



SLOVENSKI STANDARD
SIST EN 60086-2:2002
01-maj-2002

Primary batteries - Part 2: Physical and electrical specifications

Primary batteries -- Part 2: Physical and electrical specifications

Primärbatterien -- Teil 2: Physikalische und elektrische Spezifikationen

Piles électriques -- Partie 2: Spécifications physiques et électriques

Ta slovenski standard je istoveten z: EN 60086-2:2001

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EUROPEAN STANDARD

EN 60086-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2001

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Supersedes EN 60086-2:1997 + A1:1999

English version

Primary batteries
Part 2: Physical and electrical specifications
(IEC 60086-2:2000)

Piles électriques
Partie 2: Spécifications physiques et
électriques
(CEI 60086-2:2000)

Primärbatterien
Teil 2: Physikalische und elektrische
Spezifikationen
(IEC 60086-2:2000)

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This European Standard was approved by CENELEC on 2000-12-01. 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, 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

The text of document 35/1136/FDIS, future edition 10 of IEC 60086-2, prepared by IEC TC 35, Primary cells and batteries, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60086-2 on 2000-12-01.

This European Standard supersedes EN 60086-2:1997 + A1:1999.

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) 2001-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B and C are informative.

Annex ZA has been added by CENELEC.

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The text of the International Standard IEC 60086-2:2000 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-481	1996	International Electrical Vocabulary Chapter 481: Primary cells and batteries	-	-
IEC 60086-1	2000	Primary batteries Part 1: General	EN 60086-1	2001
ISO 1101	1983	Technical drawings - Geometrical tolerancing - Tolerancing of form, orientation, location and run-out - Generalities, definitions, symbols, indications on drawings	-	-

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INTERNATIONAL STANDARD

IEC 60086-2

Tenth edition
2000-12

Primary batteries –

Part 2: Physical and electrical specifications

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Piles électriques–

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Partie 2:

Spécifications physiques et électriques

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRIMARY BATTERIES –

Part 2: Physical and electrical specifications

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60086-2 has been prepared by IEC technical committee 35: Primary cells and batteries.

This tenth edition cancels and replaces the ninth edition published in 1997 and its amendment 1 (1999) and constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
35/1136/FDIS	35/1147/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annexes A, B and C are for information only.

IEC 60086 consists of the following parts under the general title: *Primary batteries*

- Part 1: General
- Part 2: Physical and electrical specifications
- Part 3: Watch batteries
- Part 4: Safety of lithium batteries
- Part 5: Safety of batteries with aqueous electrolyte

The committee has decided that the contents of this publication will remain unchanged until 2002. At this date, the publication will be

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

A bilingual version of this standard may be issued at a later date.

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INTRODUCTION

The technical content of this part of IEC 60086 provides physical dimensions, discharge test conditions and discharge performance requirements. IEC 60086-2 complements the general information and requirements of IEC 60086-1 through provision of specification sheets for primary cells and batteries.

This part was prepared to benefit primary battery users, device designers and battery manufacturers by furnishing the specifics of form, fit and function for individual standardized primary cells and batteries. Over the years, this part has been changed to improve its contents and may again be revised in due course in the light of comments made by National Committees and experts on the basis of practical experience and changing technology. This current revision is the result of a reformatting initiative, as well as some content changes, aimed at making this part more user-friendly, less ambiguous, and, from a cross-reference basis, fully harmonized with other parts of IEC 60086.

NOTE Safety information as been removed from IEC 60086-1, and is now available in IEC 60086-4 and IEC 60086-5.

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PRIMARY BATTERIES –

Part 2: Physical and electrical specifications

1 Scope

This part of IEC 60086 is applicable to primary batteries based on standardized electrochemical systems.

It specifies – the physical dimensions
– the discharge test conditions and discharge performance requirements.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60086. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60086 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 600050(481):1996, *International Electrotechnical Vocabulary – Chapter 481: Primary cells and batteries*

SIST EN 60086-2:2002

IEC 60086-1:2000, *Primary batteries – Part 1: General*

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ISO 1101:1983, *Technical drawings – Geometrical tolerancing – Tolerancing of form, orientation, location and run out – Generalities, definitions, symbols, indication on drawings*

3 Definitions

For the purpose of this International Standard, the definitions of IEC 60050(481), as well as the following definitions, apply.

3.1

application test

test which simulates the actual use of a battery in a specific application, for example, "portable lighting", "tape recorder" or "transistor radio" test

3.2

end-point voltage (EV)

specified closed circuit voltage at which a service output test is terminated

3.3

minimum average duration (MAD)

that minimum average time on discharge which shall be met by a sample of batteries

NOTE The discharge test is carried out according to the specified methods and designed to show conformity with the standard applicable to the battery types

3.4**nominal voltage of a primary battery (V_n)**

suitable approximate value of voltage used to identify the voltage of a primary battery

3.5**on-load voltage****(closed-circuit voltage) (CCV)**

voltage across the terminals of a battery when it is on discharge

3.6**open-circuit voltage (OCV)****(off-load voltage)**

voltage across the terminals of a battery when no external current is flowing

3.7**primary battery**

one or more primary cells, including case, terminals and marking

3.8**primary cell**

source of electrical energy obtained by the direct conversion of chemical energy, that is not designed to be charged by any other electrical source

3.9**service output (of a primary battery)**

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

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3.10**service output test**

test designed to measure the service output of a battery

NOTE 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

3.11**storage life**

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

3.12**terminals (of a primary battery)**

conductive parts provided for the connection of a battery to external conductors

4 Symbols and abbreviations

- 4.1 **EV:** end-point voltage
- 4.2 **MAD:** minimum average duration
- 4.3 **OCV:** open-circuit voltage (off-load voltage)
- 4.4 **R:** load resistance
- 4.5 **V_n :** nominal voltage of a battery

5 Battery dimensions

The symbols used to denote the various dimensions are as follows:

- A: maximum overall height of the battery
- B: minimum distance between the flats of the positive and negative contacts
- C: minimum outer diameter of the negative flat contact surface
- D: maximum inner diameter of the negative flat contact surface
- E: maximum recess of the negative flat contact surface
- F: maximum diameter of the positive contact within the specified projection height
- G: minimum projection of the flat positive contact
- K: minimum projection of the flat negative contact
- L: maximum diameter of the negative contact within the specified projection height
- M: minimum diameter of the flat negative contact
- N: minimum diameter of the flat positive contact
- ∅: maximum and minimum diameters of the battery
- ∅ P: concentricity of the positive contact

Recesses are permitted in the negative flat contact surface defined by dimensions C and D for batteries having the shape shown in figure 1a, provided that batteries placed end to end in series make electrical contact with each other and that the contact separation is an integral multiple of the contact separation for one battery. The following conditions must be satisfied:

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$$C > F$$

$$N > D$$

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6 Constitution of the battery specification tables

- 6.1 Batteries are categorized into several groups according to their shapes.
- 6.2 In each category, batteries having the same shape but belonging to a different electrochemical system are grouped together and shown in succession.
- 6.3 Batteries are always listed in ascending order of nominal voltage and, within each nominal voltage, in ascending order of volume.
- 6.4 One common shape drawing of these batteries which fall in the same group is exhibited.
- 6.5 Designation, nominal voltage, dimensions, discharge conditions, minimum average duration and application for these batteries which fall into the same group are summarized in one table.
- 6.6 When a drawing represents only one type of battery, the dimensions of the relevant battery are directly shown on the drawing.
- 6.7 Batteries are categorized into the following groups:
- a) Category 1: Round batteries according to figures 1a and 1b
 R1, R03, R6C, R6P, R6S, R14C, R14P, R14S, R20C, R20P, R20S, 2R10
 LR8D425, LR1, LR03, LR6, LR14, LR20
 CR 12A604

- b) Category 2: Round batteries
CR14250, CR17345, CR17450
BR17335, BR17345
- c) Category 3: Round batteries according to figure 2 and figure 3
LR9, LR53
CR 11108
- d) Category 4: Round batteries according to figure 4
PR70, PR41, PR48, PR43, PR44
LR41, LR55, LR54, LR43, LR44
SR62, SR63, SR65, SR64, SR60, SR67, SR66, SR58, SR68, SR59, SR69, SR41, SR57,
SR55, SR48, SR56, SR54, SR42, SR43, SR44
CR1025, CR1216, CR1220, CR1616, CR2012, CR1620, CR2016, CR2025, CR2320,
CR2032, CR2330, CR2430, CR2354, CR3032, CR2450
BR1225, BR2016, BR2020, BR2320, BR2325, BR3032
- e) Category 5: Other round batteries – Miscellaneous
R40
4LR44
2CR13252
4SR44
5AR40
- f) Category 6: Non-round batteries – Miscellaneous
S4
3R12C, 3R12P, 3R12S, 3LR12
4LR61
BR-P2, CR-P2
2CR5
2EP3863
4R25X, 4LR25X
4R25Y
4R25-2, 4LR25-2
6AS4
6AS6
6F22, 6LR61
6F100

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6.8 Drawings of round batteries which correspond to figures 1a and 1b, figure 2, figure 3 and figure 4 are prepared by reduction or enlargement of the relevant original drawings. The other drawings are prepared by reduction or enlargement of conventional specification drawings.

In each case the drawings show the shape of the relevant batteries. Dimensions for each battery are shown in the tables.

7 Battery specification tables and sheets

NOTE See annex C for ease of locating battery sizes.