

DIN EN 12977-2:2018-07 (E)

Thermal solar systems and components - Custom built systems - Part 2: Test methods for solar water heaters and combisystems

Contents		Page
European foreword		4
Introduction		5
1	Scope	8
2	Normative references	8
3	Terms and definitions	9
4	Symbols and abbreviations	9
5	System classification	12
6	Test methods	12
6.1	Introduction	12
6.2	General	12
6.2.1	Suitability for drinking water	12
6.2.2	Water contamination	12
6.2.3	Freeze resistance	12
6.2.4	High-temperature protection	12
6.2.5	Reverse circulation prevention	12
6.2.6	Pressure resistance	12
6.2.7	Electrical safety	13
6.3	Materials	13
6.4	Components and pipework	13
6.4.1	Collector and collector array	13
6.4.2	Supporting frame	13
6.4.3	Collector and other loops	13
6.4.4	Circulation pump	13
6.4.5	Expansion vessels	13
6.4.6	Heat exchangers	14
6.4.7	Store	14
6.4.8	Pipework	14
6.4.9	Thermal insulation	14
6.4.10	Control equipment	14
6.5	Safety equipment and indicators	15
6.5.1	Safety valves	15
6.5.2	Safety lines and expansion lines	15
6.5.3	Blow-off lines	15
6.5.4	Store isolation valve	15
6.5.5	Indicators	15
6.6	Installation	16
6.6.1	Roof tightness	16
6.6.2	Lightning	16
6.6.3	Snow and wind loads	16
6.7	Initial operation, inspection and commissioning	16
6.8	Documentation	16
6.9	System performance (for small systems only)	16
6.10	Water wastage (for small systems only)	16

7	Optional performance test of small custom built solar heating systems	16
7.1	General	16
7.2	Test of the solar collector	17
7.3	Test of the water store(s)	18
7.4	Test of the control equipment	18
7.5	Determination of the hot water comfort	18
7.6	System simulation model	18
7.7	Long-term performance prediction	18
7.7.1	General	18
7.7.2	Calculation procedure	19
7.7.3	Prediction of yearly system performance indicators	19
7.7.4	Calculation of the net auxiliary energy demand and fractional energy savings for solar-plus-supplementary systems	19
7.7.5	Calculation of the solar fraction for solar-only and preheat systems	22
7.7.6	Calculation of the parasitic energy (for all system types)	23
7.8	Presentation of performance indicators	23
8	Performance test report	25
	Annex A (normative) Reference conditions for performance prediction	26
	Annex B (normative) Additional information regarding the calculation of the fractional energy savings	35
	Annex C (informative) Short-term system testing	37
	Annex D (informative) Long-term monitoring	49
	Annex E (informative) Determination of water wastage	51
	Annex F (informative) Implementation for Ecodesign and Energy Labelling	52
	Annex ZA (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EC) No 811/2013 aimed to be covered	53
	Annex ZB (informative) Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EC) No 812/2013 aimed to be covered	54
	Annex ZC (informative) Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EC) No 814/2013 aimed to be covered	55
	Bibliography	56