

# INTERNATIONAL STANDARD

# IEC 60086-3

Second edition  
2004-12

---

---

## Primary batteries –

### Part 3: Watch batteries

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



Reference number  
IEC 60086-3:2004(E)

# INTERNATIONAL STANDARD

# IEC 60086-3

Second edition  
2004-12

---

---

## Primary batteries –

### Part 3: Watch batteries

Withdrawn

© IEC 2004 Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



PRICE CODE

T

*For price, see current catalogue*

## CONTENTS

FOREWORD.....	7
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references .....	13
3 Terms and definitions .....	13
4 Physical requirements .....	15
4.1 Dimensions and size codes .....	15
4.2 Terminals .....	19
4.3 Projection of the negative terminal ( <i>K</i> ).....	19
4.4 Shape of negative terminal.....	19
4.5 Mechanical resistance to pressure .....	21
4.6 Deformation .....	21
4.7 Leakage .....	23
4.8 Marking .....	23
5 Electrical requirements.....	23
5.1 Electrochemical system, nominal, end-point and open-circuit voltage .....	23
5.2 Closed circuit voltage $U_{CC}$ (CCV), internal resistance and impedance .....	25
5.3 Capacity.....	25
5.4 Capacity retention .....	25
6 Sampling and quality assurance.....	25
6.1 Sampling .....	25
6.2 Product quality indices .....	25
7 Test methods .....	27
7.1 Shape and dimensions .....	27
7.2 Electrical characteristics.....	27
7.3 Test methods for determining the resistance to leakage .....	39
8 Visual examination and acceptance conditions .....	41
8.1 Preconditioning .....	41
8.2 Magnification.....	41
8.3 Lighting .....	41
8.4 Leakage levels and classification .....	21
8.5 Acceptance conditions.....	43
Annex A (normative) Designation.....	45
Bibliography.....	47
Figure 1 – Dimensional characteristics.....	15
Figure 2 – Shape of negative terminal.....	21
Figure 3 – Shape requirement.....	27
Figure 4 – Schematic voltage transient .....	29
Figure 5 – Curve: $U = f(t)$ .....	29
Figure 6 – Circuitry principle .....	31

Figure 7 – Circuitry principle for method A .....	33
Figure 8 – Circuitry principle for method B .....	35
Figure 9 – Test by temperature cycles .....	41
Table 1 – Dimensions and size codes .....	17
Table 2 – Dimensions and size codes .....	19
Table 3 – Minimum values of $a$ .....	21
Table 4 – Applied force $F$ by battery dimensions .....	21
Table 5 – Standardised electrochemical systems .....	23
Table 6 – Test method for $U_{cc}$ (CCV) measurement .....	31
Table 7 – Test method A for $U_{cc}$ (CCV) measurement .....	33
Table 8 – Discharge resistance (values) .....	37
Table 9 – Storage conditions for the recommended test .....	39
Table 10 – Storage conditions for optional test .....	41
Table 11 – Leakage levels and classification .....	43

Withdrawing

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### PRIMARY BATTERIES –

### Part 3: Watch batteries

#### 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 cooperation 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.
- 2) The formal decisions or agreements of 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60086-3 has been prepared by IEC technical committee 35: Primary cells and batteries, and ISO technical committee 114: Horology.

This second edition cancels and replaces the first edition published in 1995.

This current revision of IEC 60086-3 is the result of a reformatting initiative aimed at making this part more user-friendly, less ambiguous and, from a cross-reference point of view, fully harmonized with other parts of IEC 60086.

This publication is published as a double logo standard.

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

FDIS	Report on voting
35/1212/FDIS	35/1224/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. In ISO, the standard has been approved by 8 P members out of 8 having cast a vote.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

Part 1: General

Part 2: Physical and electrical specifications

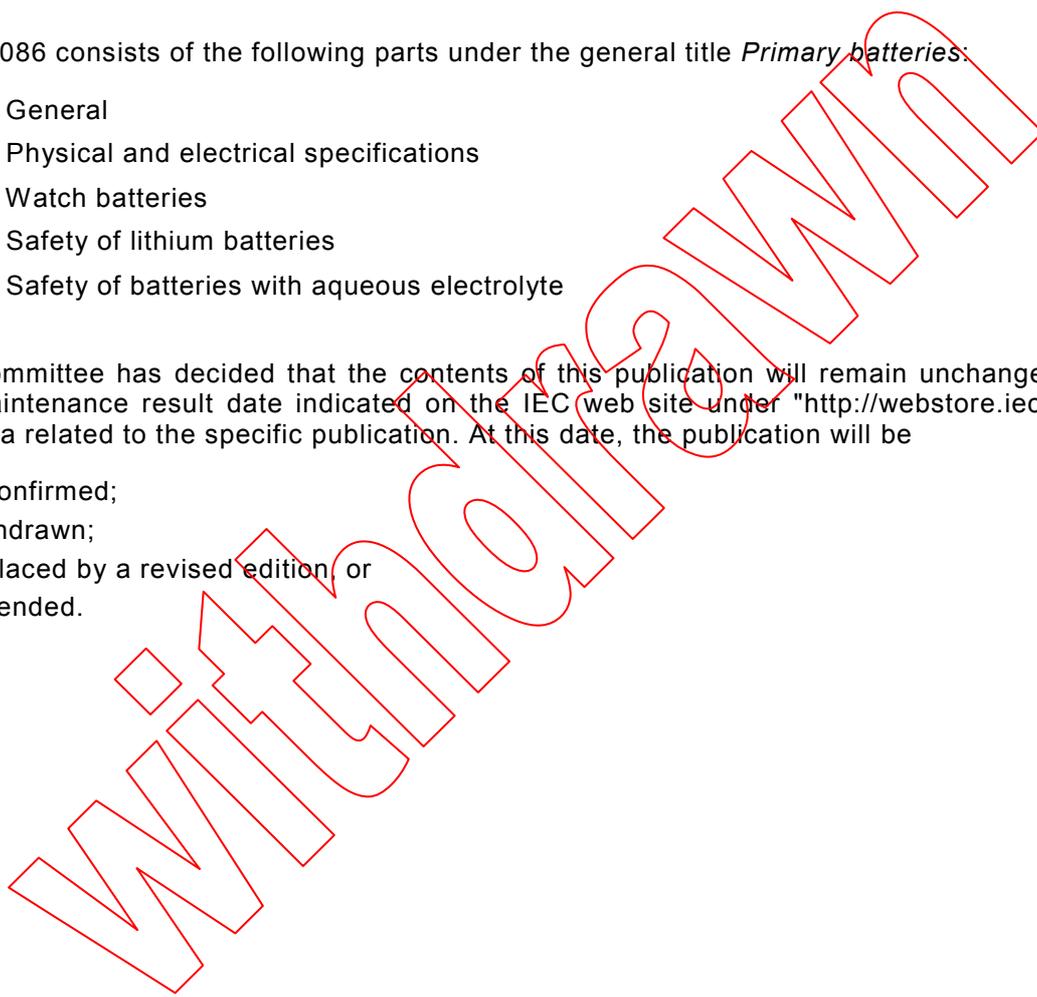
Part 3: Watch batteries

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 the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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



## INTRODUCTION

The technical content of this part of IEC 60086 provides specific requirements and information for primary watch batteries. This part was prepared through joint work between IEC TC35 and ISO TC114 to benefit primary battery users, watch designers and battery manufacturers by ensuring the best compatibility between batteries and watches.

This part will remain under continual scrutiny to ensure that the publication is kept up to date with the advances in both battery and watch technologies.

NOTE Safety information can be found in IEC 60086-4 and IEC 60086-5.

Withdrawn

## PRIMARY BATTERIES –

### Part 3: Watch batteries

#### 1 Scope

This part of IEC 60086 specifies dimensions, designation, methods of tests and requirements for primary batteries for watches. In several cases, a list of test methods is given. When presenting battery electrical characteristics and/or performance data, the manufacturer should specify which test method was used.

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

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

IEC 60086-5:2000, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*<sup>1</sup>

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 61429:1995, *Marking of secondary cells and batteries with the international recycling symbol ISO 7000-1135*

ISO 2859 (all parts), *Sampling procedures for inspection by attributes*

ISO 3951:1989, *Sampling procedures and charts for inspection by variables for percent non-conforming*

NOTE Further references are given in the Bibliography.

---

<sup>1</sup> A new edition of IEC 60086-5 is due to be published shortly.