IEC 60086-5

Edition 5.0 2021-09
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Primary batteries –
Part 5: Safety of batteries with aqueous electrolyte

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.220.10

ISBN 978-2-8322-1035-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PRIMARY BATTERIES –

Part 5: Safety of batteries with aqueous electrolyte

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 60086-5:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

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,
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- 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.

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.

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*

~~IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*~~

~~IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*~~

~~IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*~~

IEC 60086-5

Edition 5.0 2021-09

INTERNATIONAL STANDARD

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Primary batteries –
Part 5: Safety of batteries with aqueous electrolyte

Piles électriques –
Partie 5: Sécurité des piles à électrolyte aqueux



IEC 60086-5:2021-09(en-fr)

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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PILES ÉLECTRIQUES –

Partie 5: Sécurité des piles à électrolyte aqueux

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L'IEC 60086-5 a été établie par le comité d'études 35 de l'IEC: Piles. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2016. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) révision des informations de sécurité relatives au maintien des piles hors de portée des enfants;
b) suppression de la méthode de détermination de la résistance d'isolement;
c) modifications de la matrice d'essai;

d) révision de l'essai de décharge excessive;

e) révision de la définition et de la note pour le terme "élément bouton" ou "pile bouton" en 3.2;

f) révision de la méthode d'évaluation d'une explosion, qui a été déplacée du 3.6 au 6.2.1.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
35/1471/FDIS	35/1472/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Une liste de toutes les parties de la série IEC 60086, publiées sous le titre général *Piles électriques*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu du présent document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

NOTE L'attention des Comités nationaux est attirée sur le fait que les fabricants d'appareils et les organismes d'essai peuvent avoir besoin d'une période transitoire après la publication d'un nouveau document IEC, ou d'un document amendé ou révisé, pour fabriquer des produits conformes aux nouvelles exigences et pour adapter leurs équipements aux nouveaux essais ou aux essais révisés.

Le comité recommande que le contenu du présent document soit adopté pour application nationale au plus tôt 2 ans après la date de publication. La période transitoire s'applique spécifiquement au Tableau 7.

IMPORTANT – Le logo "colour inside" qui se trouve sur la page de couverture du présent document indique qu'il contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer ce document en utilisant une imprimante couleur.

INTRODUCTION

La notion de sécurité est étroitement liée à la protection de l'intégrité des personnes et des biens. La présente partie de l'IEC 60086 spécifie les exigences et essais pour les piles à électrolyte aqueux. Elle a été établie conformément aux lignes directrices ISO/IEC en prenant en compte les normes nationales et internationales correspondantes. Le présent document donne également des recommandations pour les concepteurs d'appareils concernant les compartiments de piles et des informations relatives à l'emballage, à la manipulation, à l'entreposage et au transport.

La sécurité consiste en un équilibre entre l'absence de risques de dommages et d'autres exigences auxquelles le produit doit satisfaire. La sécurité absolue ne peut pas être assurée. Même au niveau de sécurité le plus élevé, le produit ne peut offrir qu'une sécurité relative. A cet égard, la prise de décision repose sur une évaluation des risques et sur une appréciation de la sécurité.

Compte tenu des différents problèmes posés par la sécurité, il n'est pas possible de fournir un ensemble de dispositions et de recommandations précises qui s'appliquent à chaque cas. Cependant, le présent document, s'il est suivi de manière judicieuse, c'est-à-dire en "l'utilisant lorsqu'il est applicable", fournit des dispositions suffisamment cohérentes en matière de sécurité.

PILES ÉLECTRIQUES –

Partie 5: Sécurité des piles à électrolyte aqueux

1 Domaine d'application

La présente partie de l'IEC 60086 spécifie les essais et exigences pour les piles à électrolyte aqueux afin d'assurer leur fonctionnement sûr dans les conditions d'utilisation prévue et en cas de mauvais usage raisonnablement prévisible.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60086-1:2015, *Piles électriques – Partie 1: Généralités*

IEC 60086-2:2015, *Piles électriques – Partie 2: Spécifications physiques et électriques*