

DIN EN 1434-4:2023-03 (E)

Thermal energy meters - Part 4: Pattern approval tests

Contents		Page
European foreword		4
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
4	General	7
5	Requirements	7
6	Specification of operating conditions	8
6.1	Rated operating conditions	8
6.2	Reference conditions	8
6.3	Reference values for the measurand (RVM)	8
6.3.1	General	8
6.3.2	Reference values for the measurand	8
7	Tests and measurements	9
7.1	General	9
7.2	Test programme	10
7.3	Uncertainty of test equipment and influences of EUT	12
7.4	Performance tests	13
7.4.1	General	13
7.4.2	Flow sensor	13
7.4.3	Calculator	16
7.4.4	Temperature sensors	18
7.4.5	Combined sub-assemblies or complete meter	20
7.5	Dry heat	20
7.5.1	General	20
7.5.2	Calculator	20
7.5.3	Flow sensor	20
7.5.4	Combined sub-assemblies or complete meter	21
7.6	Cold	21
7.6.1	General	21
7.6.2	Calculator	21
7.6.3	Flow sensor	21
7.6.4	Combined sub-assemblies or complete meter	21
7.7	Static deviations in supply voltage	22
7.8	Durability test	23
7.8.1	General	23
7.8.2	Flow sensor	23
7.8.3	Temperature sensors	27
7.8.4	Combined sub-assemblies or complete meter	28
7.9	Damp heat	28
7.9.1	Damp heat cyclic	28
7.9.2	Damp heat steady-state	29
7.10	Short time mains voltage reduction	29
7.11	Electrical transients	30
7.11.1	Fast transients (bursts)	30
7.11.2	Surge transients	31

7.12	Electromagnetic fields	33
7.12.1	Low frequency fields	33
7.12.2	High frequency fields	34
7.13	Electromagnetic field specifically caused by wireless equipment	35
7.13.1	Electromagnetic field in distant proximity	35
7.13.2	Electromagnetic field in close proximity	36
7.14	Radio frequency amplitude modulated	37
7.15	Electrostatic discharge	39
7.16	Static magnetic field (fraud protection)	39
7.17	Mains frequency magnetic field	40
7.18	Internal pressure	40
7.19	Pressure loss	40
7.20	Electromagnetic emission	41
7.20.1	General	41
7.20.2	Conducted emission on power AC lines	41
7.20.3	Conducted emission on signal and DC power lines	41
7.20.4	Radiated emission	42
7.21	24 h interruption in the mains power supply voltage	42
7.22	Flow disturbances	42
7.23	Vibration/mechanical shock	45
8	Documentation	45
Annex A (informative) Testing procedure for temperature sensor pairs with pockets and without pockets		
		47
A.1	Test set-up	47
A.1.1	General	47
A.1.2	Requirements of a temperature bath	47
A.2	Test sequence	49
A.3	Calculations	50
Annex B (informative) Checklist for type approvals of thermal energy meters according to EN 1434		
		51
Annex C (informative) Criteria for a fully developed flow profile		
		70
Annex D (normative) Asymmetric swirl generator		
		71
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/32/EU aimed to be covered		
		75
Bibliography		
		77