
International Standard 6425/1

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Divers' watches — Part 1 : For depths down to 100 m

Montres de plongée — Partie 1 : Pour profondeurs jusqu'à 100 m

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Foreword

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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 6425/1 was developed by Technical Committee ISO/TC 114, *Horology*, and was circulated to the member bodies in April 1980.

It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	South Africa, Rep. of
Czechoslovakia	India	Switzerland
Egypt, Arab Rep. of	Japan	United Kingdom
France	Romania	USSR

No member body expressed disapproval of the document.

Divers' watches —

Part 1 : For depths down to 100 m

1 Scope and field of application

This part of ISO 6425 specifies requirements and test methods for divers' watches, to be used in diving at depths down to 100 m.

2 References

ISO 764, "Antimagnetic" watches for general purpose use.

ISO 1413, Shock-resistant wristwatches.

ISO 2281/1, Water-resistant watches — Part 1: Wristwatches — Water resistance for general use.

ISO 2859, Sampling procedures and tables for inspection by attributes.

3 Definition

diver's watch : A watch designed to withstand immersion in water at depths of at least 100 m and beyond.

4 Designation

A watch bearing the designation "diver's watch" in relation to the diving depth 100 m or any other similar term shall satisfy the minimum requirements laid down in clause 6.

5 Practical meaning

All operations described are intended to simulate conditions in which divers' watches will remain undamaged and operating after immersion at

- a) 100 m of water ($\Delta p = 10 \times 10^5 \text{ Pa}^*$) for 1 h per day;

followed by

- b) 3 m of water ($\Delta p = 0,3 \times 10^5 \text{ Pa}^*$) for 3 h per day.

6 Requirements

6.1 Time pre-selecting device

Divers' watches shall be equipped with a time pre-selecting device for example a bezel ring. Such a device shall be protected against inadvertent rotation and shall function correctly throughout the whole diving range when tested as described in 7.3.3.

The time pre-selecting device shall be provided with a minute division. The markings indicating every 5 min shall be clearly indicated. Coordination between the markings on the dial if existing and the pre-selecting device shall be provided.

The markings shall be clearly visible against the dial if existing.

6.2 Visibility

The following items of the diver's watch shall be legible at a distance of 25 cm in the dark :

- a) indicated time;
- b) set time of time pre-selecting device;
- c) indication that the watch is running.

6.3 Antimagnetic property

Divers' watches shall be antimagnetic in accordance with the requirements of ISO 764.

* 1 Pa = 1 N/m² = 10⁻⁵ bar

6.4 Shock resistance

Divers' watches shall be shock resistant in accordance with the requirements of ISO 1413.

6.5 Salt water resistance

Divers' watches shall be salt water resistant i.e. after submission to the test as described in 7.3.3 they shall not show important changes on the case or on the accessories and the moving parts shall continue to function normally.

6.6 Reliability

Divers' watches shall function normally and in particular the second hand shall continue to function normally during and after testing as described in 7.3.4.

6.7 Operation in water

The mechanisms to be operated when submerged, for example the time pre-selecting device, lamp switch, shall function correctly when tested as described in 7.3.5.

6.8 Resistance to an external force

6.8.1 Resistance of attachments to an external force

No item shall become detached from the watch, or be displaced when the diver's watch is tested as described in 7.3.1.

6.8.2 Resistance of the crowns and of other setting devices to an external force

No condensation shall be observed and the diver's watch shall function normally when tested as described in 7.3.7.

6.9 Resistance to thermal shock

Divers' watches shall be resistant to thermal shock i.e. they shall not show condensation and the watch shall function normally when tested as described in 7.3.6.

6.10 Water resistance

6.10.1 Water tightness at an air overpressure

Divers' watches must show no air flow exceeding 50 µg/min when tested as described in 7.3.2.

6.10.2 Water tightness at a water overpressure

Divers' watches must show no condensation when tested as described in 7.3.8.

7 Methods of test

7.1 Type testing and 100 % testing

The testing of divers' watches is divided in two groups :

- type testing;
- 100 % testing.

Tests for the following requirements shall be conducted as type testing in accordance with ISO 2859 :

- time pre-selecting device;
- visibility;
- antimagnetic property;
- shock resistance;
- salt water resistance;
- reliability;
- operation in water;
- resistance to external force (attachments, crowns and devices);
- resistance to thermal shock.

The tests for water resistance, which include the testing described in 7.3.2 and in 7.3.8, shall be conducted on every watch, i.e. 100 % testing.

7.2 Test procedure

Testing of divers' watches requires several consecutive tests which gives rise to considerable costs. The procedure given in the table is therefore recommended to reduce these costs.

Table

No.	Test	Sub-clause
1	Visibility	6.2
2	Antimagnetic property	6.3 of ISO 764
3	Shock resistance	6.4 of ISO 1413
4	Resistance of attachments to an external force	7.3.1
5	Water tightness at an air overpressure	7.3.2
6	Salt water resistance	7.3.3
7	Time pre-selecting device	7.3.3
8	Reliability	7.3.4
9	Operation in water	7.3.5
10	Resistance to thermal shock	7.3.6
11	Resistance of crowns and other setting devices to an external force	7.3.7
12	Water tightness at a water overpressure	7.3.8

7.3 Description of tests

7.3.1 Testing the resistance of attachments to an external force

The test samples shall be subjected to an external force of 200 N as shown in figure 1.

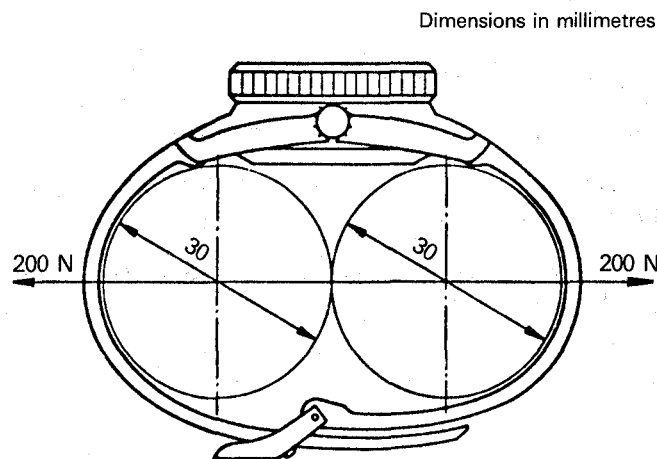


Figure 1

NOTE — The band of the test piece is clasped by buckle.

7.3.2 Testing the water tightness at an air overpressure

All test samples shall be subjected to an air overpressure of $\Delta p = 2 \times 10^5 \text{ Pa}^*$ and the flow of air entering the case shall be measured.

Comparable test methods for example with inert gases are permitted.

Test pieces with a greater flow shall be eliminated immediately.

7.3.3 Testing salt water resistance and time pre-selecting device

The test samples shall be put in a 30 g/l sodium chloride solution and remain there for 24 h at $23 \pm 3 \text{ }^\circ\text{C}$. After this test the case and accessories shall be examined for changes. Moving parts, particularly the bezel ring, shall be checked for correct functioning.

7.3.4 Testing reliability

The test samples shall be immersed in water contained in a suitable vessel. Then an overpressure of 1 250 kPa shall be applied within 1 min and maintained for 20 min.

7.3.5 Testing of operation in water

The test samples shall be immersed in water and the mechanisms operated at a depth of 0,3 m.

7.3.6 Testing resistance to thermal shock

The test samples shall be subjected to the following test cycle when immersed to a depth of 0,3 m in water :

- a) immersion in water of $40 \pm 2 \text{ }^\circ\text{C}$ for 10 min;
- b) immersion in water of $5 \pm 2 \text{ }^\circ\text{C}$ for 10 min;
- c) immersion in water of $40 \pm 2 \text{ }^\circ\text{C}$ for 10 min.

The time of transition from one immersion to the other shall not exceed 1 min.

The condensation test, as described in 7.3.9, shall be carried out before and after this test to ensure that the result is related to the above test.

7.3.7 Testing resistance of crowns and other setting devices to an external force

The test samples shall be subjected to an overpressure in water of 1 250 kPa* for 10 min and to an external force of 5 N as shown in figure 2.

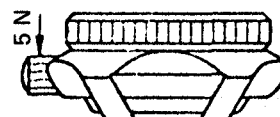


Figure 2

The condensation test as described in 7.3.9 shall be carried out before and after this test to ensure that the result is related to the above test.

7.3.8 Testing water tightness

All test samples shall be immersed in water contained in a suitable vessel. Then an overpressure of 1 250 kPa* shall be applied within 1 min and maintained for 1 h. Subsequently the overpressure shall be reduced to 30 kPa within 1 min and maintained at this pressure for 1 h. The test samples shall then be removed from the water and dried with a rag.

* $1 \text{ Pa} = 1 \text{ N/m}^2 = 10^{-5} \text{ bar}$