

Primary batteries —

Part 5: Safety of batteries with aqueous electrolyte

The European Standard EN 60086-5:2005 has the status of a British Standard

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National foreword

This British Standard is the official English language version of EN 60086-5:2005. It is identical with IEC 60086-5:2005. It supersedes BS EN 60086-5:2001 which will be withdrawn on 1 April 2008.

The UK participation in its preparation was entrusted to Technical Committee CPL/35, Primary cells, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;
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Primärbatterien
Teil 5: Sicherheit von Batterien
mit wässrigem Elektrolyt
(IEC 60086-5:2005)

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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 CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 35/1225/FDIS, future edition 2 of IEC 60086-5, prepared by IEC TC 35, Primary cells and batteries, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60086-5 on 2005-04-01.

This European Standard supersedes EN 60086-5:2000.

It is the result of a reformatting initiative aimed at making it more user-friendly, less ambiguous and, from a cross-reference point of view, fully harmonized with other parts of EN 60086. In addition, and from a safety perspective, the standard contains further guidance for appliance designers with respect to battery compartment design together with information regarding packaging, handling, warehousing and transportation.

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) 2006-02-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2008-04-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60086-5:2005 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 60086-3	NOTE	Harmonized as EN 60086-3:2005 (not modified).
IEC 60086-4	NOTE	Harmonized as EN 60086-4:2000 (not modified).
IEC 60068-2-6	NOTE	Harmonized as EN 60068-2-6:1995 (not modified).
IEC 60068-2-27	NOTE	Harmonized as EN 60068-2-27:1993 (not modified).
IEC 60068-2-32	NOTE	Harmonized as EN 60068-2-32:1993 (not modified).

CONTENTS

INTRODUCTION.....	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Requirements for safety.....	9
4.1 Design.....	9
4.1.1 General	9
4.1.2 Venting	9
4.1.3 Insulation resistance.....	9
4.2 Quality plan	9
5 Sampling	10
5.1 General.....	10
5.2 Sampling for type approval	10
6 Testing and requirements	11
6.1 General.....	11
6.1.1 Safety notice.....	12
6.1.2 Ambient temperature.....	12
6.2 Intended use	12
6.2.1 Intended use tests and requirements	12
6.2.2 Intended use test procedures	12
6.3 Reasonably foreseeable misuse.....	15
6.3.1 Reasonably foreseeable misuse tests and requirements	15
6.3.2 Reasonably foreseeable misuse test procedures	15
7 Information for safety.....	17
7.1 Safety precautions during handling of batteries	17
7.2 Packaging	19
7.3 Handling of battery cartons	20
7.4 Display and storage.....	20
7.5 Transportation	20
7.6 Disposal	20
8 Instructions for use	21
9 Marking	21
9.1 General.....	21
9.2 Small batteries	21
Annex A (informative) Additional information to Subclause 7.4.....	22
Annex B (informative) Battery compartment design guidelines	23
Bibliography	35

Figure 1 – Sampling for type approval tests and number of batteries required	10
Figure 2 – Temperature cycling procedure.....	15
Figure 3 – Incorrect installation (four batteries in series).....	16
Figure 4 – External short circuit.....	16
Figure 5 – Overdischarge.....	17
Figure 6 – XYZ axes for free fall.....	17
Figure 7 – Ingestion gauge.....	19
Figure B.1 – Example of series connection with one battery reversed.....	23
Figure B.2 – Positive contact recessed between ribs	25
Figure B.3 – Positive contact recessed within surrounding insulation	25
Figure B.4 – Negative contact U-shaped to ensure no positive (+) battery contact	26
Figure B.5 – Design with respect to battery orientation	27
Figure B.6 – Example of the design of a positive contact of an appliance	28
Figure B.7 – Example of a short circuit, a switch is piercing the battery insulating jacket	29
Figure B.8 – Typical example of insulation to prevent short circuit.....	29
Figure B.9 – Insertion against spring (to be avoided)	30
Figure B.10 – Examples showing distorted springs	30
Figure B.11 – One example of protected insertion	30
Figure B.12 – Example of negative contacts	32
Figure B.13 – Example of series connection of batteries with voltage tapping.....	33
 Table 1 – Test matrix	 11
Table 2 – Intended use tests and requirements.....	12
Table 3 – Shock pulse	13
Table 4 – Test sequence.....	13
Table 5 – Test sequence.....	14
Table 6 – Reasonably foreseeable misuse tests and requirements.....	15
Table B.1 – Dimensions of battery terminals and recommended dimensions of the positive contact of an appliance in Figure B.6.....	28
Table B.2 – Minimum wire diameters.....	31
Table B.3 – Dimensions of the negative battery terminal	32

INTRODUCTION

The concept of safety is closely related to safeguarding the integrity of people and property. This part of IEC 60086 specifies requirements and tests 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 standard 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 standard, when followed on a judicious "use when applicable" basis, will provide reasonably consistent standards for safety.

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 referenced documents are indispensable for the application 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 60050-482:2004, *International Electrotechnical Vocabulary (IEV) – Part 482: Primary and secondary cells and batteries*

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

IEC 60086-2:2000, *Primary batteries – Part 2: Physical and electrical specifications*

3 Terms and definitions

For the purposes of this document, the definitions given in IEC 60050-482 and IEC 60086-1 (some of which are repeated below for convenience) apply, together with the following definitions.

3.1

battery (primary)

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

3.2

button battery

small round battery, where the overall height is less than the diameter; batteries complying with Figures 2, 3 and 4 of IEC 60086-2

3.3

cell (primary)

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

3.4

cylindrical battery

primary battery with cylindrical geometry where the overall height is equal to or greater than the diameter; batteries complying with Figures 1a and 1b of IEC 60086-2

3.5**explosion (battery explosion)**

an instantaneous release wherein solid matter from any part of the battery is propelled to a distance greater than 25 cm away from the battery

3.6**harm**

physical injury or damage to health of people, or damage to property or the environment

3.7**hazard**

potential source of harm

NOTE The term hazard can be qualified in order to define its origin or the nature of the expected harm (e.g. electric shock hazard, crushing hazard, cutting hazard, toxic hazard, fire hazard, drowning hazard).

3.8**intended use**

use of a product, process or service in accordance with information provided by the supplier

3.9**leakage**

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

3.10**nominal voltage**

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

3.11**prismatic battery**

primary battery with non-round geometry; batteries complying with IEC 60086-2, Subclause 6.7, category 6

3.12**reasonably foreseeable misuse**

use of a product, process or service in a way not intended by the supplier, but which may result from readily predictable human behaviour

3.13**risk**

combination of the probability of occurrence of a harm and the severity of that harm

3.14**safety**

freedom from unacceptable risk

3.15**venting**

release of excessive internal pressure from a battery in a manner intended by design to preclude explosion

4 Requirements for safety

4.1 Design

4.1.1 General

Batteries shall be so designed that they do not present a safety hazard under conditions of normal (intended) use and reasonable foreseeable misuse.

4.1.2 Venting

All batteries shall incorporate a pressure relief feature or shall be so constructed that they will relieve excessive internal pressure at a value and rate which will preclude explosion. If encapsulation is necessary to support cells within an outer case, the type of encapsulant and the method of encapsulation shall not cause the battery to overheat during normal operation nor inhibit the operation of the pressure relief feature.

The battery case material and/or its final assembly shall be so designed that, in the event of one or more cells venting, the battery case does not present a hazard in its own right.

4.1.3 Insulation resistance

The insulation resistance between externally exposed metal surfaces of the battery excluding electrical contact surfaces and either terminal shall be not less than 5 M Ω at (500 $\pm$ 20) V.

4.2 Quality plan

The manufacturer shall prepare a quality plan defining the procedures for the inspection of materials, components, cells and batteries during the course of manufacture, to be applied to the total process of producing a specific type of battery.

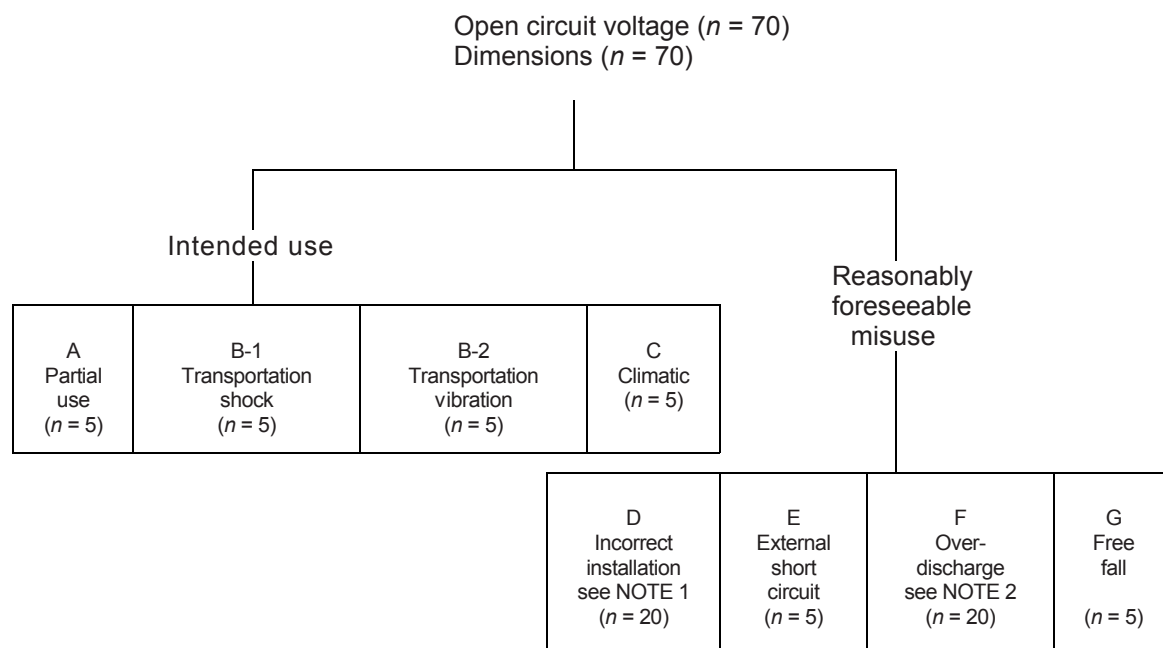
5 Sampling

5.1 General

Samples should be drawn from production lots in accordance with accepted statistical methods.

5.2 Sampling for type approval

The following number of samples are drawn for type approval.



IEC 929/2000

NOTE 1 Four batteries connected in series with one of the four batteries reversed (5 sets).

NOTE 2 Four batteries connected in series, one of which is discharged (5 sets).

Figure 1 – Sampling for type approval tests and number of batteries required