SLOVENSKI STANDARD

SIST EN 50018:2001/A1:2003

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Električne naprave za potencialno eksplozivne atmosfere - Neprodirni okrov “d“- Dopolnilo A1

Electrical apparatus for potentially explosive atomspheres - Flameproof enclosure 'd'

ICS 29.260.20

Referenčna številka
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EUROPEAN STANDARD **EN 50018/A1**

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English version

Electrical apparatus for potentially explosive atmospheres - Flameproof enclosure 'd'

Matériel électrique pour atmosphères explosibles - Enveloppe antidéflagrante 'd'

Elektrische Betriebsmittel für explosionsgefährdete Bereiche - Druckfeste Kapselung 'd'

This amendment A1 modifies the European Standard EN 50018:2000; it was approved by CENELEC on 2001-06-01. 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.

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

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Ref. No. EN 50018:2000/A1:2002 E

Foreword

This amendment to the European Standard EN 50018:2000 was prepared by SC 31-2, Flameproof enclosures 'd', of Technical Committee CENELEC TC 31, Electrical apparatus for explosive atmospheres.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 50018 on 2001-06-01.

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) 2003-03-01

- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2003-06-30

Replace the last sentece of the foreword by:

Annexes A, B, C, D and E are normative.

Add to the contents:

Annex E (normative) Cells and batteries used in flameproof 'd' enclosures

Add the following references to clause 2:

EN 60086-1	2001	Primary batteries — Part 1: General (IEC 60086-1:2000)
EN 60127	Series	Miniature fuses (IEC 60127)
EN 60285	1994	Alkaline secondary cells and batteries — Sealed nickel-cadmium cylindrical rechargeable single cells (IEC 60285:1993 + corr. August 1993)
EN 60623	1995	Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623:1990 + A1:1992 + A2:1992)
EN 60662	1993	High pressure sodium vapour lamps (IEC 60662:1980 + A2:1987 + A3:1990)
EN 61150	1993	Alkaline secondary cells and batteries – Sealed nickel-cadmium rechargeable monobloc batteries in button cell design (IEC 61150:1992)

Add Annex E:

Annex E
(normative)

Cells and batteries used in flameproof 'd' enclosures

E.1 Introduction

E.1.1 This annex contains the requirements for electrical apparatus protected by type of protection 'd' flameproof enclosures which contains one or more cells used as batteries to provide electrical power to circuits.

E.1.2 Irrespective of the type of electrochemical cell used, the main objective shall be to prevent a flammable mixture of electrolytic gases (usually hydrogen and oxygen) from occurring inside the flameproof enclosure. With this in mind, cells and batteries which are likely to release electrolytic gas in normal use (either by natural venting or by a pressure relief valve) shall not be used inside the flameproof enclosure.

E.2 Acceptable electrochemical systems

E.2.1 Only those cells listed in Tables E.1 and E.2 below for which IEC or CENELEC cell standards exist shall be used.

Table E.1 — Acceptable primary cells

EN 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
C	Manganese dioxide	Organic electrolyte	Lithium	3,0	3,7
E	Thionyl chloride ($SOCl_2$)	Non-aqueous inorganic	Lithium	3,6	3,9
L	Manganese dioxide	Alkali metal hydroxide	Zinc	1,5	1,65
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-aqueous 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 EN 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 E.2 — Secondary cells

Relevant IEC/CENELEC Standards/type	Type	Electrolyte	Nominal voltage V	Max. open circuit voltage V
Type K EN 60285 EN 60623 EN 60662 EN 61150	Nickel-cadmium	Potassium hydroxide (SGI.3)	1,2	1,55
*	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.				

E.3 General requirements for cells (or batteries) inside flameproof enclosures

E.3.1 The following restrictions of use shall apply to certain types of cells:

a) vented or open secondary cells shall not be used to form a battery inside flameproof enclosures;

b) sealed valve regulated cells may be used inside a flameproof enclosure; but for discharge purposes only;

c) subject to the requirements of clause E.5 sealed gas tight secondary cells may be recharged inside flameproof enclosures.

E 3.2 Flameproof enclosures containing a battery shall carry the warning label: ***"Do not open when an explosive gas atmosphere is present"***.

This need not apply when the battery and its associated connected circuits conform to EN 50020 and the battery is not recharged in service (see EN 50020, 7.4.7).

E.3.3 Batteries and their associated safety devices shall be securely mounted (e.g. held in place by a purpose designed clip or bracket).

E.3.4 There shall be no relative movement between the battery and the associated safety device or devices such as would impair conformity with the requirements of the type of protection concerned.

NOTE Conformity with E.3.3 and E.3.4 should be checked before and after the relevant mechanical impact/drop test required by EN 50014, *Electrical apparatus for potentially explosive atmospheres — General requirements*.

E.4 Arrangement of safety devices

E.4.1 Prevention of excessive temperature and cell damage

E.4.1.1 Under short circuit discharge conditions, batteries shall either meet both a) and b) below, or be fitted with a safety device, as described in E.4.1.2:

a) the external surface temperature of the cell or battery shall not exceed the continuous operating temperature specified by the cell or battery manufacturer or 80 °C, whichever is the lower, taking into account the local ambient temperature within the enclosure; and

b) the maximum discharge current shall not exceed that specified by the cell or battery manufacturer.

E.4.1.2 Where a) and b) above cannot be achieved, a safety device is required which shall comply with the requirements for infallible components as defined in EN 50020, *Electrical apparatus for potentially explosive atmospheres — Intrinsic safety 'i'*, and be located as close to the cell or battery terminal as is reasonably practicable and be either:

i) a resistor or current limiting device, which limits the current to the maximum continuous withdrawal current specified by the battery manufacturer; or

ii) a fuse conforming with EN 60127, selected so that the fusing characteristic prevents the maximum withdrawal current and allowable duration specified by the battery manufacturer from being exceeded. Where the fuse is of the replaceable type a label shall be provided adjacent to the fuse holder, specifying the type of fuse to be used.

E.4.2 Prevention of cell polarity reversal or reverse charging by another cell in the same battery

E.4.2.1 Where batteries are used having:

– a capacity of 1,5 Ah or less (at a one hour discharge rate), and

– a volume less than one hundredth of the free volume of the enclosure,

no additional protection need be fitted to prevent the release of electrolytic gas by polarity reversal, or reverse charging of a cell by other cells in the same battery.

NOTE These relaxations shall not be interpreted as allowing the release of electrolytic gas from such cells.

E.4.2.2 Where batteries are used having a capacity and/or volume which exceed the above values, arrangements shall be incorporated to prevent cell polarity reversal or reverse charging of a cell by others within the battery. Two examples of how this may be achieved are given in i) and ii) below:

i) monitoring the cell voltage across a cell (or a few cells) and cutting off the supply if the voltage decreases below the minimum voltage specified by the cell manufacturer; or

NOTE Such protection is often used to prevent cells going into a state of "Deep discharge". If an attempt is made to monitor too many cells connected in series, the protection may not function reliably due to tolerances in individual cell voltages and the protection circuit. Generally no more than 6 cells (in series) should be monitored by one protection unit.

ii) using shunt diodes so connected as to limit the reverse polarity voltage across each cell. For example, the protective arrangement for a battery of three cells connected in series is as shown in Figure E.1 below.

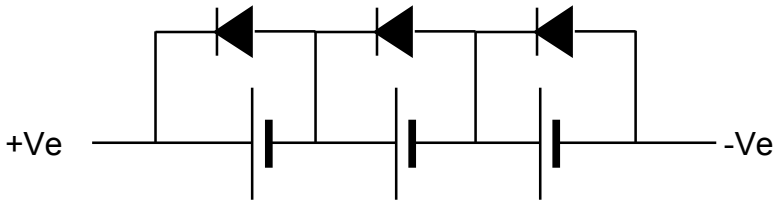

Figure E.1 — Fitting of diode arrangement for three cells in series

For this protective arrangement to be effective the forward voltage drop across each diode used to prevent reverse charging of a cell shall not exceed the safe reverse charge voltage of that cell.

NOTE Silicon diodes are considered suitable to meet this requirement.

E.4.3 Prevention of inadvertent charging of a battery by other voltage sources in the enclosure

Where there is another voltage source in the same enclosure (including other batteries), the battery and its associated circuits shall be protected against charging by other than a circuit specifically designed to do so. For example by:

i) separating the battery and its associated circuits from all other voltage source(s) inside the enclosure, using the clearance and creepage distances specified in Table 1 of EN 50019 for the highest voltage capable of causing the contamination, or

ii) separating the battery and its associated circuits from all other voltage source(s) inside the enclosure, by an earthed metal barrier/screen capable of carrying the maximum fault current of the source for the time that it is likely to exist (taking account of any circuit protection provided, e.g. fuses, earth fault protection), or

iii) separating the battery only, from the other voltage source(s) using the clearance and creepage distances specified in Table 1 of EN 50019, but with blocking diodes fitted as shown in Figure E.2 below, so arranged as to reduce the risk of a single fault causing both diodes to be short circuited.

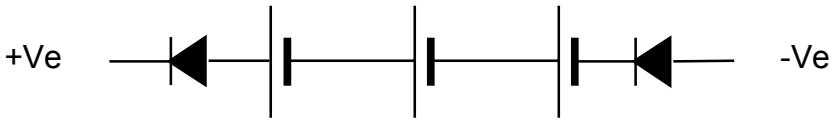

Figure E.2 — Fitting of blocking diodes to meet E.4.3iii)

The requirements of i) to iii) do not apply to circuits connected to a battery for the purpose of creating a voltage reference point, or to a charging supply intended to recharge a secondary battery in accordance with clause E.5, or to a battery having a capacity of 1,5 Ah or less and a volume less than one hundredth of the free volume of the enclosure.

E.5 Recharging of secondary cells inside flameproof enclosures

E.5.1 Only "K" type, sealed gas tight Nickel-Cadmium, as listed in Table E.2, shall be recharged inside flameproof enclosures. Nickel-metal hydride cells may be recharged only when an IEC or CENELEC cell standard exists.