BS EN 13237:2012

BSI Standards Publication

Potentially explosive atmospheres — Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres

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National foreword

This British Standard is the UK implementation of EN 13237:2012. It supersedes BS EN 13237:2003, which is withdrawn.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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English Version

Potentially explosive atmospheres - Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres

Atmosphères explosibles - Termes et définitions pour les appareils et systèmes de protection destinés à être utilisés en atmosphères explosibles

Explosionsgefährdete Bereiche - Begriffe für Geräte und Schutzsysteme zur Verwendung in explosionsgefährdeten Bereichen

This European Standard was approved by CEN on 1 September 2012.

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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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13237:2012) has been prepared by 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of an identical text or by endorsement, at the latest by April 2013, and conflicting national standards shall be withdrawn at the latest by April 2013.

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.

This document supersedes EN 13237:2003.

The significant changes between this European Standard and EN 13237:2003 are given in Annex B.

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 EU Directive 94/9/EC.

For relationship with EU Directive 94/9/EC, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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.

Introduction

This European Standard has been produced to assist designers, manufacturers and other interested parties to use harmonised terms and definitions (vocabulary) for equipment and protective systems intended for use in potentially explosive atmospheres. It describes the vocabulary to be used to give all standards in this area an overall uniformity of terminology. Throughout this European Standard, the only hazard considered is the explosion of an explosive atmosphere.

1 Scope

This European Standard specifies terms and definitions (vocabulary) to be used in suitable standards dealing with equipment and protective systems intended for use in potentially explosive atmospheres.

NOTE Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres can be applicable to the type of machine or equipment covered by this European Standard. The present standard is not intended to provide means of complying with the essential health and safety requirements of Directive 94/9/EC.

2 Normative references

Not applicable.

3 Terms and definitions

3.1
ambient atmosphere
normal atmosphere surrounding the equipment and protective system

3.2
ambient temperature
temperature of the air or other medium where the equipment and protective system are to be used

3.3
combustible dust
dust able to undergo an exothermic reaction with air when ignited

Note 1 to entry: The terms "flammable" and "combustible" are used synonymously.

[SOURCE: EN 14034-1:2004+A1:2011, 3.3]

3.4
conductive dust
dust with an electrical resistivity equal to or less than 10^3 Ωm

3.5
continuous grade of release
release which is continuous or is expected to occur frequently or for long periods

[SOURCE: EN 60079-10-1:2009, 3.11]

3.6
deflagration
explosion propagating at subsonic velocity

[SOURCE: ISO 8421-1:1987]

3.7
degree of protection
extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and/or ingress of water and verified by standardised test methods

[SOURCE: EN 60529:1991 + A1:2000, 3.3]

Note 1 to entry: The enclosure which provides the degree of protection IP is not necessarily identical with the types of protection as defined in EN 60079-0.

3.8
detonation
explosion propagating at supersonic velocity and characterised by a shock wave

[SOURCE: ISO 8421-1:1987]

3.9
dust
small solid particles in the atmosphere which settle out under their own weight, but which may remain suspended in air for some time

[SOURCE: EN 14034-1:2004+A1:2011, 3.1, modified]

Note 1 to entry: Generally combustible dusts with a median value below 500 µm may form explosive dust/air-mixtures.

3.10
electrical equipment
items applied as a whole or in part for the utilisation of electrical energy

Note 1 to entry: These include, among others, items for the generation, transmission, distribution, storage, measurement, regulation, conversion and consumption of electrical energy and items for telecommunications.

[SOURCE: EN 60079-0:2009, 3.14]

3.11
electrostatic leakage resistance
electrical resistance measured between an object and earth

[SOURCE: EN 14983:2007, 3.1]

3.12
enclosure (of equipment or protective system)
all the walls including doors, covers, cable entries, rods, spindles and shafts which contribute to the type of protection and/or their degree of protection (IP)

3.13
equipment
machines, apparatus, fixed or mobile devices, control components and instrumentation thereof and detection or prevention systems which, separately or jointly are 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 ignition source

Note 1 to entry: If equipment supplied to the user contains any interconnecting parts e.g. fastenings, pipes, etc. these form part of the equipment.

Note 2 to entry: Simple apparatus with no moving parts, containers and pipes on their own are not considered as equipment under the scope of this European Standard.

[SOURCE: EN 13463-1:2009, 3.1]

3.13.1
equipment Group I category M 1
equipment designed and, where necessary, equipped with additional special means of protection to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection

Note 1 to entry: Equipment of this category is intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust.

Note 2 to entry: Equipment of this category is required to remain functional even in the event of rare incidents relating to equipment, with an explosive atmosphere present, and is characterised by means of protection such that:

— either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection,

— or the requisite level of protection is assured in the event of two faults occurring independently of each other.

[SOURCE: EN 13463-1:2009, 3.2.1]

3.13.2
equipment Group I category M 2
equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection

Note 1 to entry: Equipment of this category is intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by firedamp and/or combustible dust.

Note 2 to entry: This equipment is intended to be de-energised in the presence of an explosive atmosphere.

Note 3 to entry: The means of protection relating to equipment in this category assure the requisite level of protection during normal operation, expected malfunctions, and also in the case of more severe operating conditions, in particular, those arising from rough handling and changing environmental conditions.

[SOURCE: EN 13463-1:2009, 3.2.2, modified]

3.13.3
equipment Group II category 1
equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection

Note 1 to entry: Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently.

Note 2 to entry: Equipment of this category ensures the requisite level of protection, even in the event of rare malfunctions relating to equipment, and is characterised by means of protection such that:

— either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection,

— or the requisite level of protection is assured in the event of two faults occurring independently of each other.

[SOURCE: EN 13463-1:2009, 3.2.3]

3.13.4
equipment Group II category 2
equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection

Note 1 to entry: Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are likely to occur.

Note 2 to entry: The means of protection relating to equipment in this category ensures the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which are normally taken into account.

[SOURCE: EN 13463-1:2009, 3.2.3]

3.13.5
equipment Group II category 3
equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a normal level of protection

Note 1 to entry: Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

Note 2 to entry: Equipment of this category ensures the requisite level of protection during normal operation.

[SOURCE: EN 13463-1:2009, 3.2.5]

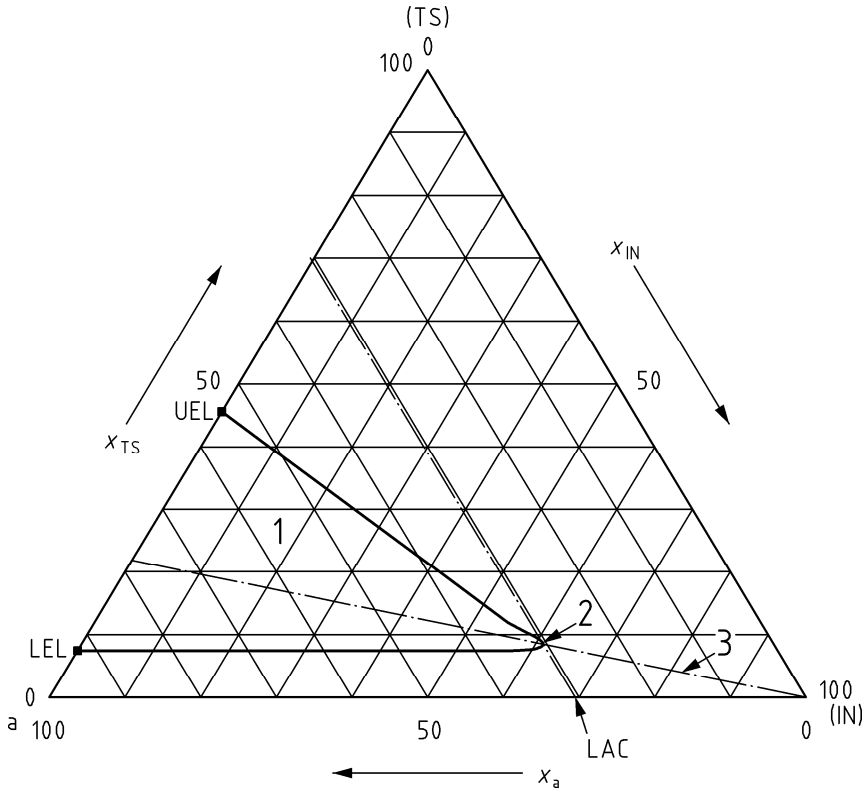
3.14
explosion
abrupt oxidation or decomposition reaction producing an increase in temperature, pressure, or in both simultaneously

[SOURCE: ISO 8421-1:1987]

3.15
explosion area
area inside the boundary curve formed by the explosion limits of a flammable substance in various mixtures with air and inert gas

Note 1 to entry: See Figure 1.

Note 2 to entry: In many cases the limiting air concentration corresponds to the apex of the boundary curve.



Key

1 explosion area
2 apex
3 stoichiometric line
x molar fraction in %
IN inert gas
TS test substance
a air

Figure 1 — Explosion area for a ternary system of test substance, air and inert gas

3.16
explosion diverter
passive device typically installed in a duct preventing flame jet ignition, pressure piling and reducing the probability of flame transmission into connected equipment

[SOURCE: EN 16020:2011, 3.2]

3.17
explosion isolation flap valve
flap valve able to stop explosions from propagating through pipelines in the opposing direction to the normal process flow through the valve

3.18
explosion isolation system

3.18.1
active explosion isolation system
protective system which is designed to stop explosions from travelling through pipelines or limit the associated destructive effects of the explosion and is activated by detectors and control and indicating equipment (CIE) which are inherent parts of the system

[SOURCE: EN 15089:2009, 3.7.1, modified]

3.18.2
passive explosion isolation system
protective system which is designed to stop explosions from travelling through pipelines or limit the associated destructive effects of the explosion and does not require detectors and a control and indicating equipment (CIE)

[SOURCE: EN 15089:2009, 3.7.2, modified]

3.19
explosion limits

3.19.1
lower explosion limit
LEL
lowest concentration of the explosion range at which an explosion can occur

Note 1 to entry: Those concentrations are given at which an explosion just fails during the tests (see EN 1839, EN 14034-3).

3.19.2
upper explosion limit
UEL
highest concentration of the explosion range at which an explosion can occur

Note 1 to entry: Those concentrations are given at which an explosion just fails during the tests (see EN 1839, EN 14034-3).

3.20
explosion points

3.20.1
lower explosion point
temperature of a flammable liquid at which the concentration of the saturated vapour in air is equal to the lower explosion limit

3.20.2
upper explosion point
temperature of a flammable liquid at which the concentration of the saturated vapour in air is equal to the upper explosion limit

3.21
explosion pressure
p_{ex}
highest pressure occurring in a closed vessel during the explosion of a specific mixture of flammable substances with air or air and inert gases determined under specified test conditions

Note 1 to entry: p_{ex} is expressed as absolute pressure with gases and vapour and as overpressure with dusts.

[SOURCE: EN 15967:2011, 3.1]

3.21.1
maximum explosion pressure
p_{max}
maximum value of explosion pressure measured in the tests for explosion pressure when the content of the flammable substances in the mixture is varied

Note 1 to entry: p_{max} is expressed as absolute pressure with gases and vapour and as overpressure with dusts.

[SOURCE: EN 15967:2011, 3.2]

3.21.2
rate of explosion pressure rise
$(dp/dt)_{ex}$
highest value of the slope (first derivative) of the pressure-time curve (smoothed if necessary), measured in a closed vessel during the explosion of a specific mixture of flammable substances with air or air and inert substances determined under specified test conditions

[SOURCE: EN 15967:2011, 3.3]

3.21.3
maximum rate of explosion pressure rise
$(dp/dt)_{max}$
maximum value of the explosion pressure rise per unit time measured in the tests when the content of the flammable substances in the mixture is varied

[SOURCE: EN 15967:2011, 3.3, modified]

3.22
explosion range
range of the concentration of a flammable substance or mixture of substances in air, within which an explosion can occur, respectively range of the concentration of a flammable substance or mixture of substances in mixture with air/inert gas, within which an explosion can occur, determined under specified test conditions

[SOURCE: EN 1839:2012; 3.1]

3.23
explosion resistant
property of vessels and equipment designed to be either explosion-pressure-resistant or explosion-pressure-shock resistant

3.23.1
explosion-pressure-resistant
property of vessels and equipment designed to withstand the expected explosion pressure without becoming permanently deformed

3.23.2
explosion-pressure-shock resistant
property of vessels and equipment designed to withstand the expected explosion pressure without rupturing, but allowing permanent deformation

3.24
explosion suppression
technique by which burning in an explosive atmosphere is detected and arrested during incipient stages, restricting development of pressure

[SOURCE: EN 14373:2005, 3.10]

3.25
explosion suppression system
protective system to detect automatically the onset of an explosion and initiate the deployment of suppressant to limit destructive effects of an explosion and has to be activated by a detector and control and indicating equipment (CIE) which are inherent parts of the system

[SOURCE: EN 14373:2005, 3.11, modified]

3.26
explosion venting
protective measure which will prevent the explosion pressure in a vessel or other closed volume from exceeding the vessel design strength by exhausting the explosion through an explosion venting device in the vessel walls

[SOURCE: EN 14797:2006, 3.3]

3.27
explosion venting device
device which protects a vessel or other closed volume by explosion venting

[SOURCE: EN 14797:2006, 3.4]

3.28
explosive atmosphere
mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts, in which, after ignition has occurred, combustion spreads to the entire unburned mixture

[SOURCE: EN 14034-1:2004+A1:2011, 3.4]

Note 1 to entry: Close to the explosion limits (LEL and UEL, see 3.19.1 and 3.19.2), the explosion may not necessarily spread to the entire unburned mixture.

3.28.1
hazardous explosive atmosphere
explosive atmosphere which causes harm, if it explodes

3.28.2
potentially explosive atmosphere:
atmosphere which could become explosive due to local and operational conditions

3.29
extinguishing barrier
active explosion isolation system that is used to discharge suppressant agent into ductwork to isolate a flame and keep it from propagating to other process areas

[SOURCE: EN 15089:2009, 3.11, modified]

3.30
flame arrester
device fitted to the opening of an enclosure or to the connecting pipework of a system of enclosures and whose intended function is to allow flow, but prevent the transmission of flame

Note 1 to entry: This device should not be confused with a fire barrier, which is ineffective in case of explosion.

[SOURCE: EN ISO 16852:2010, 3.1]

3.31
flameless explosion venting
explosion venting protective measure which will in addition prevent the transmission of flames and reduce the external explosion effects

Note 1 to entry: Examples of external explosion effects are: temperature, pressure and dust/combustion products.

[SOURCE: EN 16009:2011, 3.1]

3.32
flameless explosion venting device
device which protects a vessel or other closed volume by flameless explosion venting

[SOURCE: EN 16009:2011, 3.2]

3.33
flameproof enclosure
type of protection in which the parts which can ignite an explosive atmosphere are placed in an enclosure 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 atmosphere surrounding the enclosure

3.34
flameproof joint
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

[SOURCE: EN 60079-1:2007, 3.3]

3.34.1
gap of flameproof joint
distance between the corresponding surfaces of a flameproof joint when the electrical apparatus enclosure has been assembled

Note 1 to entry: For cylindrical surfaces, forming cylindrical joints, the gap is the difference between the diameters of the bore and the cylindrical component.

[SOURCE: EN 60079-1:2007, 3.6]

3.34.2
width of flameproof joint
shortest path through a flameproof joint from the inside to the outside of a flameproof enclosure

[SOURCE: EN 60079-1:2007, 3.4]

3.35
flame velocity
S_f
velocity of a flame front relative to a fixed reference point

[SOURCE: EN 15089:2009, 3.14]

3.36
flammable substances

3.36.1
flammable gas or vapour
gas or vapour which, when mixed with air in certain proportions, will form an explosive gas atmosphere

[SOURCE: EN 60079-10-1:2009, 3.22]

3.36.2
flammable liquid
liquid capable of producing a flammable vapour under any foreseeable operating conditions

[SOURCE: EN 60079-10-1:2009, 3.21, modified]

3.36.3
flammable mist
droplets of liquid, dispersed in air so as to form an explosive atmosphere

[SOURCE: EN 60079-10-1:2009, 3.23]

3.37
flammable/combustible substance
substance in the form of gas, vapour, liquid, solid, or mixtures of these, able to undergo an exothermic reaction with air when ignited

3.38
flash point
lowest liquid temperature at which, under certain standardised conditions, a liquid gives off vapours in a quantity such as to be capable of forming an ignitable vapour/air mixture

[SOURCE: EN 60079-10-1:2009, 3.24]

3.39
functional safety
part of the overall safety relating to the intended use in terms of the function and integrity of the protective system including any safety related devices that are part of the protective system performance

Note 1 to entry: Functional safety covers all aspects where safety depends on the correct functioning of the protective system and other technology safety-related systems.

Note 2 to entry: This definition deviates from the definition in EN 61508-4 to reflect differences in explosion safety terminology.

[SOURCE: EN 15233:2007, 3.2]

3.39.1
functional safety estimation
determination of the probability of occurrence of the failures violating the functional safety of the protective system

[SOURCE: EN 15233:2007, 3.4]

3.39.2
functional safety evaluation
procedure to determine whether the functional safety of the protective system meets the predefined acceptance criteria

[SOURCE: EN 15233:2007, 3.5]

3.40
hybrid mixture
mixture of flammable substances with air in different physical states

3.41
ignition
propagation of a flame away from the ignition source position

3.42
ignition hazard
occurrence of a potential ignition source that is capable of igniting an explosive atmosphere

[SOURCE: EN 15198:2007, 3.2]

3.43
ignition risk
probability of occurrence of an ignition source that is capable of igniting an explosive atmosphere

[SOURCE: EN 15198:2007, 3.1]

3.43.1
ignition risk estimation
determination of the probability of the occurrence of an ignition source

[SOURCE: EN 15198:2007, 3.5]

3.43.2
ignition risk evaluation
procedure to determine whether the intended level of protection (related to the equipment category) has been achieved

[SOURCE: EN 15198:2007, 3.6]

3.44
ignition source

3.44.1
possible ignition source
any kind of ignition source

Note 1 to entry: See EN 1127-1 for a list of all possible ignition sources.

Note 2 to entry: See Figure 2.

[SOURCE: EN 13463-1:2009, 3.5]

3.44.2
equipment related ignition source
any possible ignition source, which is caused by the equipment under consideration regardless of its ignition capability

Note 1 to entry: These are sometimes called "relevant ignition sources"; however this can lead to misunderstanding as to whether the ignition source is relevant in terms of it being present, in terms of its ignition capability or in terms of whether it is present in the equipment or not.

Note 2 to entry: All equipment related ignition sources are considered in the ignition hazard assessment to determine whether they are potential ignition sources.

Note 3 to entry: See Figure 2.

[SOURCE: EN 13463-1:2009, 3.4]

3.44.3
potential ignition source
equipment related ignition source that has the capability to ignite an explosive atmosphere (i.e. to become an effective ignition source)

Note 1 to entry: The probability of becoming effective determines the equipment category (they may arise in normal operation, expected malfunction, rare malfunction).

Note 2 to entry: See Figure 2.

[SOURCE: EN 13463-1:2009, 3.5]

3.44.4
effective ignition source
potential ignition source which is able to ignite an explosive atmosphere when consideration is taken of when it occurs (i.e. in normal operation, expected malfunction or rare malfunction) whereby the intended category is determined

Note 1 to entry: An effective ignition source is a potential ignition source which can ignite the explosive atmosphere if preventive or protective measures are not used.

Note 2 to entry: For example the frictional heat which may be produced by a bearing is a possible ignition source. This is an equipment related ignition source if the piece of equipment contains a bearing. If the energy which may be produced by the friction in the bearing is capable of igniting an explosive atmosphere then this is a potential ignition source. Whether this potential ignition source is effective depends on the probability that it will occur in a particular situation (e.g. following loss of lubrication).

Note 3 to entry: See Figure 2.

[SOURCE: EN 13463-1:2009, 3.6]

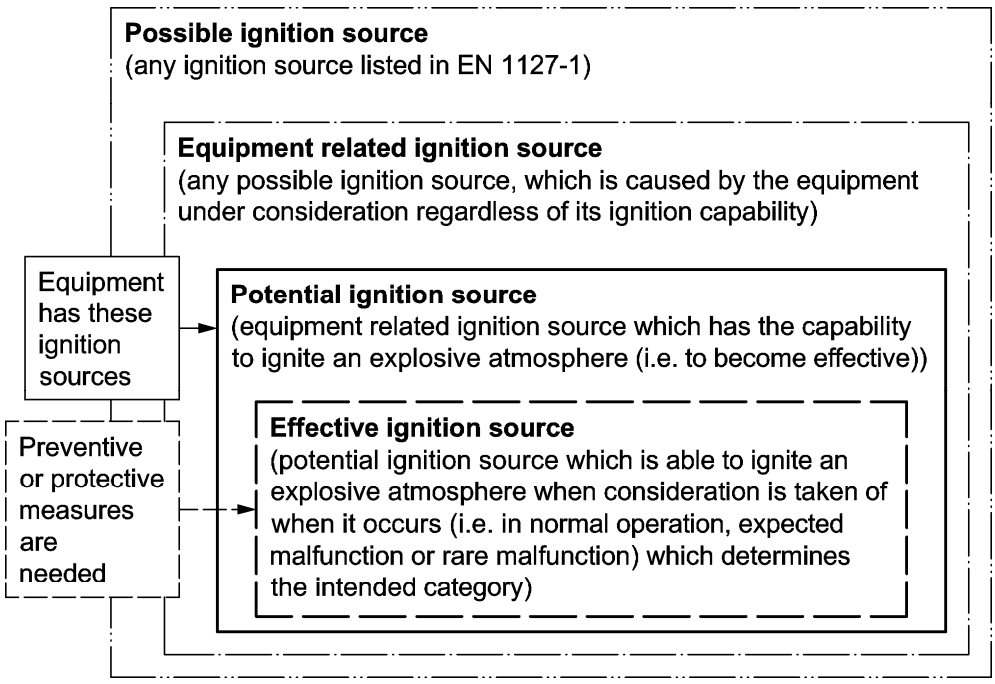


Figure 2 — Relationship between ignition source definitions

3.45
auto ignition temperature
T_i
lowest temperature (of a hot surface) at which under specified test conditions an ignition of a flammable gas or flammable vapour in mixture with air or air/inert gas occurs

[SOURCE: EN 14522:2005, 3.1]

Note 1 to entry: In literature, auto ignition temperature is also referred to as self ignition temperature. In the case of dusts, the respective safety characteristic is referred to as minimum ignition temperature.

3.45.1
minimum ignition temperature of a dust cloud
lowest temperature of a hot surface on which the most ignitable mixture of the dust with air is ignited under specified test conditions

3.45.2
minimum ignition temperature of a dust layer
lowest temperature of a hot surface at which ignition occurs in a dust layer under specified test conditions

3.46
inert gas
non-flammable gas which will not support combustion and does not react to produce a flammable gas

[SOURCE: EN 14034-4:2004+A1:2011, 3.4]

3.47
inerting
replacement of atmospheric oxygen in a system by a non-reactive, non-flammable gas, to make the atmosphere within the system unable to propagate flame

[SOURCE: CEN/TR 15281:2006, 3.1.1]

3.48
K_{St}
dust specific, volume independent characteristic which is calculated using the cubic law equation

$$(dp/dt)_{max} \cdot V^{1/3} = \text{const.} = K_{St}$$

[SOURCE: EN 14034-2:2006+A1:2011, 3.8]

3.49
limiting oxygen concentration
LOC
maximum oxygen concentration in a mixture of a flammable substance and air and an inert gas, in which an explosion will not occur, determined under specified test conditions

Note 1 to entry: The LOC does not depend only on the flammable gas or vapour, but also on the inert gas used.

3.50
malfunction
equipment, protective systems and components do not perform the intended function

Note 1 to entry: See also EN ISO 12100-1:2003, 5.3 b) 2).

Note 2 to entry: For the purposes of this standard, this can happen due to a variety of reasons, including:

a) variation of a property or of a dimension of the processed material or of the workpiece;

b) failure of one (or more) of the component parts of the equipment, protective systems and components;

c) external disturbances (e.g. shocks, vibration, electromagnetic fields);

d) design error or deficiency (e.g. software errors);

e) disturbance of the power supply or other services;

f) loss of control by the operator (especially for hand-held machines).

[SOURCE: EN 13463-1:2009, 3.8]

3.50.1
expected malfunction
disturbances or equipment faults which are known to occur in practice

[SOURCE: EN 13463-1:2009, 3.8.1]

3.50.2
rare malfunction
type of malfunction which may happen only in rare instances

Note 1 to entry: For example, this includes two independent expected malfunctions which, separately, would not create an ignition hazard but which, in combination, do create an ignition hazard, are regarded as a single rare malfunction.

[SOURCE: EN 13463-1:2009, 3.8.2]

3.51
maximum experimental safe gap
MESG
maximum gap of the joint between the two parts of the interior chamber of a test apparatus which, when the internal gas mixture is ignited and under specified conditions, prevents ignition of the external gas mixture through a 25 mm long joint, for all concentrations of the tested gas or vapour in air

Note 1 to entry: The MESG is a property of the respective gas mixture (see also IEC 60050-426, IEV 426-02-11).

Note 2 to entry: The MESG of a gas mixture is not a physical constant as it is dependent on the test equipment used. The value published in EN 60079-20-1 is based on the IEC 20 ml test vessel. Values determined in other test equipment may be greater or smaller.

3.52
maximum surface temperature
temperature used for marking of the equipment which is the highest temperature that can be attained in service under the most adverse operating conditions (but within the recognised tolerance) by any part or surface of equipment, protective system or component which can produce an ignition of the surrounding explosive atmosphere with an appropriate safety margin

Note 1 to entry: The maximum surface temperature is determined according to EN 13463-1:2009, 8.2 and includes safety margins depending on the category of the equipment. As a result of the application of safety margins according to EN 13463-1:2009, 8.2, the maximum surface temperature, in most cases, will be in excess of the highest measured surface temperature.

Note 2 to entry: The surface temperature which is relevant can be internal or external depending upon the type of ignition protection concerned.

Note 3 to entry: For equipment intended for use in explosive dust atmospheres, the surface temperature is determined without any deposited dust on the equipment, see EN 13463-1:2009, 6.2.3.

[SOURCE: EN 13463-1:2009, 3.9]

3.53
mechanically generated sparks
sparks, as well as showers of sparks, produced by impact or friction between two similar or dissimilar solid materials

[SOURCE: EN 13463-5:2011, 3.2]

3.54
minimum ignition energy
MIE
lowest electrical energy stored in a capacitor which upon discharge is sufficient to effect ignition of the most ignitable atmosphere under specified test conditions

3.55
mist
general term applied to a dispersion of droplets in a gas

Note 1 to entry: Mists can be produced by spraying or by other processes.

3.56
non-electrical equipment
equipment which can achieve its intended function mechanically

3.57
normal operation
situation when the equipment, protective systems, and components are operating for their intended use within their design parameters

Note 1 to entry: Failures (such as a breakdown of pump seals, flange gaskets or releases of substances caused by accidents) which involve repair or shut-down are not considered to be part of normal operation.

Note 2 to entry: Minor releases of flammable material may be part of normal operation. For example, releases of substances from seals which rely on wetting by the fluid which is being pumped are considered to be minor releases.

[SOURCE: EN 13463-1:2009, 3.7]

3.58
protective system
design units which are intended to halt incipient explosions immediately and/or to limit the effective range of explosion flames and explosion pressures

Note 1 to entry: Protective systems may be integrated into equipment or separately placed on the market for use as autonomous systems.

3.59
reduced explosion overpressure
p_{red}
resulting explosion overpressure generated by an explosion of an explosive atmosphere in an enclosure, after effective explosion venting or explosion suppression

Note 1 to entry: The term "explosion pressure" should only be used when the absolute pressure is meant.

3.60
maximum reduced explosion overpressure
$p_{red,max}$
maximum overpressure generated by an explosion of an explosive atmosphere in a vessel, protected by either explosion relief (venting) or explosion suppression

[SOURCE: EN 14491:2012, 3.12]

Note 1 to entry: The term "explosion pressure" should only be used when the absolute pressure is meant.

3.61
release rate
quantity of flammable gas or vapour emitted per unit time from the source of release

[SOURCE: EN 60079-10-1:2009, 3.14, modified]

3.62
symbol "X"
symbol used as a suffix to a certificate reference to denote special conditions for safe use

3.63
temperature class
temperature range used for:

- classification of equipment, protective system for explosive atmospheres based on its maximum surface temperature

or

- classification of flammable gases and vapours based on their auto ignition

Note 1 to entry: Equipment classified into temperature classes can be used in explosive atmospheres generated by flammable gases and vapours of the same temperature class.

3.64
type of protection
specific measures applied to electrical equipment to avoid ignition of a surrounding explosive atmosphere

[SOURCE: EN 60079-0:2009, 3.42]

3.65
geometric vent area
A_v
ratio of required vent area A and venting efficiency E_f for the venting device

Note 1 to entry: The minimum cross-sectional flow area of the vent opening should take into consideration the possible reduction of the cross section, e.g. by back pressure supports, retaining devices and parts of the explosion venting device which remain after bursting or venting.

[SOURCE: EN 14491:2012, 3.5, modified]

Annex A
(informative)

Definitions from the Directive 94/9/EC and corrigenda

A.1 General

The following definitions are from the Directive 94/9/EC. The user should check the latest version of the Directive for possible changes.

A.2 Explosive atmosphere

Mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

A.3 Potentially explosive atmosphere

Atmosphere which could become explosive due to local and operational conditions.

A.4 Intended use

Use of equipment, protective systems, and devices in accordance with the equipment group and category as specified in Directive 94/9/EC, Annex I, and taking into account all the information supplied by the manufacturer which is required for the safe functioning of equipment, protective systems, and devices.

NOTE The above mentioned devices are safety devices, controlling and regulating ones intended for use outside potentially explosive atmospheres but required for or contributing to the safe functioning of equipment and protective systems with respect to the risks of explosion.

A.5 Protective systems

Devices other than components (see A.6) of the equipment which are intended to halt incipient explosions immediately and/or to limit the effective range of an explosion and which are placed separately on the market as autonomous systems.

A.6 Equipment group

Equipment is classified in relation with the explosive atmosphere for which it is to be used. Two groups are defined as follows:

— Equipment group I: this equipment is intended for use in underground parts of mines, and in those parts of surface installation of such mines, liable to be endangered by firedamp and/or combustible dust;

— Equipment group II: this equipment is intended for use in other places liable to be endangered by explosive atmospheres.

A.6.1 Equipment group I

a) Category M 1 comprises equipment designed and, where necessary, equipped with additional special means of protection to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

Equipment in this category is intended for use in underground parts of mines as well as those parts of surface installations of such mines endangered by firedamp and/or combustible dust.

Equipment in this category is required to remain functional, even in the event of rare incidents relating to equipment, with an explosive atmosphere present, and is characterised by means of protection such that:

1) either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection;

2) or the requisite level of protection is assured in the event of two faults occurring independently of each other.

b) Category M 2 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

Equipment in this category is intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by firedamp and/or combustible dust.

This equipment is intended to be de energised in the event of an explosive atmosphere.

The means of protection relating to equipment in this category assure the requisite level of protection during normal operation, expected malfunctions, and also in the case of more severe operating conditions, in particular those arising from rough handling and changing environmental conditions.

A.6.2 Equipment group II

a) Category 1 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently.

Equipment in this category shall ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterised by means of protection such that:

1) either, in the event of failure of one mean of protection, at least an independent second means provides the requisite level of protection;

2) or the requisite level of protection is assured in the event of two faults occurring independently of each other.

a) Category 2 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and of ensuring a high level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures are likely to occur.

The means of protection relating to equipment in this category ensure the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account.

b) Category 3 comprises equipment designed to be capable of functioning in conformity with the operating parameters established by the manufacturer and ensuring a normal level of protection.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists, or air/dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

Equipment in this category ensures the requisite level of protection during normal operation.

A.7 Component

Item essential to the safe functioning of equipment and protective system but with no autonomous function.

Annex B
(informative)

Significant changes between this European Standard and EN 13237:2003

This European Standard supersedes EN 13237:2003.

Table B.1 — Significant changes with respect to EN 13237:2003

		Type		
Significant Changes	Clause	Minor and editorial changes	Extension	Major technical changes
Terms and definitions revised regarding the modifications of the terms and definitions in the origin standards	3	X		

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

Explanations:

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. Furthermore changes to 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’.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 94/9 EC

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 94/9 EC.

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 normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

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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