



**SLOVENSKI STANDARD**  
**SIST EN 1987-1:2000**  
**01-december-2000**

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**Electrically propelled road vehicles - Specific requirements for safety - Part 1: On board energy storage**

Electrically propelled road vehicles - Specific requirements for safety - Part 1: On board energy storage

Elektrisch angetriebene Straßenfahrzeuge - Besondere Festlegungen für die Sicherheit - Teil 1: Bordeigene Energiespeicher

Véhicules routiers a propulsion électrique - Prescriptions particulieres pour la sécurité - Partie 1: Stockage de l'énergie a bord du véhicule

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**Ta slovenski standard je istoveten z: EN 1987-1:1997**

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**ICS:**

43.120      Electric road vehicles

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EUROPEAN STANDARD

EN 1987-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1997

ICS 43.120

Descriptors: road vehicles, electric vehicles, safety, accident prevention, storage, energy, traction batteries, installation, marking, air pollution, environmental protection, gas emissions, collisions, overturning (vehicles), specifications

English version

**Electrically propelled road vehicles - Specific  
requirements for safety - Part 1: On board energy  
storage**

Véhicules routiers à propulsion électrique -  
Prescriptions particulières pour la sécurité -  
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véhicule

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Teil 1: Bordeigene Energiespeicher

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

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CEN**

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 301 "Electrically propelled road vehicles", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 1997, and conflicting national standards shall be withdrawn at the latest by December 1997.

This European Standard EN 1987 consists of the following Parts, under the general title "Electrically propelled road vehicles - Specific requirements for safety".

- Part 1 : On board energy storage ;
- Part 2 : Functional safety means and protection against failure ;
- Part 3 : Protection of users against electrical hazards.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## 1 Scope

This European Standard specifies all requirements specific to the electrically propelled vehicles in order to remain safe both for the users of the vehicle and for the environment of the vehicle (pedestrian, nature protection against pollution etc.). This standard does not apply to maintenance operations and specific requirements for the vehicle connected to an external power supply. This part deals with specific requirements related to the on board electrochemical storage of energy.

## 2 Normative references

This European Standard incorporates, by dated or undated references, provisions from other publications. These normative references are cited at 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.

EN 60 529 : 1991, Degree of protection provided by enclosures, (IP codes) (IEC 529:1989).

HD 366 : 1977, Classification of electrical and electronic equipment with regard to protection against electric shocks (IEC 536 : 1976).

prEN 1987-3 : 1996, Electrically propelled road vehicles - Specific prescriptions for safety - Part 3 : Protection of users against electrical hazards.

IEC 417K, Graphic symbols for use on equipment. Index, survey and compilation of the single sheets - Tenth supplement.

ISO 3864 : 1984, Safety colours and safety signs

## 3 Definitions

For the purposes of this standard, the following definitions apply.

### 3.1 Cell

A cell is an electro-chemical energy storage device, of which the nominal voltage is the electro-chemical couple nominal voltage, made of positive and negative electrodes, and an electrolyte.

### 3.2 Battery module

A battery module is a single unit containing one cell or a set of cells electrically connected and mechanically assembled.

### 3.3 Battery pack

A battery pack is a single mechanical assembly comprising battery modules, retaining frames or trays. The battery pack can include other components for example topping-up and temperature control.

### 3.4 Battery (traction battery)

A battery is the collection of all battery packs which are electrically connected, for the supply of energy to the power circuit.

### 3.5 Exposed conductive part

In accordance with International Electrotechnical Vocabulary (IEV), an exposed conductive part is a conductive part, which can readily be touched, and which is not electrically energized in normal use, but which can become energized under fault conditions (insulation failure).

For this standard, "readily be touched" means "can be touched with a test finger IPXXB as defined in EN 60529:1991".

NOTE : This concept is relative to a specific electrical circuit, a live part in one circuit can be an exposed conductive part to another, e.g a car body can be a live part of the auxiliary network but an exposed conductive part to the power circuit.

### 3.6 Live part

A live part is any conductor or conductive part intended to be electrically energized in normal use.

### 3.7 Electrical chassis

An electrical chassis is a set made of conductive parts electrically linked together, and all other conductive parts electrically linked to them, whose potential is taken as reference.

### 3.8 Direct contact

Direct contact is contact of persons or livestock with live parts.

### 3.9 Power circuit

The power circuit comprises all the power equipments such as traction battery, converter (inverter, chopper, etc.) traction motor and cables and connectors, used for the propulsion of the electric vehicle and other equipments (dc/dc converter, step-up, etc.) galvanically connected with these power equipments.

### 3.10 Drive system

The drive system includes all electric traction motors and the power control units for these motors ; not the on board electric power source, e.g. the traction battery, not the auxiliary electronic devices, and not converters, e.g. dc/dc converter, on board charger (unless it is common with the inverter motor controller).

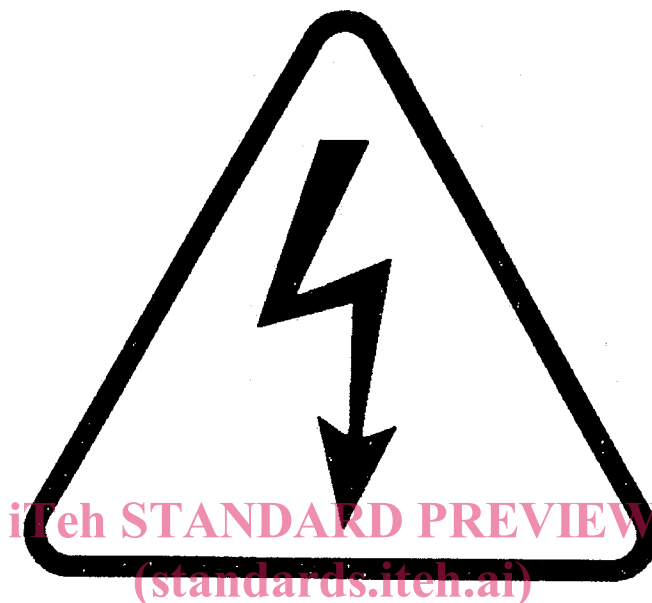
### 3.11 Connection terminal

A connection terminal is a live part of a battery module outside the enclosure of the battery module, intended to transmit electrical energy.

## 4 Marking

### 4.1 Battery pack

Nearby the battery pack shall appear the symbol given in figure 1:



(back : yellow, bounding and symbol : black), in accordance with IEC 417K and ISO 3864:1984, and the nominal voltage of the battery.

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Figure 1

This warning shall be unalterable and very visible if someone tries to access the battery.

### 4.2 Battery type

The chemical type of battery shall be clearly and visibly indicated for the benefit of emergency and rescue people.

## 5 Exhaust gas from battery

The vehicle manufacturer shall state the maximum flow rate (in cubic metres per hour) and the maximum volume (in cubic metres) in the two following situations:

- in case of normal service ;
- and in case of a first failure of devices involved in the charging process.

NOTE : These two values can be used to determine the ventilation device in the charging room.

## 6 Installation rules of the battery

### 6.1 Protection against direct contact

Protection against direct contacts shall conform to clause 5 of prEN 1987-3:1996.



## 6.2 Insulation resistance of the battery

### 6.2.1 Test method

Considering the requirements and the measuring devices used, this test is not applicable for insulation resistances of battery higher than 1 M $\Omega$ .

If the battery has a galvanic link to the electrical chassis of the vehicle, the insulation resistance values and the measurement method are still valid. It is only necessary, to do the measurement, to disconnect the battery from the electrical chassis of the vehicle.

Throughout the test, the battery shall have an open circuit voltage greater than its nominal value.

The two poles of the battery shall be disconnected from the power circuit.

The voltmeter used in this test shall measure DC values and have an internal resistance greater than 10 M $\Omega$ .

Measurement shall be made in three steps:

a) step one :

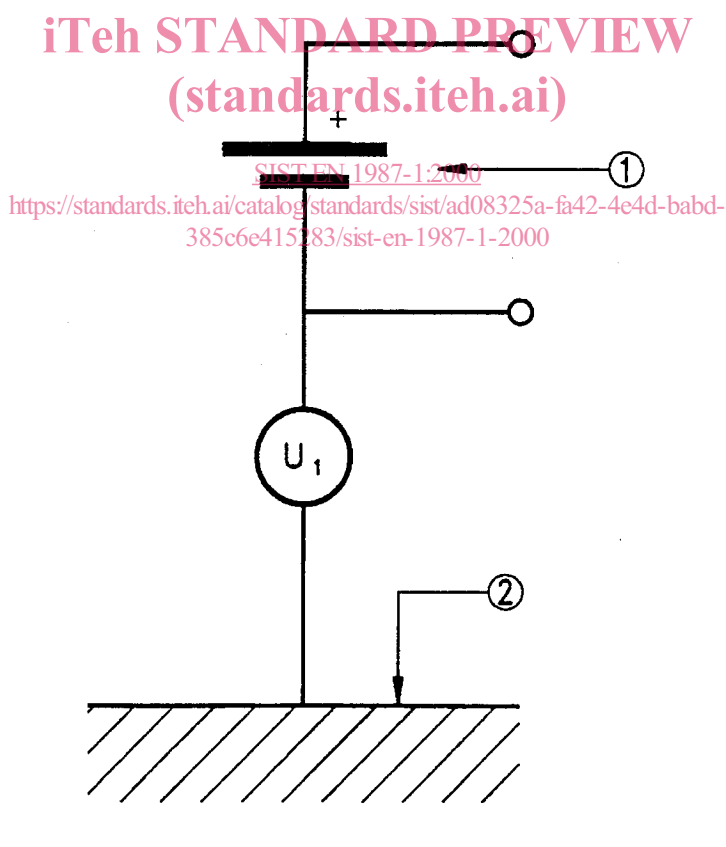


Figure 2

Measure  $U_1$  in accordance with the test assembly in figure 2.