

Electrical apparatus for use in the presence of combustible dust —

Part 10: Classification of areas where combustible dusts are or may be present

The European Standard EN 61241-10:2004 has the status of a
British Standard

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National foreword

This British Standard is the official English language version of EN 61241-10:2004. It is identical with IEC 61241-10:2004. It supersedes BS EN 50281-3:2002 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/31, Electrical apparatus for explosive atmospheres, to Subcommittee GEL/31/20, Apparatus for use in the presence of ignitable dust, which has the responsibility to:

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Electrical apparatus for use in the presence of combustible dust
Part 10: Classification of areas
where combustible dusts are or may be present
(IEC 61241-10:2004)

Matériels électriques pour utilisation
en présence de poussières combustibles
Partie 10: Classification des emplacements
où des poussières combustibles
sont ou peuvent être présentes
(CEI 61241-10:2004)

Elektrische Betriebsmittel zur Verwendung
in Bereichen mit brennbarem Staub
Teil 10: Einteilung von
staubexplosionsgefährdeten Bereichen
(IEC 61241-10:2004)

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 31H/172/FDIS, future edition 1 of IEC 61241-10, prepared by SC 31H, Apparatus for use in the presence of combustible dust, of IEC TC 31, Electrical apparatus for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61241-10 on 2004-07-01.

This European Standard supersedes EN 50281-3:2002.

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2005-04-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2007-07-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61241-10 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

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

Therefore, equipment placed in an environment where dust clouds can form should be dust ignition protected and have a surface temperature limitation below the temperature at which a dust cloud or layer will ignite.

This part of IEC 61241 gives guidance on the identification of areas where hazards from combustible dust can arise. The purpose is to permit selection of appropriate equipment for use in such areas. General and special criteria are given, with examples, for the procedure used to identify areas.

By exercising ingenuity in the layout of equipment, it is frequently possible to locate much of the equipment in less hazardous or in non-hazardous locations and thus to reduce the amount of special equipment required.

This standard contains an informative annex giving practical examples for classifying areas (Annex A).

ELECTRICAL APPARATUS FOR USE IN THE PRESENCE OF COMBUSTIBLE DUST –

Part 10: Classification of areas where combustible dusts are or may be present

1 Scope

This part of IEC 61241 is concerned with the classification of areas where explosive dust/air mixtures and combustible dust layers are present, in order to permit the proper selection of equipment for use in such areas.

In this standard, explosive dust atmospheres and combustible dust layers are treated separately. In Clause 4, area classification for explosive dusts clouds is described, with dust layers acting as one of the possible sources of release. In Clause 7, the hazard of dust layer ignition is described.

This standard assumes effective housekeeping based on a system of cleaning for the plant.

The principles of the standard can also be followed when combustible fibres or flyings may cause a hazard.

This standard is intended to be applied where there can be a risk due to the presence of explosive dust/air mixtures or combustible dust layers under normal atmospheric conditions.

It does not apply to

- underground mining areas,
- areas where a risk can arise due to the presence of hybrid mixtures,
- dusts of explosives that do not require atmospheric oxygen for combustion, or to pyrophoric substances;
- catastrophic failures which are beyond the concept of abnormality dealt with in this standard (see Note 1),
- any risk arising from an emission of flammable or toxic gas from the dust.

This standard does not take into account the effects of consequential damage following a fire or an explosion.

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

NOTE 2 In any process plant, irrespective of size, there can be numerous sources of ignition apart from those associated with equipment. Appropriate precautions will be necessary to ensure safety in this context, but these are outside the scope of this standard.

2 Normative references

The following referenced documents are indispensable for the application 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 61241-0, *Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements*

IEC 61241-14, *Electrical apparatus for use in the presence of combustible dust – Part 14: Selection and installation of apparatus*³

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

area

three-dimensional region or space

3.2

atmospheric conditions

(surrounding conditions)

conditions that 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 dust

3.3

hybrid mixture

mixture of flammable substances in different physical states, with air

NOTE An example of a hybrid mixture is a mixture of methane, coal dust and air.

3.4

dust

small solid particles including fibres and flyings in the atmosphere which settle out under their own weight, but which may remain suspended in air for some time (includes dust and grit as defined in ISO 4225)

3.5

explosive dust atmosphere

mixture with air, under atmospheric conditions, of flammable substances in the form of dust, fibres or flyings in which, after ignition, combustion spreads throughout the unconsumed mixture

[IEV 426-02-04, modified]

3.6

combustible dust

dust, fibres or flyings that can burn or glow in air and could form explosive mixtures with air at atmospheric pressure and normal temperatures

³ To be published.

3.7

hazardous area (dust)

area in which combustible dust in cloud form is, or can be expected to be, present in quantities such as to require special precautions for the construction and use of equipment in order to prevent ignition of an explosive dust/air mixture

NOTE Hazardous areas are divided into zones based upon the frequency and duration of the occurrence of explosive dust/air mixtures (see 6.1 and 6.2)

3.8

non-hazardous area (dust)

area in which combustible dust is not present to an extent that will permit the formation of significant explosive dust/air mixtures

3.9

dust containment

those parts of the process equipment inside which materials are handled, processed, transported or stored, e.g. to prevent the release of dust to the surrounding atmosphere

3.10

source of dust release

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

NOTE 1 This can be from a dust containment or a dust layer.

NOTE 2 Sources of release are divided into the following grades depending on the order of decreasing severity:

- a) 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;
- b) primary grade of release: a source can be expected to occasionally release combustible dust in normal operation;
- c) secondary grade of release: a source which is not expected to release combustible dust during normal operation; if it releases, it is likely to do so only infrequently and for short periods only.

3.11

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

3.12

normal operation

situation when the process equipment is operating within its design parameters

NOTE Minor releases of dust which may form a cloud or layer (e.g. releases from filters) can be part of normal operation.

3.13

abnormal operation

expected process-linked malfunctions that occur infrequently

3.14

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 or the processing of material and which are capable of causing an explosion through their own potential sources of ignition