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BSI Standards Publication

Primary batteries

Part 5: Safety of batteries with aqueous electrolyte

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National foreword

This British Standard is the UK implementation of EN IEC 60086-5:2021. It is identical to IEC 60086-5:2021, incorporating corrigendum June 2022. It supersedes BS EN 60086-5:2016, which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum June 2022 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee CPL/35, Primary cells.

A list of organizations represented on this committee can be obtained on request to its committee manager.

BSI, as a member of CENELEC, is obliged to publish EN IEC 60086-5:2021 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval.

It is the belief of the UK committee that abuse testing of batteries with aqueous electrolyte should be more thorough and that the method described within this document is oversimplified. The UK committee advises users to simulate test conditions whereby one battery in a set of four connected in series parallel is reversed.

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Amendments/corrigenda issued since publication

Date	Text affected
31 October 2022	Implementation of IEC corrigendum June 2022

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EUROPÄISCHE NORM

November 2021

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Supersedes EN 60086-5:2016 and all of its amendments
and corrigenda (if any)

English Version

Primary batteries - Part 5: Safety of batteries with aqueous
electrolyte
(IEC 60086-5:2021)

Piles électriques - Partie 5: Sécurité des piles à électrolyte
aqueux
(IEC 60086-5:2021)

Primärbatterien - Teil 5: Sicherheit von Batterien mit
wässrigem Elektrolyt
(IEC 60086-5:2021)

This European Standard was approved by CENELEC on 2021-11-04. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of document 35/1471/FDIS, future edition 5 of IEC 60086-5, prepared by IEC/TC 35 "Primary cells and batteries" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60086-5:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-08-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-11-04

This document supersedes EN 60086-5:2016 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60086-5:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-27 NOTE Harmonized as EN 60068-2-27

IEC 60068-2-6 NOTE Harmonized as EN 60068-2-6

IEC 60068-2-31 NOTE Harmonized as EN 60068-2-31

ISO 7010:2019 NOTE Harmonized as EN ISO 7010:2020 (not modified)

IEC 60086-3 NOTE Harmonized as EN IEC 60086-3

IEC 60086-4 NOTE Harmonized as EN IEC 60086-4

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(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60086-1	2015	Primary batteries - Part 1: General	EN 60086-1	2015
IEC 60086-2	2015	Primary batteries - Part 2: Physical and electrical specifications	EN 60086-2	2016

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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Requirements for safety	10
4.1 Design	10
4.1.1 General	10
4.1.2 Venting	10
4.2 Quality plan	10
5 Sampling	10
5.1 General	10
5.2 Sampling for type testing	11
5.3 Validity of testing	11
6 Testing and requirements	11
6.1 General	11
6.1.1 Applicable safety tests	11
6.1.2 Cautionary notice	12
6.1.3 Ambient temperature	12
6.2 Evaluation of test criteria	13
6.2.1 Explosion	13
6.2.2 Fire	13
6.2.3 Leakage	13
6.2.4 Venting	13
6.3 Intended use	13
6.3.1 Intended use tests and requirements	13
6.3.2 Intended use test procedures	13
6.4 Reasonably foreseeable misuse	16
6.4.1 Reasonably foreseeable misuse tests and requirements	16
6.4.2 Reasonably foreseeable misuse test procedures	16
7 Information for safety	18
7.1 Precautions during handling of batteries	18
7.2 Packaging	20
7.3 Handling of battery cartons	20
7.4 Display and storage	20
7.5 Transportation	21
7.6 Disposal	21
8 Instructions for use	21
9 Marking and packaging	22
9.1 General batteries	22
9.2 Swallowable button cells	22
9.3 Safety pictograms	22
Annex A (informative) Additional information on display and storage	24
Annex B (informative) Battery compartment design guidelines	25
B.1 Background	25

This is a preview of "BS EN IEC 60086-5:20...". [Click here to purchase the full version from the ANSI store.](#)

B.1.1	General	25
B.1.2	Battery failures resulting from poor battery compartment design	25
B.1.3	Potential hazards resulting from battery reversal	25
B.1.4	Potential hazards resulting from a short circuit	25
B.2	General guidance for appliance design	26
B.2.1	Key battery factors to be first considered	26
B.2.2	Other important factors to consider	26
B.3	Specific measures against reversed installation	27
B.3.1	General	27
B.3.2	Design of the positive contact	27
B.3.3	Design of the negative contact	27
B.3.4	Design with respect to battery orientation	28
B.3.5	Dimensional considerations	28
B.4	Specific measures to prevent short-circuiting of batteries	31
B.4.1	Measures to prevent short-circuiting due to battery jacket damage	31
B.4.2	Measures to prevent external short circuit of a battery caused when coiled spring contacts are employed for battery connection	31
B.5	Special considerations regarding recessed negative contacts	33
B.6	Waterproof and non-vented devices	34
B.7	Other design considerations	34
Annex C (informative)	Safety pictograms	36
C.1	General	36
C.2	Pictograms	36
C.3	Recommendations for use	38
Annex D (informative)	Use of the KEEP OUT OF REACH OF CHILDREN safety sign	39
D.1	General	39
D.2	Safety sign	39
D.3	Best practices for marking the packaging	39
Annex E (informative)	Child resistant packaging	40
E.1	General	40
E.1.1	General	40
E.1.2	Applicability	40
E.1.3	Packaging design	40
E.2	Packaging tests	40
E.2.1	General	40
E.2.2	Test items	40
E.2.3	Test procedure	42
E.2.4	Criteria	42
Bibliography	44
Figure 1	– Sampling for tests and number of batteries required	11
Figure 2	– Temperature cycling procedure	16
Figure 3	– Circuit diagram for incorrect installation (four batteries in series)	17
Figure 4	– Circuit diagram for external short circuit	17
Figure 5	– Circuit diagram for overdischarge	18
Figure 6	– XYZ axes for free fall	18
Figure 7	– Ingestion gauge	19
Figure B.1	– Example of series connection with one battery reversed	25

This is a preview of "BS EN IEC 60086-5:20...". [Click here to purchase the full version from the ANSI store.](#)

Figure B.2 – Positive contact recessed between ribs.....	27
Figure B.3 – Positive contact recessed within surrounding insulation	27
Figure B.4 – Negative contact U-shaped to ensure no positive (+) battery contact	27
Figure B.5 – Design with respect to battery orientation	28
Figure B.6 – Example of the design of a positive contact of an appliance.....	30
Figure B.7 – Example of a short circuit where a switch is piercing the battery insulating jacket.....	31
Figure B.8 – Typical example of insulation to prevent short circuit	31
Figure B.9 – Insertion against spring (to be avoided)	32
Figure B.10 – Examples showing distorted springs	32
Figure B.11 – Example of protected insertion.....	32
Figure B.12 – Example of negative contacts	34
Figure B.13 – Example of series connection of batteries with voltage tapping	35
Figure E.1 – Bending test	41
Figure E.2 – Torsion test.....	41
Figure E.3 – Tearing test	42
Figure E.4 – Pushing test.....	42
Figure E.5 – Maximum packaging opening.....	43
Table 1 – Test matrix	12
Table 2 – Intended use tests and requirements	13
Table 3 – Shock pulse	14
Table 4 – Test sequence of the shock test.....	14
Table 5 – Test sequence of the vibration test.....	15
Table 6 – Reasonably foreseeable misuse tests and requirements.....	16
Table 7 – Marking and packaging requirements	23
Table B.1 – Dimensions of battery terminals and recommended dimensions of the positive contact of an appliance in Figure B.6	29
Table B.2 – Minimum wire diameters	33
Table B.3 – Dimensions of the negative battery terminal.....	34
Table C.1 – Safety pictograms	36
Table E.1 – Test procedure.....	42

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRIMARY BATTERIES –

Part 5: Safety of batteries with aqueous electrolyte

FOREWORD

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IEC 60086-5 has been prepared by IEC technical committee 35: Primary cells and batteries. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2016. This edition constitutes a technical revision.

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

- a) revised information for safety dealing with keeping batteries out of the reach of children;
- b) removal of the method to determine the insulation resistance;
- c) changes to the test matrix;
- d) revision of the over-discharge test;
- e) revised definition and note for "button cell" or "button battery" in 3.2;
- f) revised method for evaluation of an explosion, moved from 3.6 to 6.2.1.

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

FDIS	Report on voting
35/1471/FDIS	35/1472/RVD

Full information on the voting for its approval 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, published 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 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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC document in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this document be adopted for implementation nationally not earlier than 2 years from the date of publication. The transitional period applies specifically to Table 7.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

The contents of the corrigendum 1 (2022-06) have been included in this copy.

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INTRODUCTION

The concept of safety is closely related to safeguarding the integrity of people and property. This part of IEC 60086 specifies tests and requirements for primary batteries with aqueous electrolyte and has been prepared in accordance with ISO/IEC guidelines, taking into account all relevant national and international standards which apply. Also included in this document is guidance for appliance designers with respect to battery compartments and information regarding packaging, handling, warehousing and transportation.

Safety is a balance between freedom from risks of harm and other demands to be met by the product. There can be no absolute safety. Even at the highest level of safety, the product can only be relatively safe. In this respect, decision-making is based on risk evaluation and safety judgement.

As safety will pose different problems, it is impossible to provide a set of precise provisions and recommendations that will apply in every case. However, this document, when followed on a judicious "use when applicable" basis, will provide reasonably consistent standards for safety.

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PRIMARY BATTERIES –

Part 5: Safety of batteries with aqueous electrolyte

1 Scope

This part of IEC 60086 specifies tests and requirements for primary batteries with aqueous electrolyte to ensure their safe operation under intended use and reasonably foreseeable misuse.

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 60086-1:2015, *Primary batteries – Part 1: General*

IEC 60086-2:2015, *Primary batteries – Part 2: Physical and electrical specifications*

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 <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

battery

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

[SOURCE: IEC 60050-482:2004, 482-01-04 [1], modified – The definition has been revised.]

3.2

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 or battery), lithium button (cell or battery) in IEC 60086-1 and IEC 60086-2.

[SOURCE: IEC 60050-482:2004, 482-02-40, modified – The second term "coin cell" has been deleted, the definition has been revised and the note has been replaced with a new note.]