

ISO 4064-2:2024-12 (E)

Water meters for cold potable water and hot water - Part 2: Test methods

Contents

Page

Foreword	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Reference conditions	2
5 Symbols, units and equations	3
6 External examination	3
6.1 General	3
6.2 Object of the examination	3
6.3 Preparation	3
6.4 Examination procedures	4
6.4.1 General	4
6.4.2 Marks and inscriptions (ISO 4064-1:2024 OIML R 49-1:2024, 6.6)	4
6.4.3 Indicating device (ISO 4064-1:2024 OIML R 49-1:2024, 6.7)	4
6.4.4 Protection devices (ISO 4064-1:2024 OIML R 49-1:2024, 6.8)	8
7 Performance tests for all water meters	8
7.1 General	8
7.2 Required conditions for all tests	8
7.2.1 Water quality	8
7.2.2 General rules concerning test installation and location	8
7.3 Static pressure test (ISO 4064-1:2024 OIML R 49-1:2024, 4.2.10)	9
7.3.1 Object of the test	9
7.3.2 Preparation	9
7.3.3 Test procedure	9
7.3.4 Acceptance criteria	10
7.4 Determination of intrinsic errors (of indication) (ISO 4064-1:2024 OIML R 49-1:2024, 7.2.3)	10
7.4.1 Object of the test	10
7.4.2 Preparation	10
7.4.3 Combination meters	15
7.4.4 Test procedure	16
7.4.5 Acceptance criteria	16
7.4.6 Interchange test on all types of cartridge meters and meters with exchangeable metrological modules (ISO 4064-1:2024 OIML R 49-1:2024, 7.2.7)	17
7.5 Water temperature test (ISO 4064-1:2024 OIML R 49-1:2024, 4.2.8)	18
7.5.1 Object of the test	18
7.5.2 Preparation	18
7.5.3 Test procedure	18
7.5.4 Acceptance criteria	18
7.6 Overload water temperature test (ISO 4064-1:2024 OIML R 49-1:2024, 7.2.5)	18
7.6.1 Object of the test	18
7.6.2 Preparation	18
7.6.3 Test procedure	18
7.6.4 Acceptance criteria	18
7.7 Water pressure test (ISO 4064-1:2024 OIML R 49-1:2024, 4.2.8)	19
7.7.1 Object of the test	19
7.7.2 Preparation	19
7.7.3 Test procedure	19
7.7.4 Acceptance criteria	19

7.8	Reverse flow test (ISO 4064-1:2024 OIML R 49-1:2024, 4.2.7)	19
7.8.1	Object of the test	19
7.8.2	Preparation	19
7.8.3	Test procedure	19
7.8.4	Acceptance criteria	20
7.9	Pressure loss test (ISO 4064-1:2024 OIML R 49-1:2024, 6.5)	20
7.9.1	Object of the test	20
7.9.2	Equipment for pressure loss test	21
7.9.3	Test procedure	22
7.9.4	Calculation of the actual Δp of a water meter	24
7.9.5	Acceptability criteria	24
7.10	Flow disturbance tests (ISO 4064-1:2024 OIML R 49-1:2024, 6.3.4)	24
7.10.1	Object of the tests	24
7.10.2	Preparation	24
7.10.3	Test procedure	25
7.10.4	Acceptance criteria	25
7.11	Durability tests (ISO 4064-1:2024 OIML R 49-1:2024, 7.2.6)	25
7.11.1	General	25
7.11.2	Discontinuous flow test	25
7.11.3	Continuous flow test	29
7.12	Magnetic field testing	31
7.13	Tests on ancillary devices of a water meter	31
7.13.1	Object of the test	31
7.13.2	Preparation	31
7.13.3	Test procedure	31
7.13.4	Acceptance criteria	32
7.14	Environmental testing	32
7.15	Software evaluation	32
8	Performance tests related to influence factors and disturbances	32
8.1	General requirements (ISO 4064-1:2024 OIML R 49-1:2024, A.1)	32
8.1.1	Overview	32
8.1.2	Environmental classification	32
8.1.3	Electromagnetic classification	32
8.1.4	Reference conditions (ISO 4064-1:2024 OIML R 49-1:2024, 7.1)	32
8.1.5	Test volumes for measuring error (of indication) of a water meter	33
8.1.6	Influence of the water temperature (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	33
8.1.7	Requirements for environmental tests	33
8.1.8	Equipment under test (ISO 4064-1:2024 OIML R 49-1:2024, 7.2.12.3)	34
8.1.9	Determination of required tests	35
8.2	Dry heat (non-condensing) (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	36
8.2.1	Object of the test	36
8.2.2	Preparation	36
8.2.3	Test procedure (in brief)	36
8.2.4	Acceptance criteria	37
8.3	Cold (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	37
8.3.1	Object of the test	37
8.3.2	Preparation	37
8.3.3	Test procedure (in brief)	37
8.3.4	Acceptance criteria	38
8.4	Damp heat, cyclic (condensing) (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	38
8.4.1	Object of the test	38
8.4.2	Preparation	38
8.4.3	Test procedure (in brief)	38
8.4.4	Acceptance criteria	39
8.5	Power supply variation (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	39
8.5.1	Water meters powered by direct AC or by AC/DC converters (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	39
8.5.2	Water meters powered by external DC voltage or by primary DC batteries (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	40
8.5.3	Interruption in battery supply	41
8.6	Vibration (random) (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	41
8.6.1	Object of the test	41

8.6.2	Preparation	41
8.6.3	Test procedure (in brief)	42
8.6.4	Acceptance criteria	42
8.7	Mechanical shock (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	42
8.7.1	Object of the test	42
8.7.2	Preparation	42
8.7.3	Test procedure (in brief)	43
8.7.4	Acceptance criteria	43
8.8	AC mains voltage dips, short interruptions and voltage variations (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	43
8.8.1	Object of the test	43
8.8.2	Preparation	43
8.8.3	Test procedure (in brief)	43
8.8.4	Acceptance criteria	45
8.9	Bursts on signal lines (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	45
8.9.1	Object of the test	45
8.9.2	Preparation	46
8.9.3	Test procedure (in brief)	46
8.9.4	Acceptance criteria	46
8.10	Bursts (transients) on AC and DC mains (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	47
8.10.1	Object of the test	47
8.10.2	Preparation	47
8.10.3	Test procedure (in brief)	47
8.10.4	Acceptance criteria	47
8.11	Electrostatic discharge (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	48
8.11.1	Object of the test	48
8.11.2	Preparation	48
8.11.3	Test procedure (in brief)	48
8.11.4	Acceptance criteria	49
8.12	Radiated electromagnetic fields (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	49
8.12.1	Object of the test	49
8.12.2	Preparation	49
8.12.3	Test procedure (in brief)	49
8.12.4	Acceptance criteria	50
8.13	Conducted electromagnetic fields (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	51
8.13.1	Object of the test	51
8.13.2	Preparation	51
8.13.3	Test procedure (in brief)	51
8.13.4	Acceptance criteria	52
8.14	Surges on signal, data and control lines (ISO 4064-1 OIML R 49-1, A.5)	52
8.14.1	Object of the test	52
8.14.2	Preparation	52
8.14.3	Test procedure (in brief)	52
8.14.4	Acceptance criteria	53
8.15	Surges on AC and DC mains power lines (ISO 4064-1:2024 OIML R 49-1:2024, A.5)	53
8.15.1	Object of the test	53
8.15.2	Preparation	53
8.15.3	Test procedure (in brief)	53
8.15.4	Acceptance criteria	54
8.16	Static magnetic field (ISO 4064-1 OIML R 49-1, 7.2.8)	54
8.16.1	Test conditions	54
8.16.2	Object of the test	55
8.16.3	Preparation	55
8.16.4	Test procedure in brief	55
8.16.5	Acceptance criteria	55
8.17	Absence of flow test	56
8.17.1	Object of the test	56
8.17.2	Preparation	56
8.17.3	Test procedure	56

8.17.4	Acceptance criteria	56
8.18	Mains power frequency electromagnetic fields test.....	56
8.18.1	Object of the test.....	56
8.18.2	Preparation	56
8.18.3	Test procedure.....	56
8.18.4	Acceptance criteria	57
9	Test program for type evaluation.....	57
9.1	Number of samples required	57
9.2	Performance test applicable to all water meters.....	57
9.3	Performance tests applicable to electronic water meters, mechanical water meters fitted with electronic devices, and their separable parts	58
9.4	Type evaluation of separable parts of a water meter.....	59
9.5	Families of water meters.....	59
10	Tests for initial verification	59
10.1	Initial verification of complete and combined water meters.....	59
10.1.1	Object of the test.....	59
10.1.2	Preparation	60
10.1.3	Test procedure.....	60
10.1.4	Acceptance criteria	60
10.2	Initial verification of separable parts of a water meter.....	61
10.2.1	Object of the test.....	61
10.2.2	Preparation	61
10.2.3	Test procedure.....	61
10.2.4	Acceptance criteria	61
11	Presentation of results.....	62
11.1	Object of the reports.....	62
11.2	Identification and test data to be included in records.....	62
11.2.1	Type evaluation	62
11.2.2	Initial verification.....	62
Annex A (normative)	Type examination and testing of checking facilities of electronic devices	63
Annex B (normative)	Calculating the relative error (of indication) of a water meter.....	69
Annex C (normative)	Installation requirements for flow disturbance tests	74
Annex D (normative)	Type evaluation of a family of water meters.....	75
Annex E (informative)	Examples of methods and components used for testing concentric water meters.....	77
Annex F (informative)	Maximum uncertainties in the measurement of influence factors and disturbances.....	80
Annex G (informative)	Pressure loss test pressure tappings, hole and slot details	83
Annex H (normative)	Flow disturbers.....	86
Annex I (normative)	Software evaluation for software-controlled water meters.....	96
Bibliography		97