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INTERNATIONAL STANDARD

REDLINE VERSION

**Explosive atmospheres -
Part 10-2: Classification of areas - Explosive dust atmospheres**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Explosive atmospheres -
Part 10-2: Classification of areas - Explosive dust atmospheres**

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60079-10-2:2015. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 60079-10-2 has been prepared by Subcommittee SC31J: Classification of hazardous areas and installation requirements of IEC technical committee 31: Equipment for explosive atmospheres. It is an International Standard.

This third edition of IEC 60079-10-2 cancels and replaces the second edition of IEC 60079-10-2 published in 2015. This edition constitutes a technical revision.

Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the "history" tab of the page for each document.

This edition includes the following significant technical changes with respect to the previous edition:

Explanation of the significance of the changes	Type			
	Clause	Minor and editorial changes	Extension	Major technical changes
Scope Revised to clarify that this document applies at standard atmospheric conditions and standard oxidizing medium.	1	X		
Terms and definitions Revised the informational note to the combustible dust definition to correctly point to the proper sieve size for 500 micron material.	3.1.3	X		
Terms and definitions The term "extent of zone" was removed as the term expresses the meaning more clearly than the definition.	Formerly 3.1.7	X		
Terms and definitions Revised the definition of "equipment" to reflect the IEV defined term.	3.11	X		
Terms and definitions Added a definition for Minimum Explosible Concentration based on NFPA 660's definition.	3.2.1		X	
Terms and definitions Revised the definitions of Zone 20, 21, and 22 and added a definition of Zone NE to reflect the IEV defined terms.	3.10		X	
Terms and definitions Added definition of "Limiting Oxygen Concentration" to align with EN definition as referenced.	3.2.4		X	
Terms and definitions Added definition of "Minimum Ignition Energy" to align with IEC 80079-20-2 definition.	3.2.5		X	
Area classification Revised subclause editorially based on comments received.	4.1	X		
Revised subclause to include guidance on particle density vs. ability to travel greater distances as based on NFPA 499.	4.1.1	X		
Area classification Added description of "small quantities" based on IEC 60079-10-1.	4.1.2		X	
Area classification Added description of zone of "negligible extent" to better clarify when such a zone might exist, based on IEC 60079-10-1.	4.1.3		X	

Explanation of the significance of the changes	Type			
	Clause	Minor and editorial changes	Extension	Major technical changes
Area classification Revised the subclause to address inerting by inert gas or mixture with non-combustible dust.	4.1.4		X	
Safety principles Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.2	X		
Area classification objectives Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.3	X		
Interior of process equipment Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.4	X		
Management of change Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.5	X		
Management of change Recommended a 3 years interval for reviewing the classification of an area.	4.5	X		
Commissioning and maintenance Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.6	X		
Catastrophic failures Existing text was grouped and organized to align with IEC 60079-10-1 and to improve usability.	4.7	X		
Competence of personnel Existing language recommending that competent personnel conduct the area classification assessment was converted to mandatory language based on comments received.	4.8		X	
Area classification procedure for explosive dust atmospheres Procedure/subclause has been cleaned up editorially and revised based on comments received.	4.9	X		
Zone 21 Revised the subclause making the former "Note 1" into normative text based on comments received.	6.2.3		X	
Zone 22 Revised the section making the former "Note" into normative text based on comments received.	6.2.4		X	
Clause A.1 Preferred symbols previously shown were moved to Annex A as the annex is informative, not normative.	A.1	X		
Clause A.2 Sample Table A.1 was added to provide a possible table format to be used. This is informative and not normative.	A.2		X	
Clause C.1 Added language reference to maximum recommended dust layer thicknesses, beyond which classification or improved housekeeping should be considered.	C.1		X	
Clause C.3 Added language referencing the danger of hot surface ignition of layers of dust.	C.3		X	
Annex D Minor editorial changes to the document to address comments from CD.	Annex D	X		

Explanation of the types of significant changes:	
1. Minor and editorial changes:	<ul style="list-style-type: none"> – 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 the level of existing requirement.	
2. Extension:	<ul style="list-style-type: none"> – 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 the requirements that are fully compliant with the previous standard. Therefore, these will not have to be considered for existing area classifications in conformity with the preceding edition.	
3. Major technical changes:	<ul style="list-style-type: none"> – 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 an existing area classification 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 existing area classifications in conformity with the preceding edition.	

The text of this International Standard is based on the following documents:

Draft	Report on voting
31J/413/FDIS	31J/419/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Combustible dusts are hazardous because when they are dispersed in air by any means they may could form ~~potentially~~ explosive atmospheres. Furthermore, layers of dust ~~may~~ could ignite and act as ignition sources for an explosive atmosphere.

This part of IEC 60079 gives guidance on the identification and classification of areas where such hazards from dust can arise. It sets out the essential criteria against which the ~~ignition~~ hazards due to combustible dusts can be assessed and gives guidance on the design and control parameters which can be used in order to reduce such a hazard. General and special criteria are given for the process of identification and classification of hazardous areas.

This document contains an informative Annex B giving examples for classifying hazardous areas.

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1 Scope

This part of IEC 60079 is concerned with the identification and classification of areas where explosive dust atmospheres and combustible dust layers are present in order to permit the proper assessment of ignition sources in such areas.

In this document, explosive dust atmospheres and combustible dust layers are treated separately. In Clause 4, area classification for explosive dust clouds is described, with dust layers acting as one of the possible sources of release. In Clause 7, other general considerations for dust layers are described.

The examples in this document are based on a system of effective housekeeping being implemented in the plant to prevent dust layers from accumulating. Where effective housekeeping is not present, the area classification includes the possible formation of explosive dust clouds from dust layers.

The principles of this document can also be followed when combustible fibres or flyings might cause a hazard.

~~This standard is intended to be applied where there can be a risk due to the presence of explosive dust atmospheres or combustible dust layers under normal atmospheric conditions (see Note 1).~~

~~NOTE 1~~ Atmospheric conditions include variations in pressure and temperature above and below reference levels of 101,3 kPa (1 013 mbar) and 20 °C (293 K), provided that the variations have a negligible effect on the explosive properties of the combustible material. For air with normal oxygen content, typically a volume fraction of 21 % is assumed.

It does not apply to

- a) underground mining areas;
- b) dusts of explosives that do not require atmospheric oxygen for combustion such as pyrophoric substances, propellants, pyrotechnics, munitions, peroxides, oxidizers, water-reactive elements or compounds, or other similar materials;
- c) catastrophic failures or rare malfunctions which are ~~beyond~~ outside the ~~concept of abnormality~~ conditions dealt with in this document;
~~— any risk arising from an emission of toxic gas from the dust.~~
- d) rooms used for medical purposes;
- e) domestic premises;
- f) ~~This standard does not apply to~~ where a hazard ~~might arise~~ is due to the presence of flammable gas or vapour, but the principles ~~may~~ can be used in the assessment of a hybrid mixture (see also IEC 60079-10-1).

NOTE Additional guidance on hybrid mixtures is provided in Annex D.

This document does not consider the effects of consequential damage following a fire or an explosion.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

~~IEC 60079-10-1, Explosive atmospheres — Part 10-1: Classification of areas — Explosive gas atmospheres~~

~~ISO/IEC 80079-20-2, Explosive Atmospheres — Part 20-2: Material Characteristics — Combustible dusts test methods⁴~~

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

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

~~3.1~~

~~area~~

~~three-dimensional region or space~~

3.1

dust

3.1.1

dust

~~generic term including both~~ combustible dust ~~and~~ or combustible flyings

[SOURCE: IEC 60079-0:2026, 3.25, modified – Note 1 to entry removed]

3.1.2

combustible flyings

solid particles, including fibres, where one dimension is greater than 500 µm in nominal size, which ~~may~~ can form an explosive mixture with air at standard atmospheric pressure and ~~normal~~ temperature

Note 1 to entry: Examples of flyings include rayon, cotton (including cotton linters and cotton waste) sisal, jute, hemp, cocoa fibre, oakum and waste kapok.

Note 2 to entry: Combustible flyings are classified as Group IIIA.

[SOURCE: ISO/IEC 80079-20-2:2016, 3.2, modified – "may" replaced with "can"]

3.1.3

combustible dust

finely divided solid particles, 500 µm or less in nominal size, which ~~may~~ can form an explosive mixture with air at atmospheric pressure and normal temperatures

~~Note 1 to entry: This includes dust and grit as defined in ISO 4225.~~

Note 1 to entry: The term solid particles is intended to address particles in the solid phase and not the gaseous or liquid phase, but does not preclude a hollow particle.

Note 2 to entry: Materials passing a U.S. No. ~~40~~ 35 Standard sieve as defined in ASTM ~~E 11-04~~ E11 are considered to meet the 500 µm criterion.

⁴ ~~To be published.~~

Note 3 to entry: Combustible dust test methods can be found in ISO/IEC 80079-20-2.

[SOURCE: ISO/IEC 80079-20-2:2016, 3.1]

3.1.4

non-conductive dust

combustible dust with electrical resistivity greater than ~~$10^3 \Omega$~~ $1 \text{ k}\Omega \times \text{m}$

Note 1 to entry: Non-conductive dust is classified as Group IIIB.

3.1.5

conductive dust

combustible ~~dust~~ metal dusts and other combustible dusts with electrical resistivity equal to or less than ~~$10^3 \Omega$~~ $1 \text{ k}\Omega \times \text{m}$

Note 1 to entry: ISO/IEC 80079-20-2 contains the test method for determining the electrical resistivity of dusts.

Note 2 to entry: Metal dust is treated as conductive dust because it is assumed that surface oxidation cannot be depended upon to always ensure electrical resistivity greater than $1 \text{ k}\Omega \times \text{m}$.

Note 3 to entry: Conductive dust is classified as Group IIIC.

[SOURCE: ISO/IEC 80079-20-2:2016, 3.1.1, modified – addition of Notes 1 and 3 to entry]

3.14

continuous formation of a dust cloud

~~locations in which a dust cloud may exist continuously, or may be expected to continue for long periods or for short periods which occur frequently~~

3.22

ignition temperature of a dust layer

~~lowest temperature of a surface at which ignition occurs in a dust on the surface~~

~~Note 1 to entry: The ignition temperature of a dust layer may be determined by the test method given in ISO/IEC 80079-20-2.~~

3.23

ignition temperature of a dust cloud

~~lowest temperature of the hot inner wall of a furnace at which ignition occurs in a dust cloud in air contained therein~~

~~Note 1 to entry: The ignition temperature of a dust cloud may be determined by the test method given in ISO/IEC 80079-20-2.~~

3.2

dust properties

3.2.1

minimum explosible concentration

MEC

minimum concentration of a combustible dust suspended in air, measured in mass per unit volume, that will support a deflagration

Note 1 to entry: This is sometimes referred to as lower explosion limit (LEL), for example EN 14034-3:2011 or EN 13237:2024.

[SOURCE: NFPA 660:2025, 3.3.78]

3.2.2**layer ignition temperature**

DEPRECATED: minimum ignition temperature of a dust layer

MIT_L

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

[SOURCE: ISO/IEC 80079-20-2:2016, 3.4, modified – addition of new preferred term "layer ignition temperature" and admitted term "MIT_L"]**3.2.3****cloud ignition temperature**

DEPRECATED: minimum ignition temperature of a dust cloud

MIT_C

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

[SOURCE: ISO/IEC 80079-20-2:2016, 3.5, modified – addition of new preferred term "cloud ignition temperature" and admitted term "MIT_C"]**3.2.4****limiting oxygen concentration**

LOC

maximum oxygen concentration in mixture of a combustible dust and air and an inert gas, in which an explosion will not occur, determined under test conditions

Note 1 to entry: Test conditions are specified in EN 14034-4 and ASTM E2931.

Note 2 to entry: This is also referred to as limiting oxidant concentration.

[SOURCE: EN 14034-4:2004, 3.7, modified – Notes 1 and 2 to entry added]

3.2.5**minimum ignition energy**

MIE

<of a combustible dust/air mixture> lowest electrical energy stored in a capacitor which upon discharge is sufficient to effect ignition of the most sensitive dust/air mixture under specified test conditions

[SOURCE: ISO/IEC 80079-20-2:2016, 3.6]

3.3**explosive dust atmosphere**mixture with air, under atmospheric conditions, of ~~flammable~~ combustible substances in the form of dust, which, after ignition, permits self-sustaining propagation~~Note 1 to entry: Non-conductive dust is classified as Group IIB.~~**3.4****hazardous area**<dust> area in which ~~combustible~~ dust, in the form of a cloud, is present, or ~~may~~ can be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipmentNote 1 to entry: Hazardous areas are divided into zones based upon the frequency and duration of the occurrence of explosive dust atmospheres (see 6.2 ~~and 6.3~~).

Note 2 to entry: The potential of creating an explosive dust cloud from a dust layer also needs to be considered.

Note 3 to entry: For the purposes of this document, an area is a three-dimensional region or space.

3.5**non-hazardous area**

<dust> area in which ~~combustible~~ dust, in the form of a cloud, is not expected to be present in quantities such as to require special precautions for the construction, installation and use of equipment

3.6**hybrid mixture**

mixture of a flammable gas or vapour with a dust

3.7**operation****3.7.1****normal operation**

<explosive atmospheres> operation of equipment conforming electrically and mechanically with its design specification and used within the limits specified by the manufacturer

Note 1 to entry: Minor releases of dust which ~~may~~ could form a cloud or layer (for example, releases from filters) can be part of normal operation.

[SOURCE: IEC 60079-0:2026, 3.65, modified – Notes 1, 2 and 3 to entry replaced with new Note 1 to entry]

3.7.2**abnormal operation**

<explosive atmospheres> process-linked malfunctions that occur infrequently

3.7.3**catastrophic failure**

<explosive atmospheres> occurrence which exceeds the design parameters of the process plant and control system resulting in major release of ~~flammable material~~ dust

Note 1 to entry: Catastrophic failure in this context is applied, for example, to the rupture of a storage silo or a pneumatic conveyor.

3.8**dust containment**

process equipment housing which is intended to handle, process, transport or store materials inside of it, while minimizing the ~~risk~~ possibility of the release of dust to the surrounding atmosphere

3.9**source of dust release**

point or location from which dust ~~may~~ can be released into the atmosphere

Note 1 to entry: The source of dust release can be from a dust containment or from a dust layer.

3.9.1**continuous grade of release**

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

3.9.2**primary grade of release**

release which can be expected to occur periodically or occasionally during normal operation

3.9.3**secondary grade of release**

release which is not expected to occur in normal operation and, if it does occur, is likely to do so only infrequently and for short periods

3.10 Zones

3.10.1 Zone 20

~~a place~~ area in which an explosive ~~dust~~ atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently

3.10.2 Zone 21

~~a place~~ area in which an explosive ~~dust~~ atmosphere in the form of a cloud of combustible dust in air is likely to occur, occasionally, in normal operation

3.10.3 Zone 22

area in which an explosive ~~dust~~ atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only

Note 1 to entry: The potential of creating an explosive dust cloud from a dust layer also needs to be considered.

3.10.4 Zone NE

zone of negligible extent such that if ignition did occur it would have negligible consequences

Note 1 to entry: Zones of negligible extent could be Zone 20 NE, Zone 21 NE, or Zone 22 NE.

[SOURCE: IEC 60079-10-1:2020, 3.3.8, modified – Note 1 to entry adapted]

3.11 equipment

<explosive atmospheres> general term including apparatus, fittings, devices, ~~components~~, and the like used as a part of, or in connection with, an installation ~~in an explosive atmosphere~~

Note 1 to entry: Equipment incorporating a Type of Protection can be "Ex Equipment", or an "Ex Component".

[SOURCE: IEC 60079-0:2026, 3.33.1, modified – field of application and Note 1 to entry added]

3.12 verification dossier

set of documents showing ~~the compliance~~ assurance of ~~electrical~~ conformity of equipment and installations

Note 1 to entry: Requirements for a 'verification dossier' are given in IEC 60079-14.

[SOURCE: IEC 60079-14:2024, 3.1.2, modified – Note 1 to entry added]

3.17 ~~extent of zone~~

~~distance in any direction from the edge of a source of release to the point where the hazard associated with the release is considered to exist no longer~~

4 Area classification

4.1 General

4.1.1 Basic considerations

This document adopts the concept, similar to that used for flammable gases and vapours, of using area classification to give an assessment of the likelihood of an explosive dust atmosphere occurring.