SLOVENSKI STANDARD
oSIST prEN IEC 60086-1:2025

01-maj-2025

Primarne baterije - 1. del: Splošno

Primary batteries - Part 1: General

Primärbatterien - Teil 1: Allgemeines

Piles électriques - Partie 1: Généralités

Ta slovenski standard je istoveten z: **prEN IEC 60086-1:2025**

ICS:

29.220.10 Primarni členi in baterije Primary cells and batteries

oSIST prEN IEC 60086-1:2025 **en**

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 35 : PRIMARY CELLS AND BATTERIES	
SECRETARIAT: Japan	SECRETARY: Mr Takao Uyama
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 3C,TC 21,SC 21A,TC 61,TC 108	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant “In Some Countries” clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Primary batteries - Part 1: General

PROPOSED STABILITY DATE: 2029

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PRIMARY BATTERIES –

Part 1: General

FOREWORD

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International Standard IEC 60086-1 has been prepared by IEC technical committee 35: Primary cells and batteries.

This fourteenth edition cancels and replaces the thirteenth edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) In Clause 3, terms were reordered according their functions: basic terms, electrochemical systems, battery shapes, electrical characteristics, specifications, failure modes;

b) New letter "T" was added in Table 1 Standardized electrochemical systems of 4.1.4 classification;

c) Maximum open circuit voltage of letter "F" was changed from 1,83 to 1,90 V;

d) Drawing of pulse tests with multiple load was moved from IEC 60086-2 to 5.2.2.2 application tests with multiple loads;

e) Annex F: Guidance for proposing value of minimum average duration was modified;

f) Annex D of IEC 60086-2:2021, Common designation, has transferred to Annex H of this document;

g) Table H.1, common designation index, was modified to provide reference to IEC 60086-2-1 and IEC 60086-2-2 for each battery;

h) Annex I identifies the batteries of general use and the applicable tests to compare their performance, in support of Regulation (EU) 2023/1542 (Batteries Regulation).

The text of this International Standard is based on the following documents:

FDIS	Report on voting
35/XXXX/CD	35/XXXX/XX

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

A list of all parts in the IEC 60086 series, under the general title *Primary batteries*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The technical content of this part of IEC 60086 provides fundamental requirements and information on primary cells and batteries. In this sense, IEC 60086-1 is the main component of the IEC 60086 series and forms the basis for the subsequent parts. For example, this part includes elementary information on definitions, nomenclature, dimensions and marking. While specific requirements are included, the content of this part tends to explain methodology (how) and justification (why).

Over the years, this part has been changed to improve its content and remains under continual scrutiny to ensure that the publication is kept up to date with the advances in both battery and battery-powered device technologies.

Safety requirements and recommendations are available in IEC 60086-4, IEC 60086-5 and IEC 62281. Specifications are available in IEC 60086-2-1, IEC 60086-2-2 and IEC 60086-3. Environmental aspects are dealt with in IEC 60086-6.

PRIMARY BATTERIES –

Part 1: General

1 Scope

This part of IEC 60086 is intended to standardize primary batteries with respect to dimensions, nomenclature, terminal configurations, markings, test methods, typical performance, safety and environmental aspects.

This document on one side specifies requirements for primary cells and batteries. On the other side, this document also specifies procedures of how requirements for these batteries are to be standardised.

As a classification tool for primary batteries, this document specifies system letters, electrodes, electrolytes, and nominal as well as maximum open circuit voltage of electrochemical systems.

The object of this part of IEC 60086 is to benefit primary battery users, device designers and battery manufacturers by ensuring that batteries from different manufacturers are interchangeable according to standard form, fit and function. Furthermore, to ensure compliance with the above, this part specifies standard test methods for testing primary cells and batteries.

This document also contains requirements in Annex A justifying the inclusion or the ongoing retention of batteries in the IEC 60086 series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60086-2-1, *Primary batteries – Part 2-1: Physical and electrical specifications of batteries with aqueous electrolyte*

IEC 60086-2-2, *Primary batteries – Part 2-2: Physical and electrical specifications of lithium batteries*

IEC 60086-3, *Primary batteries – Part 3: Watch batteries*

IEC 60086-4, *Primary batteries – Part 4: Safety of lithium batteries*

IEC 60086-5, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
cell
basic functional unit, consisting of an assembly of electrodes, electrolyte, container, terminals and usually separators, that is a source of electric energy obtained by direct conversion of chemical energy

[SOURCE:IEC 60050-482:2004, 482-01-01]

3.2
battery
one or more cells electrically connected and fitted in a case, with terminals, markings and protective devices etc., as necessary for use

[SOURCE:IEC 60050-482:2004, 482-01-04, modified – removal of "fitted with devices necessary for use.]

3.3
primary cell
primary battery
cell or battery that is not designed to be electrically recharged

3.4
round cell
round battery
cell or battery with circular cross section

3.5
button cell
button battery
small round cell or battery where the overall height is less than the diameter, containing aqueous electrolyte

Note 1 to entry: See coin cell, coin battery, lithium button cell, lithium button battery.

[SOURCE: IEC 60050-482:2004 482-02-40]

3.6
coin cell
coin battery
lithium button cell
lithium button battery
small round cell or battery where the overall height is less than the diameter, containing non-aqueous electrolyte

Note 1 to entry: The nominal voltage of lithium batteries is typically greater than 2 V.

Note 2 to entry: See button cell, button battery.

3.7
cylindrical cell
cylindrical battery
round cell or battery in which the overall height is equal to or greater than the diameter

[SOURCE:IEC 60050-482:2004, 482-02-39, modified – "cell with a cylindrical shape" replaced with "round cell or battery"]

3.8
nominal voltage
U_n
suitable approximate value of the voltage used to designate or identify a cell, a battery or an electrochemical system

[SOURCE:IEC 60050-482:2004, 482-03-31, modified – addition of U_n.]

3.9
open-circuit voltage
OCV
voltage across the terminals of a cell or battery when it is off discharge

3.10
closed-circuit voltage
CCV
voltage across the terminals of a battery when it is on discharge

[SOURCE:IEC 60050-482:2004, 482-03-28, modified – "voltage between the terminals of a cell or battery" replaced by "voltage across the terminals of a battery".]

3.11
end-point voltage
EV
specified voltage of a battery at which the battery discharge is terminated

[SOURCE:IEC 60050-482:2004, 482-03-30]

3.12
minimum average duration
MAD
minimum average time on discharge which is met by a sample of batteries

Note 1 to entry: The discharge test is carried out according to the specified methods or standards and designed to show conformity with the standard applicable to the battery types.

3.13
application test
simulation of the actual use of a battery in a specific application

3.14
discharge
operation during which a battery delivers current to an external circuit

3.15
service output
service life, or capacity, or energy output of a battery under specified conditions of discharge

3.16
service output test
test designed to measure the service output of a battery

Note 1 to entry: A service output test may be prescribed, for example, when

a) an application test is too complex to replicate;

b) the duration of an application test would make it impractical for routine testing purposes.

3.17
storage life
duration under specified conditions at the end of which a battery retains its ability to perform a specified service output

[SOURCE:IEC 60050-482:2004, 482-03-47, modified – "function" replaced by "service output".]

3.18
terminal
conductive parts of a battery providing connection to an external circuit

[SOURCE:IEC 60050-482:2004, 482-02-22, modified – “conductive part of a device, electric circuit or electric network, provided” replaced by to “conductive parts of a battery providing” and “device, electric circuit or electric network to one or more external conductor” replaced by “an external circuit”.]

3.19
leakage
unplanned escape of electrolyte, gas or other material from a cell or battery

Note 1 to entry: Leakage in this sense should not be confused with the test evaluation criteria for leakage specified in Clause 4 and Clause 5 of this document.

[SOURCE:IEC 60050-482:2004, 482-02-32]

4 Requirements

4.1 General

4.1.1 Design

Primary batteries are sold mainly in consumer markets. In recent years, they have become more sophisticated in both chemistry and construction, for example both capacity and rate capability have increased to meet the growing demands from new, battery-powered equipment technology.

When designing primary batteries, the aforementioned considerations shall be taken into account. Specifically, their dimensional conformity and stability, their physical and electrical performance and their safe operation under normal use and foreseeable misuse conditions shall be assured.

Additional information on equipment design can be found in Annex B.

4.1.2 Battery dimensions

The dimensions for individual types of batteries are given in IEC 60086-2-1, IEC 60086-2-2 and IEC 60086-3.

4.1.3 Terminals

4.1.3.1 General

Terminals shall be in accordance with Clause 8 of IEC 60086-2-1 and IEC 60086-2-2.

Their physical shape shall be designed in such a way that they ensure that the batteries make and maintain good electrical contact at all times.

They shall be made of materials that provide good electrical conductivity and resistance to corrosion.