

TECHNICAL REPORT

ISO TR 10220

First edition
1989-05-15

Batteries for watches — Leakage tests

Piles pour montres — Essais de résistance aux fuites

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Reference number
ISO/TR 10220 : 1989 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The main task of ISO technical committees is to prepare International Standards. In exceptional circumstances a technical committee may propose the publication of a technical report of one of the following types:

- type 1, when the necessary support within the technical committee cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development, requiring wider exposure;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical reports are accepted for publication directly by ISO Council. Technical reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 10220, which is a technical report of type 1, was prepared by Technical Committee ISO/TC 114, *Horology*.

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Introduction

This Technical Report applies to primary batteries used as the energy source for watches. This kind of battery is known by experts as a "button cell" and/or a "small battery". Button cells and small batteries are used not only for watches but also for other applications, for example pocket calculators, hearing aids, etc.

The standardization of button cells and small batteries is conducted within IEC/TC 35, *Primary cells and batteries*. Specifications are laid down in IEC 86. The standards of IEC/TC 35 are applicable in the fields with the highest applications of button cells and small batteries, such as pocket-calculators. However, specific requirements for batteries used in watches are not sufficiently covered by IEC 86 : 1988.

Consequently, a working group for watch batteries within ISO/TC 114, *Horology* was set up and has clarified questions of specific requirements for watch batteries. The results of this working group have been submitted to IEC/TC 35 and have been included in its discussions. A full agreement on many detail requirements, however, could not yet be achieved. In particular the matter of leakage still meets with different opinions.

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Since IEC/TC 35 is continuing its discussions on batteries, the ISO/TC 114 working group will continue to provide the necessary information on requirements for watch batteries. ISO/TC 114 is, however, of the opinion that it is inevitable that requirements and other specifications for watch batteries must be included in complete documents and must be provided for the manufacturers of watches and the consumers. This Technical Report takes care of this justified wish.

This Technical Report is also subject to further considerations and members of WG 1 have already provided relevant proposals. Moreover, ISO/TC 114 intends that this Technical Report be reviewed regularly in the light of technological advances and the availability of more data, with the ultimate objective of converting it into an International Standard or of incorporating the contents of this Technical Report into already existing International Standards.

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Batteries for watches — Leakage tests

1 Scope

This Technical Report specifies methods for testing the leakage resistance and gives a leakage classification of batteries for watches.

It applies to button cells/small batteries for electronic watches.

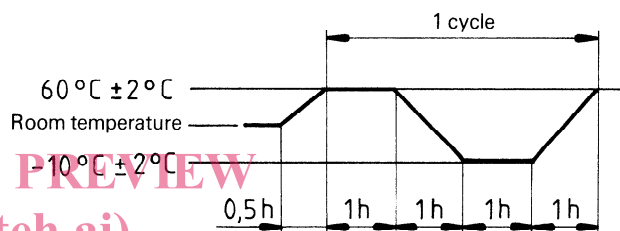
2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this Technical Report. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/TR 10219 : 1989, *Batteries for watches — Dimensions, requirements and marking.*

3.3 Test by temperature cycles

The battery shall be subjected to 150 temperature cycles according to the following schedule:



The relative humidity shall be 50 % to 60 % at room temperature and variable with the temperature variation.

3 Test method for determining the resistance to leakage

3.1 Pre-conditioning

Before carrying out the tests specified in 3.2 and 3.3, the batteries shall be unpacked and stored for at least 8 h at room temperature and a relative humidity between 45 % and 75 %.

3.2 Test at high temperature

The battery shall be stored under the conditions given in table 1.

Table 1 — Test at high temperature

Temperature °C	Relative humidity %	Nominal storage life of the battery years	Test time h
40 ± 2	90 to 95	1	1 000
		2	2 000
		3	3 000
45 ± 2	90 to 95	1	500
		2	1 000
		3	1 500

NOTE — The tests at a temperature of 40 °C or 45 °C are optional.

4 Visual examination

4.1 Preconditioning

Before carrying out the visual examination after the tests according to clause 3, batteries shall be stored for at least 24 h at room temperature and a relative humidity between 45 % and 75 %.

NOTES

1 The leakage should, as a rule, be observed after the leaked liquid has crystallized. The exposure time of at least 24 h may be altered to a time period at which the liquid has crystallized.

2 A visual examination of batteries for watches according to this clause is recommended for examining the resistance to leakage of new batteries or after discharge tests (see ISO/TR 10219).

4.2 Magnification

The visual examination may be carried out, if necessary, at a magnification of X 10 to X 15 (see table 2).

4.3 Lighting

The visual examination shall be carried out under a diffuse white light, 900 lx to 1 100 lx at the surface of the battery to be inspected.

4.4 Leakage level and classification

The leakage levels and the classification are given in table 2.

Table 2 — Leakage level and classification

Leakage level		Grade	Definition	Inspection according to clause 4
Defect				
Non-defective batteries	Salting	S1	A little leakage near the gasket	Detectable by magnification only
		S2	Leakage in the vicinity of the gasket	Scarcely detectable by human eye
		S3	Leakage spreads in clouds on both sides of the gasket but does not reach the flat negative contact	Detectable by human eye
Defective batteries	Creep	C1	Leakage spreads in clouds on the flat negative contact but does not reach the centre part of the flat negative contact	
		C2	Leakage spreads in clouds over a considerable area of the flat contact	
	Leaks	L1	Crystallized liquid swells up on part of the cloud spread on almost all the surface of the flat negative contact	
		L2	Crystallized liquid swells up on almost all the surface of the flat negative contact	

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