SLOVENSKI STANDARD
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Electrical apparatus for potentially explosive atmospheres - General requirements - Amendment A2

Electrical apparatus for potentially explosive atmospheres - General requirements

Elektrische Betriebsmittel für explosionsgefährdete Bereiche - Allgemeine Bestimmungen

Matériel électrique pour atmosphères explosibles - Règles générales

Ta slovenski standard je istoveten z: **EN 50014:1997/A2:1999**

ICS:

29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres

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English version

Electrical apparatus for potentially explosive atmospheres General requirements

Matériel électrique pour atmosphères explosibles - Règles générales

Elektrische Betriebsmittel für explosionsgefährdete Bereiche Allgemeine Bestimmungen

This amendment A2 modifies the European Standard EN 50014:1997; it was approved by CENELEC on 1998-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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

This amendment was prepared by the Technical Committee CENELEC TC 31, Electrical apparatus for explosive atmospheres - General requirements

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A2 to EN 50014:1997 on 1998-10-01.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	1999-10-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	-

Contents

Replace the current entry 22 by:

22 Caplights, caplamps, handlamps and batteries

2 Normative references

Add:

EN 50281-1-1		Electrical apparatus for use in the presence of combustible dust Part 1-1: Electrical apparatus protected by enclosures Construction and testing
EN 60423	1994	Conduits for electrical purposes - Outside diameters of conduits for electrical installations and threads for conduits and fittings (IEC 60423:1993, modified)
IEC 60050(486)	1991	International Electrotechnical Vocabulary Chapter 486: Secondary cells and batteries
ISO 426-2	1983	Wrought copper-zinc alloys - Chemical composition and forms of wrought products -- Part 2: Leaded copper-zinc alloys

3 Definitions and symbols

After subclause 3.31, **add**:

3.32 cell: An assembly of electrodes and electrolyte which constitutes the smallest electrical unit of a battery.

3.33 primary cell or battery: An electrochemical system capable of producing electrical energy by chemical reaction.

3.34 secondary cell or battery: An electrically rechargeable electrochemical system capable of storing electrical energy and delivering it by chemical reaction.

3.35 open cell or battery: A secondary cell, or battery, having a cover provided with an opening through which gaseous products may escape. [IEC 486-01-18]

3.36 sealed valve regulated cell or battery: A cell or battery which is closed under normal conditions, but which has an arrangement which allows the escape of gas if the internal pressure exceeds a predetermined value. The cell cannot normally receive an addition to the electrolyte. [IEC 486-01-20/1]

3.37 sealed gas tight cell or battery: A cell or battery which remains closed and does not release either gas or liquid when operated within the limits of charge or temperature specified by the manufacturer.

NOTE 1: Such cells and batteries may be equipped with a safety device to prevent dangerously high internal pressure. The cell or battery does not require addition to the electrolyte and is designed to operate during its life in its original sealed state.

NOTE 2: The above definition is taken from EN 50020. It differs from the definition in IEC 486-01-20/1 by virtue of the fact that it applies to either a cell or battery.

3.38 battery: An assembly of two or more cells electrically connected to each other to increase the voltage or capacity.

3.39 capacity: The quantity of electricity or electric charge, which a fully charged battery can deliver under specified conditions.

3.40 nominal voltage: (of a cell or battery) is that specified by the manufacturer.

3.41 maximum open circuit voltage: (of a cell or battery) is the maximum attainable voltage under normal conditions, that is, from either a new primary cell, or a secondary cell just after a full charge. (See the tables in 22.3.1.2 which show the maximum open circuit voltage for acceptable cells.)

3.42 charging: The act of forcing current through a secondary cell or battery in the opposite direction to the normal flow to restore the energy stored originally.

3.43 reverse charging: The act of forcing current through either a primary cell or secondary cell in the same direction as the normal flow e.g. in an expired battery.

3.44 deep discharge: Refers to an event which reduces a cell voltage below that recommended by the cell or battery manufacturer.

3.45 inherently safe (Ihs) cell (or battery): A primary cell or battery in which the short circuit current and maximum surface temperature are limited to a safe value by its internal resistance.

14 Connection facilities and terminal compartments

Add the following subclause:

14.5 The contact pressure of electrical connections shall not be affected by dimensional changes in service (due to temperature, humidity, etc.) of insulating materials.

In the particular case of plastics walled enclosures provided with an internal earth continuity plate, the test of 23.4.7.9 shall be applied.

NOTE: The material and dimensions of the earth continuity plate should be appropriate for the anticipated fault current.

22 Caplights, caplamps and handlamps

Replace the title of clause 22 by:

22 Caplights, caplamps, handlamps and batteries

Add the following subclause:

22.3 Appartus incorporating cells and batteries

22.3.1 The requirements in 22.3.1.1 to 22.3.1.12 below shall apply for all cells and batteries incorporated into explosion protected apparatus:

22.3.1.1 Batteries incorporated into explosion protected apparatus shall be formed only from cells connected in simple series.

22.3.1.2 Only cell types referred to in published IEC or CENELEC cell standards and having known characteristics shall be used. Tables 1 and 2 below list cells for which suitable standards either exist, or are to be produced.

Table 1: Primary cells

IEC 60086-1 Type	Positive electrode	Electrolyte	Negative electrode	Nominal voltage (V)	Max. open circuit voltage (V)
-	Manganese dioxide	Ammonium chloride, zinc chloride	Zinc	1,5	1,73
A	Oxygen	Ammonium chloride, zinc chloride	Zinc	1,4	1,55
B	Carbon monofluoride	Organic electrolyte	Lithium	3	3,7
C	Manganese dioxide	Organic electrolyte	Lithium	3	3,7
E	Thionyl chloride ($SOCl_2$)	Non-aqueous inorganic	Lithium	3,6	3,9
F	Iron disulfide (FeS_2)	Organic electrolyte	Lithium	1,5	1,83
G	Copper (II) oxide (CuO)	Organic electrolyte	Lithium	1,5	2,3
L	Manganese dioxide	Alkali metal hydroxide	Zinc	1,5	1,65
P	Oxygen	Alkali metal hydroxide	Zinc	1,4	1,68
S	Silver oxide (Ag_2O)	Alkali metal hydroxide	Zinc	1,55	1,63
T	Silver oxide (AgO, Ag_2O)	Alkali metal hydroxide	Zinc	1,55	1,87
*	Sulphur dioxide	Non-aqeous organic salt	Lithium	3,0	3,0
*	Mercury	Alkali metal hydroxide	Zinc	Data awaited	Data awaited

NOTE 1: Zinc/manganese dioxide cells are listed in IEC 60086-1 but not classified by a type letter
NOTE 2: Those marked * may only be used once an IEC or CENELEC cell standard exists.

Table 2: Secondary cells

Relevant IEC/CENELEC standards/type	Type	Electrolyte	Nominal voltage (V)	Max. open circuit voltage (V)
Type K EN 61056 EN 60095	Lead-acid (WET) Lead-acid (DRY)	Sulphuric acid (SG 1,25)	2,2 2,2	2,67 2,35
Type K IEC 60285 IEC 60623 IEC 60662 EN 61150	Nickel-cadmium	Potassium hydroxide (SG1,3)	1,2	1,55
*	Nickel-iron	Potassium hydroxide (SG1,3)	Data awaited	1,6
*	Lithium	Non-aqueous organic salt	Data awaited	Data awaited
*	Nickel metal hydride	Potassium hydroxide	1,2	1,5
NOTE: Those marked * may only be used once an IEC or CENELEC cell standard exists.				

22.3.1.3 All cells in a battery shall be of the same electrochemical system, cell design and rated capacity.

22.3.1.4 All batteries shall be arranged and operated so as to be within the allowable limits defined by the cell or battery manufacturer.

22.3.1.5 Batteries shall not contain a mixture of primary and secondary cells.

22.3.1.6 Primary and secondary cells or batteries shall not be used inside the same apparatus enclosure if they are readily interchangeable.

22.3.1.7 Primary batteries shall not be re-charged. Where another voltage source exists inside apparatus containing primary batteries and there is a possibility of interconnection, precautions shall be taken to prevent charging current passing through them.

22.3.1.8 Batteries shall not contain cells made by different manufacturers.

22.3.1.9 All cells shall be constructed, or arranged so as to prevent leakage of electrolyte, which would adversely affect the type of protection or components on which safety depends.

22.3.1.10 Only the manufacturer's recommended method(s) of making electrical connections to a battery shall be used.

22.3.1.11 Where a battery is mounted inside apparatus and its orientation is important for safe operation, the correct orientation of the apparatus shall be indicated on the outside of the apparatus enclosure.

22.3.1.3 Where it is necessary for the user to replace cells or batteries contained within an enclosure, the relevant parameters to allow correct replacement shall be legibly and durably marked on or inside the enclosure, or detailed in the manufacturer's instructions. That is, either the manufacturer's part number, or the name of the cell or battery manufacturer, the electrochemical system, nominal voltage and rated capacity.

23 Type verifications and tests

Add the following new subclause 23.4.7.9:

23.4.7.9 Earth continuity test via non-metallic enclosure

The material from which the enclosure is manufactured may be tested as a complete enclosure, a part of an enclosure, or as a sample of the material from which the enclosure is made, provided that the relevant critical dimensions of the sample are the same as those of the enclosure.

The cable gland is represented by a 20 mm (nominal) diameter test bar manufactured from brass (Cu Zn 39 Pb 3 or Cu Zn 38 Pb 4 (to ISO 426-2:1983)) carrying an ISO metric thread with a tolerance class 6g, 1,5 mm pitch (IEC 60423). The length of the test bar shall be such as to ensure that at least one full thread remains free at each end when assembled as shown in the diagram.

Complete earth plates or parts of earth plates that are intended to be used with the enclosure shall be used for the purpose of this test.

If the earth plate is intended to have a clearance hole, the hole provide in the samples used for the test shall be between 22 mm and 23 mm diameter and the method of assembly shall ensure that the screw thread of the test bar does not make contact directly with the inside of the clearance hole.

The clamping nuts are manufactured from brass (Cu Zn 39 Pb 3 or Cu Zn 38 Pb 4 (to ISO 426-2:1983)) and are provided with an ISO metric thread with a tolerance class 6h, 1,5 mm pitch (IEC 60423). The thickness of the nuts shall be 3 mm (nominal).

The components are assembled as shown in Figure 5. The torque applied to each pair of the nuts in turn shall be 10 Nm (± 10%).

The hole in the wall (or part of the wall or the test sample) may be a plain through hole or a tapped hole having a thread form compatible with the test bar.

After the test sample has been assembled it shall be subjected to the conditions for the test for thermal endurance to heat as described in 23.4.7.3.

This shall be followed by a further period of 14 days in an air oven at a temperature of 80°C.

On completion of the conditioning the resistance between the earth plates or parts of earth plates shall be calculated by passing a direct current of 10 A between the earth plates and measuring the voltage drop between them.

The plastic material that has been tested in this manner is deemed to be satisfactory if the resistance between the earth plates or parts of earth plates does not exceed 1×10^{-3} ohms.