
Električne naprave za uporabo v prisotnosti gorljivega prahu - 0. del: Splošne zahteve (IEC 61241-0:2004, spremenjen, s popravkom nov. 2005)

Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements (IEC 61241-0:2004, Modified + corrigendum Nov. 2005)

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English version

Electrical apparatus for use in the presence of combustible dust
Part 0: General requirements
(IEC 61241-0:2004, modified + corrigendum Nov. 2005)

Matériels électriques pour utilisation
en présence de poussières combustibles
Partie 0: Exigences générales
(CEI 61241-0:2004, modifiée +
corrigendum nov. 2005)

Elektrische Betriebsmittel zur Verwendung
in Bereichen mit brennbarem Staub
Teil 0: Allgemeine Anforderungen
(IEC 61241-0:2004, modifiziert +
Corrigendum Nov. 2005)

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This European Standard was approved by CENELEC on 2005-09-13. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 31H/173/FDIS, future edition 1 of IEC 61241-0, prepared by SC 31H, Apparatus for use in the presence of combustible dust, of IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 31, Electrical apparatus for explosive atmospheres - General requirements, containing some common modifications to the text of document 31H/173/FDIS, was submitted to the formal vote.

The two texts were combined and approved by CENELEC as EN 61241-0 on 2005-09-13.

This standard, and the other parts within this series, was developed to align protection methods associated with electrical apparatus for use in the presence of combustible dust and those similar protection methods associated with the EN 60079 series of standards, where possible.

This European Standard, together with EN 61241-1:2004, supersedes EN 50281-1-1:1998 + corrigendum August 1999 + A1:2002.

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) 2007-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-10-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 94/9/EC. See Annex ZZ.

NOTE 1 Other EC Directives may be applicable.

NOTE 2 Subclauses, notes and annexes that are additional to those in IEC 61241-0 are prefixed with the letter Z.

Annexes ZA, ZB and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61241-0:2004, with its corrigendum November 2005, was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

1 Scope

Add after the first paragraph:

This Part 0 of EN 61241 covers Category 1D, 2D and 3D apparatus.

Only in cases specifically mentioned, the requirements differ for Categories 1D, 2D and 3D.

In all cases where apparatus are involved, the references to zones shall be read

Zone 20	Category 1D
Zone 21	Category 2D or Category 1D
Zone 22	Category 3D or Category 1D or 2D

2 Normative references

Add:

See also Annex ZB.

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3 Terms and definitions

Add:

3.Z1

category

within an equipment group, a category is the classification according to the required level of protection

NOTE The categories are defined as given in Annex ZA.

4 Construction

4.2 Principles for design and testing of apparatus for use in Zone 20

Replace by:

4.2 Void

Add:

4.Z1 Mechanical strength of apparatus

The apparatus shall be subjected to the tests of 23.4.2. Guards relied upon to provide protection from impact shall be removable only by the use of a tool and shall remain in place for the required impact tests.

6 Enclosure material

6.1 Non-metallic enclosures and non-metallic parts of enclosures

Replace the text by:

The following requirements apply to non-metallic enclosures and non-metallic parts of enclosures on which the type of protection depends. In addition, the requirements of 23.4.7 shall apply for Category 1D or Category 2D apparatus.

For Category 3D electrical apparatus the requirements of 23.4.7 shall also apply, but with the modifications given in 23.4.7.3 for the Category 3D apparatus.

6.1.5 Electrostatic charges

Add:

If there is danger that plastic enclosures or plastic parts of enclosures can be charged to a dangerous level in normal operation, also Category 3D electrical apparatus shall be designed in line with 6.1.5.1 and 6.1.5.2.

Enclosures designed not in line with 6.1.5.1 and 6.1.5.2 shall be clearly marked and the restriction in use stated.

6.2.1 Composition

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Add:

For Category 3D electrical apparatus no restrictions shall be observed except for fans, fan hoods, and ventilating screens. These parts shall comply with the requirements for Category 2D.

10 Materials used for cementing

10.2 Thermal stability

Add:

For Category 3D electrical apparatus, the thermal stability shall be considered adequate if the lower limiting value of temperature for the material are below or equal to the lowest working temperature specified for the material, and the continuous operating temperature (COT) is at least 10 K above the maximum service temperature.

16 Supplementary requirements for specific electrical apparatus – Rotating electrical machines

16.3 Clearances for the ventilating system for use in Zone 20 or 21

Replace the entire subclause by:

16.3 Clearances for the ventilating system

16.3.Z1 Clearances for the ventilating system of Category 1D and 2D electrical apparatus

In normal operation the clearances, taking into account design tolerances, between the external fan and its hood, ventilation screens and their fasteners shall be at least one hundredth of the maximum diameter of the fan, except that the clearances need not exceed 5 mm and may be reduced to 1 mm if the opposing parts are manufactured so as to have dimensional accuracy and stability. In no case shall the clearance be less than 1 mm.

16.3.Z2 Clearances for the ventilating system of Category 3D electrical apparatus

In normal operation the clearances, taking into account design tolerances, between the external fan and its hood shall be in no case less than 1 mm.

16.4 Materials for external fan and fanhoods

Add:

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16.4.Z1 Thermal stability of plastic materials for Category 3D electrical apparatus

The thermal stability of plastic materials shall be considered adequate if the COT specified by the manufacturer of the plastic material exceeds the maximum temperature to which the material is subjected in service (within the rating) by at least 10 K.

16.4.Z2 Materials containing light metals for Category 3D electrical apparatus

The external fans, fan hoods and ventilation screens of rotating electrical machines manufactured from materials containing light metals shall not contain by weight more than 7,5 % in total of magnesium and titanium.

20 Luminaires

20.5 Parts remaining energized

Replace the text by:

20.5.Z1 Category 1D and 2D electrical apparatus

In the case of 20.4 a), where it is intended that some parts other than the lampholder will remain energized after operation of the disconnecting device, then in order to minimize the risk of explosion, those energized parts shall be protected by

- clearances and creepage distances between phases (poles) and to earth in accordance with the requirements of EN 60079-7; and
- an internal supplementary enclosure (which can be the reflector for the light source) which contains the energized parts and provides a degree of protection of at least IP30, according to EN 60529; and

- marking on the internal supplementary enclosure with the warning “**DO NOT OPEN WHEN ENERGIZED**”.

20.5.Z2 Category 3D electrical apparatus

In the case of 20.4 a), where it is intended that some parts other than the lampholder will remain energized after operation of the disconnecting device, in order to minimize the risk, those energized parts shall be protected by

- clearances and creepage distances between phases (poles) and to earth in accordance with the requirements of EN 60664; and
- an internal supplementary enclosure (which can be the reflector for the light source) which contains the energized parts and provides a degree of protection of at least IP20, according to EN 60529; and
- marking on the internal supplementary enclosure with the warning “**DO NOT OPEN WHEN ENERGIZED**”.

23 Verifications and tests

23.4.7.3 Thermal endurance to heat

Add:

For Category 3D electrical apparatus the thermal endurance to heat is determined by submitting the enclosures or parts of enclosures in plastic materials on which the integrity of the type of protection depends to continuous storage for four weeks in an ambience of (90 ± 5) % relative humidity and at a temperature of (10 ± 2) K above the maximum service temperature, but at least 80 °C.

In the case of a maximum service temperature above 75 °C, the period of four weeks specified above shall be replaced by a period of two weeks at (95 ± 2) °C and (90 ± 5) % relative humidity followed by a period of two weeks at a temperature of (10 ± 2) K higher than the maximum service temperature.

29 Marking

Add:

29.Z1 Instructions

All electrical apparatus shall be accompanied by instructions, including the following particulars as a minimum:

- a) a recapitulation of the information with which the electrical apparatus is marked, except for the serial number together with any appropriate additional information to facilitate maintenance (for example, address of the importer, repairer, etc.);
- b) instructions for the safe
 - putting into service,
 - use,
 - assembling and dismantling,
 - maintenance (servicing and emergency repair),

- installation,
 - adjustment;
- c) where necessary, training instructions;
- d) details which allow a decision to be made as to whether the apparatus can be used safely in the intended area under the expected operating conditions;
- e) electrical and pressure parameters, maximum surface temperatures and other limit values;
- f) where necessary, special conditions of use, including particulars of possible misuse which experience has shown might occur;
- g) where necessary, the essential characteristics of tools which may be fitted to the apparatus;
- h) a list of the standards, including the issue date, with which the apparatus is declared to comply. A certificate can be used to satisfy this requirement.

The instructions shall contain information necessary for the putting into service, maintenance, inspection, checking of correct operation and, where appropriate, repair of the apparatus, together with all useful instructions, in particular with regard to safety.

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Annex ZA (informative)

Classification of electrical apparatus into categories

ZA.1 Categories

ZA.1.1 Category 1D electrical apparatus

Category 1D electrical apparatus needs special consideration.

The apparatus shall be designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

Category 1D electrical apparatus are intended for use in areas in which explosive atmospheres caused by air/dust mixtures are present continuously, for long periods or frequently. Category 1D apparatus shall ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and are 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.

The special requirements for Category 1D shall be investigated under simulated working conditions as stated by the manufacturer.

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NOTE 1 Apparatus for measurement and control techniques (e.g. instrumentation, sensors, controls) are typical applications under dust of excessive layers.

NOTE 2 Power engineering apparatus (such as motors, luminaires, plugs and sockets) should, wherever practicable, be placed outside of such areas.

ZA.1.2 Category 2D electrical apparatus

The apparatus shall be designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

Category 2D electrical apparatus are intended for use in areas in which explosive atmospheres caused by air/dust mixtures are likely to occur. Category 2D apparatus shall ensure the requisite level of protection, even of frequently occurring disturbances or equipment faults which normally have to be taken into account.

ZA.1.3 Category 3D electrical apparatus

ZA.1.3.1 General

The apparatus shall be designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a normal level of protection.

Category 3D electrical apparatus are intended for use in areas in which explosive atmospheres caused 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. Category 3D apparatus shall ensure the requisite level of protection during normal operation and in certain abnormal conditions specified in this standard.

ZA.1.3.2 Potential ignition sources

In normal operation and in certain abnormal conditions specified by this standard, the apparatus shall not

- a) produce an operational arc or spark unless that arc or spark is prevented from causing ignition of a surrounding explosive atmosphere by one of the methods described in this standard or the relevant type of protection standards as defined in Clause 1;
- b) develop a maximum surface temperature exceeding the maximum value , unless the temperature of the surface or hot spot is prevented from causing ignition of a surrounding explosive atmosphere by one of the methods described in this standard or the relevant type of protection standards, or is otherwise shown to be safe.

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Annex ZB (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-5	2000	Rotating electrical machines Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification	EN 60034-5	2001
IEC 60079-0 (mod)	2004	Electrical apparatus for explosive gas atmospheres Part 0: General requirements	EN 60079-0	2006
IEC 60079-7	2001	Electrical apparatus for explosive gas atmospheres Part 7: Increased safety "e"	EN 60079-7	2003
IEC 60079-11	1999	Electrical apparatus for explosive gas atmospheres Part 11: Intrinsic safety "i"	-	-
IEC 60086-1	2000	Primary batteries Part 1: General	EN 60086-1	2001
IEC 60095 (mod)	Series	Lead-acid starter batteries	EN 60095	Series
IEC 60192	2001	Low pressure sodium vapour lamps - Performance specifications	EN 60192	2001
IEC 60216-1	2001	Electrical insulating materials - Properties of thermal endurance Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2001
IEC 60216-2	1990	Guide for the determination of thermal endurance properties of electrical insulating materials Part 2: Choice of test criteria	-	-
IEC 60243-1	1998	Electrical strength of insulating materials - Test methods Part 1: Tests at power frequencies	EN 60243-1	1998
IEC 60285	1993	Alkaline secondary cells and batteries - Sealed nickel-cadmium cylindrical rechargeable single cells	EN 60285 ¹⁾	1994

¹⁾ EN 60285 is superseded by EN 61951-1:2003, which is based on IEC 61951-1:2003.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60623	2001	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Vented nickel-cadmium prismatic rechargeable single cells	EN 60623	2001
IEC 60662 (mod)	1980	High pressure sodium vapour lamps	EN 60662 ²⁾	1993
IEC 60947-3	1999	Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	1999
IEC 61056	Series	General purpose lead-acid batteries (valve regulated types)	EN 61056	Series
IEC 61150	1992	Alkaline secondary cells and batteries - Sealed nickel-cadmium rechargeable monobloc batteries in button cell design	EN 61150	1993
IEC 61241-1	- ³⁾	Electrical apparatus for use in the presence of combustible dust Part 1: Protection by enclosures "tD"	EN 61241-1	2004 ⁴⁾
IEC 61241-14	- ³⁾	Electrical apparatus for use in the presence of combustible dust Part 14: Selection and installation	EN 61241-14	2004 ⁴⁾
ISO 48	1994	Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)	-	-
ISO 178	2001	Plastics - Determination of flexural properties	EN ISO 178	2003
ISO 179	Series	Plastics - Determination of Charpy impact properties	EN ISO 179	Series
ISO 262	1998	ISO general-purpose metric screw threads - Selected sizes for screws, bolts and nuts	-	-
ISO 273	1979	Fasteners - Clearance holes for bolts and screws	EN ISO 273	1991
ISO 286-2	1988	ISO system of limits and fits Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts	EN 20286-2	1993
ISO 527	Series	Plastics - Determination of tensile properties	EN ISO 527	Series
ISO 965	Series	ISO general-purpose metric screw threads - Tolerances	-	-

²⁾ EN 60662 includes A1:1986 + A2:1987 + A3:1990 to IEC 60662 (mod).

³⁾ Undated reference.

⁴⁾ Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 1818 ⁵⁾	1975	Vulcanized rubbers of low hardness (10 to 35 IRHD)	-	-
ISO 4014	1999	Hexagon head bolts - Product grades A and B	EN ISO 4014	2000
ISO 4017	1999	Hexagon head screws - Product grades A and B	EN ISO 4017	2000
ISO 4026	2003	Hexagon socket set screws with flat point	EN ISO 4026	2003
ISO 4027	2003	Hexagon socket set screws with cone point	EN ISO 4027	2003
ISO 4028	2003	Hexagon socket set screws with dog point	EN ISO 4028	2003
ISO 4029	2003	Hexagon socket set screws with cup point	EN ISO 4029	2003
ISO 4032	1999	Hexagon nuts, style 1 - Product grades A and B	EN ISO 4032	2000
ISO 4762	1997	Hexagon socket head cap screws	EN ISO 4762	1997 ⁶⁾
ISO 4892	Series	Plastics - Methods of exposure to laboratory light sources	EN ISO 4892	Series

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⁵⁾ Withdrawn standard.

⁶⁾ EN ISO 4762:1997 is superseded by EN ISO 4762:2004, which is based on ISO 4762:2004.

Annex ZZ (informative)

Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers only the following essential requirements out of those given in Annex II of the EC Directive 94/9/EC:

- ER 1.0.1 to ER 1.0.6
- ER 1.1.1 to ER 1.1.3
- ER 1.2.1, ER 1.2.2, ER 1.2.4 to ER 1.2.9
- ER 1.3.1 to ER 1.3.4
- ER 1.4.1, ER 1.4.2
- ER 1.6.4 1st paragraph
- ER 2.1.2.1, ER 2.1.2.2, ER 2.1.2.3
- ER 2.2.2.1 to ER 2.2.2.4
- ER 2.3.2.1 to ER 2.3.2.3

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.