
INTERNATIONAL STANDARD



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Water-resistant watches — Part I : ~~Wrist~~watches — Water resistance for general use

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2281 was drawn up by Technical Committee ISO/TC 114, *Horology*.

It was approved in July 1971 by the Member Bodies of the following countries:

| | | |
|---------------------|-----------------------|----------------|
| Czechoslovakia | Japan | Turkey |
| Egypt, Arab Rep. of | New Zealand | United Kingdom |
| France | South Africa, Rep. of | |
| Italy | Switzerland | |

The Member Body of the following country expressed disapproval of the document on technical grounds:

Germany

Water-resistant watches — Part 1 : Wristwatches — Water resistance for general use

1 SCOPE AND FIELD OF APPLICATION

This International Standard lays down the technical definition of wristwatches described as "water resistant" for general use, describes the practical meaning of water resistance and specifies equivalent non-destructive test methods.

2 DEFINITION

A wristwatch bearing the qualification "water-resistant" or "étanche" is one which satisfies the minimum requirement specified in section 3.

3 MINIMUM REQUIREMENT

A watch satisfies this requirement if, in the conditions specified in 5.1.1, 5.1.2 and 5.2.1, the flow of air does not exceed

$$50 \mu\text{g}/\text{min}$$

4 PRACTICAL MEANING OF WATER RESISTANCE

All the operations described have been designed to simulate conditions in which the wristwatch will remain undamaged after immersion under

- a) 1 m of water (equivalent to an overpressure of $\Delta p = 0.1 \times 10^5 \text{ N/m}^2 = 0.1 \text{ bar}$) for 30 min,

followed by

- b) 20 m of water (equivalent to an overpressure of $\Delta p = 2 \times 10^5 \text{ N/m}^2 = 2 \text{ bar}$) for 90 s.

5 TEST PROCEDURE

5.1 Test conditions

5.1.1 Prior to the test, the hands shall be shifted and the crown then reset to its normal position.

5.1.2 For the entire duration of the test, the ambient temperature shall be between 18 and 25 °C.

5.2 Operations

5.2.1 Basic method

The wristwatch is exposed to air at an overpressure of

$$\Delta p = 2 \times 10^5 \text{ N/m}^2 = 2 \text{ bar}$$

The flow of air entering the watch is measured.

5.2.2 Equivalent methods

In addition to the basic method specified in 5.2.1, the method consisting in measuring the flow of a gas, or any other method giving quantitative results ensuring that the minimum requirement is satisfied, may be admitted.

The equivalence of various methods giving a quantitative measurement of the inflow or outflow of a gas is established applying the law of Hagen-Poiseuille.

5.2.2.1 Vacuum test method

The watch to be tested is placed inside an airtight chamber, which is then evacuated. The increase in the pressure Δp in the chamber of any volume V , measured during a period of Δt , determines the leakage rate L , i.e.

$$L = \frac{V \times \Delta p}{\Delta t}$$

5.2.2.2 Helium test method

The watch is exposed under overpressure in helium for a certain time, after which the quantity of helium escaping from the watch is measured spectrographically.

6 MARKING

For the marking of wristwatches which satisfy the minimum requirement laid down in section 3, only one term may be used in each language. In English and French, the only permissible terms are "water-resistant" and "étanche", respectively.