

INTERNATIONAL STANDARD



Primary batteries –
Part 3: Watch batteries

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	2
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Physical requirements	8
4.1 Battery dimensions, symbols and size codes	8
4.2 Terminals.....	13
4.3 Projection of the negative terminal (h_5).....	13
4.4 Shape of negative terminal battery.....	13
4.5 Mechanical resistance to pressure	14
4.6 Deformation	14
4.7 Leakage.....	14
4.8 Marking.....	14
4.8.1 General	14
4.8.2 Disposal	15
5 Electrical requirements	15
5.1 Electrochemical system, nominal voltage, end-point voltage and open-circuit voltage.....	15
5.2 Closed circuit voltage U_{CC} (CCV), internal resistance and impedance	15
5.3 Capacity	16
5.4 Capacity retention.....	16
6 Sampling and quality assurance	16
7 Test methods.....	16
7.1 Shape and dimensions.....	16
7.1.1 Shape requirement	16
7.2 Electrical characteristics	17
7.2.1 Environmental conditions.....	17
7.2.2 Equivalent circuit – Effective internal resistance – DC method	17
7.2.3 Equipment	18
7.2.4 Measurement of open-circuit voltage U_{OC} (OCV) and closed circuit voltage U_{CC} (CCV).....	18
7.2.5 Calculation of the internal resistance R_i	19
7.2.6 Measurement of the capacity	19
7.2.7 Calculation of the internal resistance R_i during discharge in case of method A (optional)	21
7.3 Test methods for determining the resistance to leakage.....	23
7.3.1 Preconditioning and initial visual examination	23
7.3.2 High temperature and humidity test	23
7.3.3 Test by temperature cycles.....	23
8 Visual examination and acceptance conditions	24
8.1 Preconditioning.....	24
8.2 Magnification	24
8.3 Lighting.....	24
8.3 Leakage levels and classification	24

8.4 Acceptance conditions	25
Annex A (normative) Designation	27
Bibliography	28
Figure 1 – Dimensional drawing	8
Figure 2 – Shape of negative terminal battery	13
Figure 3 – Shape requirement	16
Figure 4 – Schematic voltage transient	17
Figure 5 – Curve: $U = f(t)$	18
Figure 6 – Circuitry principle	19
Figure 7 – Circuitry principle for method A	20
Figure 8 – Circuitry principle for method B	21
Figure 9 – Test by temperature cycles	23
Table 1 – Zinc systems L and S dimensions and size codes	9
Table 2 – Lithium systems B and C dimensions and size codes	11
Table 3 – Minimum Values of I_1	14
Table 4 – Applied force F by battery dimensions	14
Table 5 – Standardised electrochemical systems	15
Table 6 – Test method for U_{CC} (CCV) measurement	19
Table 7 – Test method A for U_{CC} (CCV) measurement	20
Table 8 – Discharge resistance (values)	23
Table 8 – Storage conditions for the recommended test	23
Table 9 – Storage conditions for optional test	23
Table 10 – Leakage levels and classification	24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRIMARY BATTERIES –**Part 3: Watch batteries****FOREWORD**

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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 60086-3:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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

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

This publication is published as a double logo standard.

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

- a) reformatted Table 1 and Table 2. The reformatted tables are now divided by system. Dimensional tolerances were changed when appropriate. Cell sizes were removed or added based on the size prevalence in the market place;
- b) in Table 3 the minimum values of I_1 were reformatted;
- c) the minimum OCV for the S system in Table 5 was changed to 1,55 V.

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

FDIS	Report on voting
35/1467/FDIS	35/1470/RVD

Full information on the voting for the approval of this International Standard 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 "<http://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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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 (2023-06) have been included in this copy.

INTRODUCTION

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

This part of IEC 60086 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 is available in IEC 60086-4 and IEC 60086-5.

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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 menu of test methods is given. When presenting battery electrical characteristics and/or performance data, the manufacturer specifies which test method was used.

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 60086-4:~~2014~~, *Primary batteries – Part 4: Safety of lithium batteries*

IEC 60086-5:~~1~~, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60086-1 and the following 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

capacitive reactance

part of the internal resistance that leads to a voltage drop during the first seconds under load

3.2

capacity

electric charge (quantity of electricity) which a cell or battery can deliver under specified discharge conditions

Note 1 to entry: The SI unit for electric charge is the coulomb (1 C = 1 As) but, in practice, capacity is usually expressed in ampere hours (Ah).

⁴ ~~To be published.~~

3.3

fresh battery

undischarged battery 60 days maximum after date of manufacture

3.4

ohmic drop

part of the internal resistance that leads to a voltage drop immediately after switching the load on

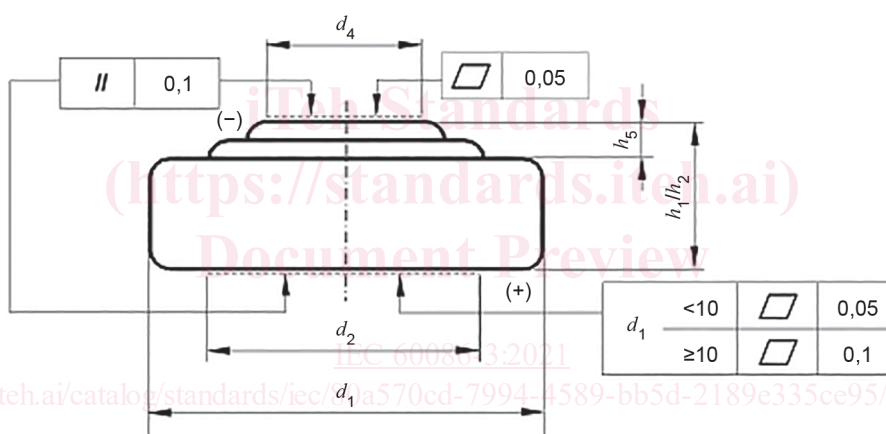
4 Physical requirements

4.1 Battery dimensions, symbols and size codes

Dimensions and tolerances of batteries for watches shall be in accordance with Figure 1, Table 1 and Table 2. The dimensions of the batteries shall be tested in accordance with 7.1.

The symbols used to denote the various dimensions in Figure 1 are in accordance with IEC 60086-2:2015, Clause 4.

Dimensions in millimetres



IEC

Key

- h_1 maximum overall height of the battery
- h_2 minimum distance between the flats of the positive and negative contacts
- h_5 minimum projection of the flat negative contact
- d_1 maximum and minimum diameter of the battery
- d_2 minimum diameter of the flat positive contact
- d_4 minimum diameter of the flat negative contact

NOTE This numbering follows the harmonization in the IEC 60086 series.

Figure 1 – Dimensional drawing

Table 1 – Zinc systems L and S dimensions and size codes

Dimensions in millimetres

Diameter		Height h_1/h_2														
		Code ^a														
Code ^a	d_4	40	42	44	46	20	21	25	26	27	30	31	32	36	42	54
		Tolerance														
4	4-8	0 -0,10	0 -0,15	0 -0,15	0 -0,18	0 -0,20	0 -0,20	0 -0,20	0 -0,20	0 -0,20	0 -0,25	0 -0,25	0 -0,25	0 -0,25	0 -0,25	0 -0,25
5	5-8	1,05	1,25	1,45	1,65	1,65	1,65	1,65	1,65	2,70						
6	6-8	1,05	1,25	1,45	1,65	1,65	1,65	1,65	2,60							
7	7-9	1,05	1,25	1,45	1,65	1,65	1,65	1,65	2,60			3,10		3,60		5,40
9	9-5	1,05	1,25	1,45	1,65	2,05	2,10	2,10	2,60	2,70				3,60		
10	10-0							2,50								
11	11-6	1,05	1,25	1,45	1,65	2,05	2,10	2,10	2,60		3,05			3,60	4,20	5,40
12	12-5		1,20		1,60	2,00		2,50								

NOTE—Open boxes in the above matrix are not necessarily available for standardisation due to the concept of overlapping tolerances.

a—See Annex A.

Dimensions in millimetres

Diameter			Height h_1/h_2														
Code ^a	d_1	Tolerance	d_4	Code ^a													
				10	12	14	16	20	21	26	27	30	31	36	42	54	
				Tolerances													
4	4,8	$^0_{-0,15}$		$^0_{-0,10}$	$^0_{-0,15}$	$^0_{-0,15}$	$^0_{-0,18}$	$^0_{-0,20}$	$^0_{-0,20}$	$^0_{-0,20}$	$^0_{-0,20}$	$^0_{-0,20}$	$^0_{-0,20}$	$^0_{-0,25}$	$^0_{-0,25}$	$^0_{-0,25}$	$^0_{-0,25}$
5	5,8	$^0_{-0,15}$	2,6	1,05	1,25	1,65	1,65	1,65	2,15	2,15	2,70	2,70	2,70				
6	6,8	$^0_{-0,15}$	3,0			1,45	1,65	1,65	2,15	2,60	2,60	2,60	2,60				
7	7,9	$^0_{-0,15}$	3,5		1,25	1,45	1,65	1,65	2,10	2,60	2,60	2,60	2,60	3,10	3,60	3,60	5,40
9	9,5	$^0_{-0,15}$	4,5	1,05	1,25	1,45	1,65	2,05	2,05	2,70	2,70	2,70	2,70				
11	11,6	$^0_{-0,20}$	6,0				1,65	2,05	2,05				3,05	3,60	4,20	4,20	5,40

NOTE Open boxes in the above matrix are not necessarily available for standardization due to the concept of overlapping tolerances.

^a See Annex A.

Dimensions in millimetres

Table 2 – Lithium systems B and C dimensions and size codes

Diameter		Height h_1/h_2							
Code ^a	d_4	Code ^a							
		12	16	20	25	30	32		
		Tolerances							
		0 -0,20	0 -0,20	0 -0,25	0 -0,30	0 -0,30	0 -0,30	0 -0,30	
16	16	1,20	1,60	2,00	2,50			3,20	
20	20	1,20	1,60	2,00	2,50			3,20	
23	23	1,20	1,60	2,00	2,50		3,00		
24	24,5	1,20	1,60				3,00		

NOTE—Open boxes in the above matrix are not necessarily available for standardisation due to the concept of overlapping tolerances.

a. See Annex A.

Dimensions in millimetres

Diameter		d ₄	Height h ₁ /h ₂						
Code ^a	d ₁		Tolerance	Code ^a					
				12	16	20	25	30	32
			Tolerances						
			0 -0,15	0 -0,18	0 -0,20	0 -0,20	0 -0,20	0 -0,25	0 -0,30
10	10,0	0 -0,15				2,50			
12	12,5	0 -0,25	1,60	2,00	2,50				
16	16	0 -0,25	1,60	2,00			3,20		
20	20	0 -0,25	1,60		2,50			3,20	
23	23	0 -0,25		2,00	2,50				
24	24,5	0 -0,25				3,00			5,00

NOTE Open boxes in the above matrix are not necessarily available for standardization due to the concept of overlapping tolerances.

^a See Annex A.