



SLOVENSKI STANDARD
SIST EN 50272-3:2003
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**Safety requirements for secondary batteries and battery installations - Part 3:
Traction batteries**

Safety requirements for secondary batteries and battery installations -- Part 3: Traction batteries

Sicherheitsanforderungen an Batterien und Batterieanlagen -- Teil 3: Antriebsbatterien für Elektrofahrzeuge

Règles de sécurité pour les batteries et les installations de batteries -- Partie 3: Batteries de traction

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29.220.20 Sä | ä • \ ä ^ \ ~ } ä æ } ä | ^ } ä æ Acid secondary cells and batteries

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EUROPEAN STANDARD

EN 50272-3

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English version

**Safety requirements for secondary batteries and battery installations
Part 3: Traction batteries**

Règles de sécurité pour les batteries
et les installations de batteries
Partie 3: Batteries de traction

Sicherheitsanforderungen an Batterien
und Batterieanlagen
Teil 3: Antriebsbatterien für
Elektrofahrzeuge

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This European Standard was approved by CENELEC on 2002-07-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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 European Standard was prepared by the Technical Committee CENELEC TC 21X, Secondary cells and batteries.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50272-3 on 2002-07-01.

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) 2003-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-07-01

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1 Scope

This standard applies to secondary batteries and battery installations used for electric vehicles, e.g. in electric industrial trucks (including - lift trucks, tow trucks, cleaning machines, automatic guided vehicles), in battery powered locomotives, in electric road vehicles (e.g. passenger and goods vehicles, golf carts, bicycles, wheelchairs).

The nominal voltages are limited to 1 000 V a.c. and 1 500 V d.c. respectively and describe the principal measures for protection against hazards generally from electricity, gas emission and electrolyte.

It provides requirements on safety aspects associated with the installation, use, inspection, maintenance and disposal of batteries.

It covers lead-acid, nickel cadmium and other alkaline secondary batteries.

NOTE It is intended to amend this standard to include other battery systems when they become available.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 166	1995	Personal eye-protection - Specifications
EN 1175-1	1998	Safety of electrical trucks - Electrical requirements Part 1: General requirements for battery powered trucks
EN 1987-1	1987	Electrically propelled road vehicles - Specific requirements for safety - Part 1: On board energy storage
EN 60204-1	1986	Electrical equipment of industrial machines Part 1: General requirements
EN 60900	1993	Hand tools for live working up to 1 kV a.c. and 1,5 kV d.c.
EN 61140	2001	Protection against electric shock - Common aspects for installation and equipment (IEC 61140:1997)
EN 61429 + A11	1996 1998	Marking of secondary cells and batteries with the international recycling symbol ISO 7000-1135 and indications regarding directives 93/86/EEC and 91/157/EEC
HD 22.1 S3	1997	Rubber insulated cables of rated voltages up to and including 450 V/750 V - Part 1: General requirements
IEC 60364-4-41	1992	Electrical installations of buildings - Part 4: Protection for safety - Chapter 41: Protection against electric shock
IEC 60050-486	1991	International Electrotechnical Vocabulary - Chapter 486: Secondary cells and batteries
IEC/TR3 61431	1995	Guide for the use of monitor systems for lead-acid traction batteries
ISO 7000	1989	Graphical symbols for use on equipment - Index and synopsis

3 Definitions

For the purposes of this European Standard the following definitions apply.

3.1

(secondary) cell; (rechargeable) cell; single cell

an assembly of electrodes and electrolyte which constitutes the basic unit of a secondary battery (see IEC 60050: 486-01-02)

NOTE This assembly is contained in an individual case and closed by a cover.

3.2

lead-acid cell or battery

a secondary battery in which the electrodes are made mainly from lead and the electrolyte is a sulphuric acid solution (H_2SO_4) (see IEC 60050: 486-01-04)

3.3

nickel-cadmium cell or battery

an alkaline secondary battery in which the positive material is made mainly from nickel and the negative material is made mainly from cadmium (see IEC 60050: 486-01-07). The electrolyte is an alkaline solution (potassium hydroxide, KOH)

3.4

vented (secondary) cell

a secondary cell having a cover provided with an opening through which gaseous products may escape (see IEC 60050: 486-01-18)

3.5

valve regulated (secondary) cell (standards.iteh.ai)

a secondary cell which is closed under normal conditions but has an arrangement which allows the escape of gas if the internal pressure exceeds a predetermined value. The cell cannot normally receive addition to the electrolyte (see IEC 60050: 486-01-20)

3.6

gas-tight sealed (secondary) cell

a secondary cell which remains closed and does not release either gas or liquid when operated within the limits of charge and temperature specified by the manufacturer. The cell may be equipped with a safety device to prevent dangerously high internal pressure.

The cell does not require addition to the electrolyte and is designed to operate during its life in its original sealed state (see IEC 60050: 486-01-21)

3.7

secondary battery

two or more secondary cells connected together and used as a source of electrical energy (see IEC 60050: 486-01-03)

3.8

traction battery

a secondary battery which is designed to provide the propulsion energy for electric vehicles

3.9

monobloc battery

a secondary battery in which the plate packs are fitted in a multi-compartment container (see IEC 60050: 486-01-17)

3.10

electrolyte

a liquid or solid phase containing mobile ions which render the phase ionically conductive (see IEC 60050: 486-02-19)

3.11**gassing; gas emission**

the formation of gas produced by electrolysis of the electrolyte (see IEV 60050: 486-03-24)

3.12**charge; charging (of a battery)**

An operation during which a battery receives from an external circuit electrical energy which is converted into chemical energy (see IEV 60050: 486-01-11)

3.13**equalisation charge**

extended charge which ensures complete charging of all cells in a battery

3.14**opportunity charging**

the use of free time during a work period to top up the charge and thus extend the work period of a battery whilst avoiding excessive discharge

3.15**overcharge; overcharging (of a cell or battery)**

continued charging after the full charge of a cell or battery (see IEV 60050: 486-03-35)

3.16**discharge; discharging (of a battery)**

an operation during which a battery delivers current to an external circuit by the conversion of chemical energy into electrical energy (see IEV 60050: 486-01-12)

3.17**battery peripheral equipment**

equipment installed on the battery, which supports or monitors the operation of the battery, e.g. central water filling system, electrolyte agitation system, battery monitoring system, central de-gassing system, battery connectors (plugs and sockets), thermal management system, etc

3.18**charging room**

a room or closed area intended specifically for recharging batteries. The room may also be used for battery maintenance

3.19**charging area**

an open area designated and made suitable for recharging batteries. The area may also be used for battery maintenance

4 Protection against electric shock

Measures shall be taken on batteries and in battery charging installations for protection against direct contact and indirect contact, or against both direct or indirect contact. These measures are described in detail in IEC 60364-4-41 specifying the protection against electric shock on installations up to 1 000 V a.c. or 1 500 V d.c. The following clauses describe the typical measures to be taken for traction batteries in electrical vehicles.

4.1 Protection against both direct and indirect contact

Protection against direct and indirect contact is simultaneously met by the use of safety extra low voltage (SELV) (24 V d.c.) or protective extra low voltage (PELV) (24 V d.c.), as long as the whole installation corresponds to the conditions for SELV or PELV.

For protection against direct contact the following protective measures apply:

- protection by insulation of live parts;
- protection by barriers or enclosures;
- protection by obstacles.

(see IEC 60364-4-41,412.1 to 412.3).

For protection against indirect contact the following measures can be selected:

- protection by automatic disconnection or signalling;
- protection by protective insulation;
- protection by earth-free local equipotential bonding;
- protective electrical separation.

4.2 Protection against direct and indirect contact when discharging the traction battery on the vehicle (battery disconnected from charger / mains)

4.2.1 Batteries with nominal voltages up to and including 60 V d.c. do not require protection against electric shock caused by direct contact, as long as the whole installation corresponds to the conditions for SELV and PELV.

However, for other reasons, e.g. short circuits, mechanical damage, all batteries in electrical vehicles require protection against direct contact of live parts, even if the battery nominal voltage is 60 V d.c. or less.

4.2.2 Batteries with nominal voltages from above 60 V d.c. and up to and including 120 V d.c. require protective measures against direct contact.

NOTE Batteries with nominal voltages up to and including 120 V d.c. are regarded as safe power sources for SELV-systems (safety extra low voltage) or PELV-systems (protective extra low voltage), (see IEC 60364-4-41,411.1).

The following protective measures apply:

- a) insulation of live parts;
- b) barriers or enclosures;
- c) obstacles or placing out of reach.

If the protection against direct contact of live parts is ensured only by obstacles or placing out of reach, the battery accommodation shall have access restricted to trained and authorized personnel only, and shall be marked by warning labels

Batteries having nominal voltages exceeding 120 V d.c. require protective measures against both direct and indirect contact.

Battery compartments with batteries having nominal voltages exceeding 120 V d.c. shall be locked and have restricted access for trained and authorized personnel only and shall be marked by warning labels (see Clause 11).

For batteries with nominal voltages exceeding 120 V d.c. the following protective measures against indirect contact can be selected:

- protective electrical insulation;
- protection by earth-free equipotential bonding;
- protection by automatic disconnection or signalling.