BS EN ISO 80079-36:2016

BSI Standards Publication

Explosive atmospheres

Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements

bsi.

National foreword

This British Standard is the UK implementation of EN ISO 80079-36:2016. It supersedes BS EN 13463-1:2009 which is withdrawn.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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EUROPEAN STANDARD

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English Version

Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36:2016)

Atmosphères explosives - Partie 36: Appareils non électriques destinés à être utilisés en atmosphères explosives - Méthodologie et exigences (ISO 80079-36:2016)

Explosionsfähige Atmosphären - Teil 36: Nicht-elektrische Geräte für den Einsatz in explosionsfähigen Atmosphären - Grundlagen und Anforderungen (ISO 80079-36:2016)

This European Standard was approved by CEN on 18 February 2016.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European Foreword

This document (EN ISO 80079-36:2016) 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.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 13463-1:2009 are included in Annex ZB “*Significant changes between this European Standard and* EN 13463-1:2009".

This document supersedes EN 13463-1:2009.

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.

Endorsement notice

The text of ISO 80079-36:2016 has been approved by CEN as EN ISO 80079-36:2016 without any modification.

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 2014/34/EU

Clauses/sub-clauses of this EN	Essential Requirements (ERs) of EU Directive 2014/34/EU	Qualifying remarks/Notes
4	1.0.1 1.0.2	
5.1	1.0.1 1.0.2 1.0.3	
5.2	1.0.2 1.3	
6.1	1.3	
6.2.1, 6.2.2, 6.2.3	1.2.8 1.3.1 1.4.1	
6.2.4	2.0.1 2.0.2	
6.2.5, 6.2.6	2.1.1 2.2.1 2.3.1	
6.2.7	2.1.2 2.2.2 2.3.2	
6.3	1.3.1	reference to EN 1127-1

Table ZA.1 *(continued)*

Clauses/sub-clauses of this EN	Essential Requirements (ERs) of EU Directive 2014/34/EU	Qualifying remarks/Notes
6.4	1.3.4	
6.5	1.0.1 1.3.1	reference to EN 60079 series
6.6	1.3.3	
6.7	1.3.2	
6.8 - 6.9	1.3.1	
7.1, 7.2	1.3.4	
7.3	1.2.6	
7.4	1.1.3 1.4.1 1.4.2	
7.5	1.2.2 1.2.6	
7.6	1.1.3 1.4.2	
7.7	1.1.3 1.4.1 1.4.2	
8	1.1.3 1.2.1 1.2.2 1.2.5	
9.1	1.0.1 1.0.3 1.0.4	
9.5	1.0.6	
10	1.0.5	
Annexes A - G	1.0.2 1.3.1	

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

Annex ZB
(informative)

Correspondence of equipment groups

In all cases Equipment Protection Levels (EPL) as defined by EN 60079-0 are related to the corresponding Equipment Groups and Equipment Categories according to the following table. The same applies if a standard makes reference to the intended use of equipment in Zones according to the definitions in EN 60079-10.

Table ZB.1 — Correspondence of equipment groups

EN 60079-0		**Directive 2014/34/EU**		EN 60079-10-1 **and** EN 60079-10-2
EPL	**Group**	**Equipment Group**	**Equipment Category**	**Zones**
Ma	I	I	M1	NA
Mb			M2	
Ga	II	II	1G	0
Gb			2G	1
Gc			3G	2
Da	III		1D	20
Db			2D	21
Dc			3D	22

Instructions

The manufacturer or his authorized representative in the Community is to draw up the instructions for use in the required Community languages.

Marking

The marking according to this standard is to be supplemented by the marking according to Directive **2014/34/EU**. Examples are given below.

European marking examples

Directive part	**Standard part**	**Equipment example**
Ex I M2	**Ex h I Mb**	Non-electrical equipment for Mining Industry,
Ex II 2 G	**Ex h IIB T4 Gb**	Non-electrical equipment intended to be used in Surface Industry classified as Gas Explosive Atmosphere - Zone1
Ex II 1 D	**Ex h IIIC 120°C Da**	Non-electrical equipment intended to be used in Surface Industry classified as Explosive Atmosphere of Combustible Dust - Zone 20

Annex ZC
(informative)

Significant changes between this European Standard and EN 13463-1:2009

This European Standard supersedes EN 13463-1:2009

Table ZC.1 — Significant changes between this European Standard and EN 13463-1:2009

Modifications significatives	Clause	Minor and formal changes	Extensions	Extensions
Introduction of new definitions and slight redefinitions concerning ignition sources to improve ignition hazard assessment	Clause 3	X		
Introduction of Equipment Protection Level instead of Category relating to ATEX Directive	Clause 4.1		X	
Introduction of Dust groups defined as Group IIIA, IIIB, & IIIC	Clause 4.4		X	
Introduction in the instructions for safe use and required maintenance for the equipment shall be specified by the manufacturer	Clause 5.1		X	
Change of wording regarding the formal Ignition hazard identification and assessment	Clause 5.2.1	X		
Introduction of what the assessment shall show	Clause 5.2.2.1		X	
Change of wording regarding EPL Mb equipment requirment	Clause 5.2.2.2	X		
Introduction of a new note regarding the risk of ignition due to other ignition source	Clause 6.1		X	
Change of wording regarding the ambient temperature	Clause 6.2.2	X		
Introduction of a new note regarding the option to calculate maximum temperatures	Clause 6.2.3		X	
Introduction of a new note regarding the layers of coal dust	Clause 6.2.3		X	
Introduction of a new note regarding the instructions	Clause 6.2.5		X	

Table ZC.1 *(continued)*

Modifications significatives	Article	Minor and formal changes	Extensions	Extensions
Introduction of a new column regarding requirement for T5 classification	Clause 6.2.6.1		X	
Introduction of two new notes regarding the enclosed volume	Clause 6.2.6.2		X	
Introduction of requirement regarding External hot surfaces	Clause 6.2.6.3		X	

NOTE 1 The technical changes referred to include the significant technical changes from the revised EN but this 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.

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 Guideline 10.3 and Annex ZA

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements

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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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 80079-36 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/103/FDIS	31M/109/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 22 having cast a vote.

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.

INTRODUCTION

This part of ISO/IEC 80079 addresses for the first time basic requirements and protection concepts for mechanical explosion protected equipment on an international level. Up to now, with some exceptions, only the design, manufacture, installation and operation of electrical equipment in explosive atmospheres have been addressed in ISO and IEC standards. Examples of non-electrical equipment are: couplings, pumps, gearboxes, brakes, hydraulic and pneumatic motors and any combination of devices to realise a machine, fan, engine, compressor, assemblies, etc.

Although many but not all of such machines use an explosion protected electric motor for motive power the measures needed to reduce the risk of ignition in mechanical equipment as part of the machine may be different to those applied to electrical equipment.

Whereas electrical equipment working within design parameters often contains effective ignition sources such as sparking parts, this is not necessarily true for mechanical equipment which is designed to operate without break-down between predetermined maintenance operations.

Generally there are two mechanical ignition scenarios that need to be considered. These are, ignition resulting from a failure in the machine such as a bearing over-heating or ignition created by the normal functioning of the machine such as a hot brake surface.

Experience has shown that it is essential to perform a comprehensive ignition hazard assessment on the complete mechanical equipment to identify all potential ignition sources and determine if they can become effective ignition sources during the expected lifetime of the mechanical equipment. Once these ignition risks are understood and documented it is then possible to assign protective measures, depending on the required Equipment Protection Level (EPL), to minimise the probability that these ignition sources will become effective.

This standard addresses mechanical equipment and assemblies intended for the generation, transfer, storage, measurement, control and conversion of energy and/or the processing of material and which are capable of causing an explosion through their own potential sources of ignition.

Potential ignition sources are not limited to those created by the equipment but include any ignition sources created by the operation of the equipment; for example hot surfaces when pumping hot fluids or electrostatic charging when handling plastics.

If the only source of ignition of an item comes from the external process such items are not considered to have their own source of ignition, and they are not in the scope of this part of ISO/IEC 80079.

NOTE Examples are items made from plastics (polymers) like plastic pipes and containers that can become charged due to an external process (and not by the operation of the equipment), or items that can become hot due to an external process (like a pipe). These are not considered to be “non-electrical equipment" on their own. If on the other hand such items are incorporated into non-electrical equipment, and could become an ignition source by the intended operation of the equipment, they need to be assessed together with the equipment under consideration (for example a plastic pipe as part of a petrol dispenser could become charged due to the operation of this dispenser).

EXPLOSIVE ATMOSPHERES –

Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements

1 Scope

This part of ISO/IEC 80079 specifies the basic method and requirements for design, construction, testing and marking of non-electrical Ex equipment, Ex Components, protective systems, devices and assemblies of these products that have their own potential ignition sources and are intended for use in explosive atmospheres.

Hand tools and manually operated equipment without energy storage are excluded from the scope of this standard. This standard does not address the safety of static autonomous process equipment when it is not part of equipment referred to in this standard.

NOTE 1 Static autonomous process equipment includes items such as tanks, vessels, fixed pipework and hand operated valves which do not have their own source of energy that could create a potential ignition source during operation.

This standard does not specify requirements for safety, other than those directly related to the risk of ignition which may then lead to an explosion. The standard atmospheric conditions (relating to the explosion characteristics of the atmosphere) under which it may be assumed that equipment can be operated are:

- temperature -20 °C to +60 °C;
- pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar); and
- air with normal oxygen content, typically 21 % v/v.

Such atmospheres can also exist inside the equipment. In addition, the external atmosphere can be drawn inside the equipment by natural breathing produced as a result of fluctuations in the equipment's internal operating pressure, and/or temperature.

NOTE 2 Although the standard atmospheric conditions above give a temperature range for the atmosphere of -20 °C to +60 °C, the normal ambient temperature range for the equipment is -20 °C to +40 °C, unless otherwise specified and marked. It is considered that -20 °C to +40 °C is appropriate for most equipment and that to manufacture all equipment to be suitable for a standard atmosphere upper ambient temperature of +60 °C would place unnecessary design constraints.

NOTE 3 The requirements of this standard can also be helpful for the design, construction, testing and marking of equipment intended for use in atmospheres outside the validity range stated above. In this case however, the ignition hazard assessment, ignition protection provided, additional testing (if necessary), manufacturer's technical documentation and instructions to the user, clearly demonstrate and indicate the equipment's suitability for the conditions it may encounter. It is also recognized that changes in temperature and pressure can have a significant influence on characteristics of the explosive atmosphere, such as ignitability.

This part of ISO/IEC 80079 specifies the requirements for the design and construction of equipment, intended for explosive atmospheres in conformity with all Equipment Protection Levels (EPLs) of Group I, II and III.

NOTE 4 It is not unusual for equipment designed and constructed in accordance with this standard for a particular EPL to be used in areas requiring an EPL with a higher level of safety by including the application of additional measures. Such measures include for example inerting, suppression, venting or containment or for example by dilution, drainage, monitoring and shut-down. Such measures are outside the scope of this standard.

This standard supplements and modifies the general requirements of IEC 60079-0, as shown in Table 1. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, as far as applicable for non-electrical equipment, the requirement of this standard takes precedence.