

DIN EN 14154-3:2007-07 (E)

Water meters - Part 3: Test methods and equipment (includes Amendment A1:2007)

Contents	Page
Foreword	5
1 Scope	6
2 Normative references	6
3 Reference conditions	7
4 Administrative and external examination for approval programme	7
5 Performance tests for approval programme	8
5.1 General requirements for the test installation	8
5.1.1 Location	8
5.1.2 Test water	9
5.1.3 Calibrated reference device	9
5.1.4 Freedom from spurious influences	9
5.1.5 Group testing of meters	10
5.2 Static pressure test	10
5.2.1 Object of test	10
5.2.2 Preparation	10
5.2.3 Test procedure	10
5.2.4 Acceptance criteria	11
5.3 Determination of intrinsic errors (of indication)	11
5.3.1 Object of test	11
5.3.2 Preparation	11
5.3.3 Test procedure	12
5.3.4 Acceptance criteria	12
5.4 Error (of indication) tests	13
5.4.1 Object of test	13
5.4.2 Preparation	13
5.4.3 Test Procedure	13
5.4.4 Acceptance criteria	13
5.5 Absence of flow test	13
5.5.1 Object of test	13
5.5.2 Preparation	13
5.5.3 Test procedure	13
5.5.4 Acceptance criteria	13
5.6 Water temperature test (within ROC)	14
5.6.1 Object of test	14
5.6.2 Preparation	14
5.6.3 Test procedure	14
5.6.4 Acceptance criteria	14
5.7 Overload water temperature test	14
5.7.1 Object of test	14
5.7.2 Preparation	14
5.7.3 Test procedure	15
5.7.4 Acceptance criteria	15
5.8 Water pressure test	15
5.8.1 Object of test	15
5.8.2 Preparation	15
5.8.3 Test procedure	15
5.8.4 Acceptance criteria	15

5.9	Verification of flow profile sensitivity classes	15
5.9.1	Object of test	15
5.9.2	Preparation	16
5.9.3	Test procedure	16
5.9.4	Acceptance criteria	16
5.10	Tests on ancillary devices of a water meter	18
5.10.1	Object of test	18
5.10.2	Preparation	18
5.10.3	Procedure	18
5.10.4	Acceptance criteria	18
5.11	Pressure loss test	18
5.11.1	Object of test	18
5.11.2	Preparation	18
5.11.3	Test procedure	19
5.11.4	Acceptance criteria	19
5.12	Reverse flow test	19
5.12.1	Meters designed to measure reverse flows	19
5.12.2	Meters not designed to measure reverse flows	19
5.13	Endurance tests	20
5.13.1	Continuous flow test	20
5.13.2	Discontinuous flow test	23
6	Performance tests related to influence quantities	26
6.1	General requirements	26
6.1.1	Environmental classification	26
6.1.2	Electromagnetic environments	26
6.1.3	Reference conditions	26
6.1.4	Test volumes for measuring error (of indication) of a water meter	27
6.1.5	Influence of the water temperature	27
6.1.6	Requirements for environmental tests	27
6.1.7	Equipment under test (EUT)	27
6.2	Climatic and mechanical environment	29
6.2.1	Dry heat (non-condensing)	29
6.2.2	Cold	30
6.2.3	Damp heat, cyclic (condensing)	31
6.2.4	Vibration (random)	33
6.2.5	Mechanical shock	34
6.3	Electromagnetic environment	35
6.3.1	Electrostatic discharge	35
6.3.2	Radiated radio frequency/Electromagnetic fields	36
6.4	Power supply	38
6.4.1	A.C. power voltage variation	38
6.4.2	A.C. voltage dips and short interruptions	39
6.4.3	Surge immunity	41
6.4.4	Electrical fast transients/Burst	42
6.4.5	D.C. power voltage variation	43
6.5	Static magnetic field	45
6.5.1	Object of test	45
6.5.2	Preparation	45
6.5.3	Test procedure	45
6.5.4	Acceptance criteria	45
6.6	Interruption in battery supply	46
6.6.1	Object of test	46
6.6.2	Test procedure	46
6.6.3	Acceptance criteria	46
Annex A (normative) Irregularity in water velocity field	47	
A.1	Irregularity in water velocity field	47
A.2	Flow disturbers	47

Annex B (informative) Examples of methods and components used for testing Concentric Water Meters	58
Annex C (normative) Equipment and method used to determine meter error	61
C.1 Principle	61
C.2 Description of the test rig	61
C.3 Pipe-work	61
C.3.1 Description	61
C.3.2 Test section	62
C.3.3 Precautions to be taken during tests	62
C.3.4 Special arrangements for the installation of meters	62
C.3.5 Cyclic distortion of the meter	64
C.3.6 Major factors affecting the measurement of errors of indication	64
Annex D (informative) Equipment and methods for pressure loss test	66
D.1 Principle	66
D.2 Pressure loss test equipment	66
D.2.1 General	66
D.2.2 Measuring section	66
D.3 Test procedure	71
D.3.1 Determination of pressure loss attributable to pipe lengths for water meters (measurement 1)71 D.3.2 Measurement and calculation of the actual P of a water meter (measurement 2)	72
Annex E (informative) Characteristics of reference devices	73
E.1 General	73
E.2 Types of reference devices	73
E.2.1 Calibration using volumetric vessels	73
E.2.2 Calibration using reference meters (master meters)	74
E.2.3 Calibration using calibrated tubes	75
E.2.4 Calibration by weighing method	76
E.2.5 Other calibration methods	76
Annex ZA (informative) !!!Relationship between this European Standard and the Essential Requirements of EU Directive 22/2004/EC on Measuring Instruments	77
Bibliography	84