall be able to provide that degree of protection.

NOTE IP degrees of protection according to IEC 60529 are not intended to provide protection against the ingress of an explosive gas atmosphere.

5.2.2 Ingress protection in special cases

The following points specify the minimum IP rating for enclosures used in the circumstances described.

a) In the case of equipment intended for use in explosive gas atmospheres, where entry of foreign objects can cause ignition, but entry of dust is harmless, the required degree of protection against the entry of foreign objects shall be determined in the ignition hazard assessment and shall be at least IP20.

b) In the case of equipment intended for use in explosive gas atmospheres, where the entry of dusts or liquids could cause a malfunction leading to an ignition source, the degree of protection shall be at least IP5X for dust and IPX4 for liquids.

c) In the case of equipment intended for use in explosive dust atmospheres, where ingress of dust can result in an ignition source or fire, the degree of protection shall be IP6X.

d) In the case of equipment intended for use in explosive dust atmospheres, where ingress of dust, foreign objects and liquids are not likely to cause an ignition, no specific degree of protection is necessary for the purpose of ignition protection.

NOTE An enclosure is often employed for other safety reasons, e.g. IP2X to prevent parts of the body coming into contact with rotating parts.

5.3 Seals for moving parts

5.3.1 Unlubricated gaskets, seals, sleeves, bellows and diaphragms

Un-lubricated gaskets, seals, sleeves, bellows and diaphragms shall not become an effective ignition source, e.g. if there is a risk of mechanically generated sparks and hot surfaces which can become an effective ignition source. Light metals shall not be used for these parts in this case (see ISO 80079-36).

Non-metallic materials shall be resistant to distortion and degradation which would reduce the effectiveness of explosion protection within the specified lifetime of operation.

Documents
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Full document details: BS EN ISO 80079-37:2016