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Water meters for cold potable water and hot water —

Part 2: Test methods

*Compteurs d'eau potable froide et d'eau chaude —**Partie 2: Méthodes d'essai*

ICS: 91.140.60

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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 procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2, www.iso.org/directives.

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The committees responsible for this document are Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, Subcommittee SC 7, *Volume methods including water meters* and OIML Technical Subcommittee TC 8/SC 5 *Water meters*.

This fifth edition of ISO 4064-2 cancels and replaces the fourth edition (ISO 4064-2:2014), which has been technically revised.

ISO 4064 consists of the following parts, under the general title *Water meters for cold potable water and hot water*:

- *Part 1: Metrological and technical requirements*
- *Part 2: Test methods*
- *Part 3: Test report format*
- *Part 4: Non-metrological requirements not covered in ISO 4064-1*
- *Part 5: Installation requirements*

This edition of ISO 4064-2 is identical with the corresponding edition of OIML R 49-2, which has been issued concurrently. OIML R 49-2 was approved for final publication by the International Committee of Legal Metrology at its XX meeting in XXX and will be submitted to the International Conference on Legal Metrology in XXX for formal sanction.

Water meters for cold potable water and hot water —

Part 2: Test methods

1 Scope

This part of ISO 4064|OIML R 49 is applicable to the type evaluation and initial verification testing of water meters for cold potable water and hot water as defined in ISO 4064-1:xxx|OIML R 49-1:xxx. OIML Certificates of Conformity can be issued for water meters under the scope of the OIML Certificate System, provided that this part of ISO 4064|OIML R 49, ISO 4064-1:xxx|OIML R 49-1:xxx and ISO 4064-3:xxx|OIML R 49-3:xxx are used in accordance with the rules of the System.

This part of ISO 4064|OIML R 49 sets out details of the test programme, principles, equipment and procedures to be used for the type evaluation, and initial verification of a meter type.

The provisions of this part of ISO 4064|OIML R 49 also apply to ancillary devices, if required by national regulations.

The provisions include requirements for testing the complete water meter and for testing the measurement transducer (including the flow or volume sensor) and the calculator (including the indicating device) of a water meter as separate units.

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.

General requirements for software controlled measuring instruments

IEC 61000-4-20:2022, *Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61000-4-20, *Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test*

IEC 60068-2-1, *Environmental testing — Part 2-1: Tests — Test A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2-2: Tests — Test B: Dry heat*

IEC 60068-2-30, *Environmental testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-31, *Environmental testing — Part 2-31: Tests — Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-47, *Environmental testing — Part 2-47: Tests — Mounting of specimens for vibration, impact and similar dynamic tests*

IEC 60068-2-64, *Environmental testing — Part 2-64: Tests — Test Fh: Vibration, broadband random and guidance*

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IEC 60068-3-4, *Environmental testing — Part 3-4: Supporting documentation and guidance — Damp heat tests*

IEC 60654-2, *Operating conditions for industrial process measurement and control equipment — Part 2: Power*

IEC 61000-2-1, *Electromagnetic compatibility (EMC) — Part 2: Environment — Section 1: Description of the environment — Electromagnetic environment for low-frequency conducted disturbances and signaling in public power supply systems*

IEC 61000-2-2, *Electromagnetic compatibility (EMC) — Part 2-2: Environment — Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage power supply systems*

IEC 61000-4-1, *Electromagnetic compatibility (EMC) — Part 4-1: Testing and measurement techniques — Overview of IEC 61000-4 series*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — Radiated, radio frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) — Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments*

IEC 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments*

ISO 4064-1, *Water meters for cold potable water and hot water — Part 1: Metrological and technical requirements*

ISO 4064-1, *Water meters for cold potable water and hot water — Part 1: Metrological and technical requirements*

ISO 4064-2:2014, *Water meters for cold potable water and hot water — Part 2: Test methods*

ISO 4064-3, *Water meters for cold potable water and hot water — Part 3: Test report format*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO 4064-3:2014, *Water meters for cold potable water and hot water — Part 3: Test report format*

OIML D11 2013, *General requirements for measuring instruments -Environmental conditions*

OIML G 13, *Planning of metrology and testing laboratories*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4064-1:xxx|OIML R 49-1:xxx apply.

4 Reference conditions

All applicable influence quantities, except for the influence quantity being tested, shall be held at the following values during type evaluation tests on a water meter. However, for influence factors and disturbances for electronic water meters, it is permissible to use the reference conditions defined in the applicable IEC standard:

Flow rate:	$0,7 \times (Q_2 + Q_3) \pm 0,03 \times (Q_2 + Q_3)$
Water temperature:	T30, T50 is $20 \text{ °C} \pm 5 \text{ °C}$ T70 to T180 is $20 \text{ °C} \pm 5 \text{ °C}$ and $50 \text{ °C} \pm 5 \text{ °C}$ T30/70 to T30/180 is $50 \text{ °C} \pm 5 \text{ °C}$
Water pressure:	Within rated operating conditions (see ISO 4064-1:xxx OIML R 49-1:xxx, 6.4)
Ambient temperature range:	15 °C to 25 °C
Ambient relative humidity range:	25% to 75%
Ambient atmospheric pressure range:	86 kPa to 106 kPa [$0,86 \text{ bar}$ to $1,06 \text{ bar}$]
Power supply voltage (mains AC):	Nominal voltage, $U_{\text{nom}} \pm 5 \%$
Power supply frequency:	Nominal frequency, $f_{\text{nom}} \pm 2 \%$
Power supply voltage (battery):	A voltage V in the range $U_{\text{bmin}} \leq V \leq U_{\text{bmax}}$

During each test, the temperature and relative humidity shall not vary by more than 5 °C or 10% , respectively, within the reference range. The reference conditions are permitted to deviate from the defined tolerance values during the performance tests if evidence can be given to the body responsible for type approval that the type of meter under consideration is not affected by the deviation of the condition in question. The actual values of the deviating condition, however, shall be measured and documented as part of the performance test documentation.

5 Symbols, units and equations

Equations, symbols and their units, concerning the calculation of the error (of indication) of a water meter used in this part of ISO 4064|OIML R 49, are given in [Annex B](#).

6 External examination

6.1 General

During the external examination, all relevant values, dimensions, and observations shall be recorded.

NOTE 1 For presentation of the results of type examinations, see 11.

NOTE 2 The relevant subclauses of ISO 4064-1:xxx|OIML R 49-1:xxx are shown in parentheses in the following.

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6.2 Object of the examination

To verify that a water meter meets the requirements of ISO 4064-1:xxx|OIML R 49-1:xxx with respect to the design of the indicating device, the marking of the meter and the application of protection devices.

6.3 Preparation

Linear measurements that have to be taken of a meter shall be made using traceable, calibrated measuring devices.

The actual or apparent dimensions of the scales of the indicating device shall be taken without removing the meter lens or disassembling the meter.

NOTE A travelling microscope (cathetometer) can be used to measure the width, spacing and height of the scale divisions and the height of the numerals.

6.4 Examination procedures

6.4.1 General

The following aspects of a meter design shall be examined on at least one meter from the sample.

Either the same meter sample may be used for all the external examinations or different meters from the samples submitted may be used for some of the examinations.

6.4.2 Marks and inscriptions (ISO 4064-1:xxx|OIML R 49-1:xxx, 6.6)

- a) Verify that a place is provided for affixing the verification mark which is visible without dismantling the water meter.
- b) Verify that the water meter is clearly and indelibly marked with the information presented in ISO 4064-1:xxx|OIML R 49-1:xxx, 6.6.2.
- c) Complete the section reference ISO 4064-1:xxx|OIML R 49-1:xxx, 6.6.1 and 6.6.2 (r) in ISO 4064-3:xxx|OIML R 49-3:xxx, 4.4.1.

6.4.3 Indicating device (ISO 4064-1:xxx|OIML R 49-1:xxx, 6.7)

6.4.3.1 Function (ISO 4064-1:xxx|OIML R 49-1:xxx, 6.7.1.1)

- a) Verify that the indicating device provides an easily read, reliable and unambiguous visual indication of the indicated volume.
- b) Verify that the indicating device includes visual means for testing and calibration.
- c) If the indicating device includes additional elements for testing and calibration by other methods, e.g. for automatic testing and calibration, record the type(s) of device.
- d) If the meter is a combination meter with two indicating devices, [6.4.3](#) applies to both indicating devices.
- e) Complete the section reference ISO 4064-1:xxx|OIML R 49-1:xxx, 6.7.1.1 in ISO 4064-3:xxx|OIML R 49-3:xxx, 4.4.1.

6.4.3.2 Unit of measurement, symbol, and its placement (ISO 4064-1:xxx|OIML R 49-1:xxx, 6.7.1.2)

- a) Verify that the indicated volume of water is expressed in cubic metres.
- b) Verify that the symbol m³ appears on the dial or immediately adjacent to the numbered display.