

Informal short report System test Nr. S182

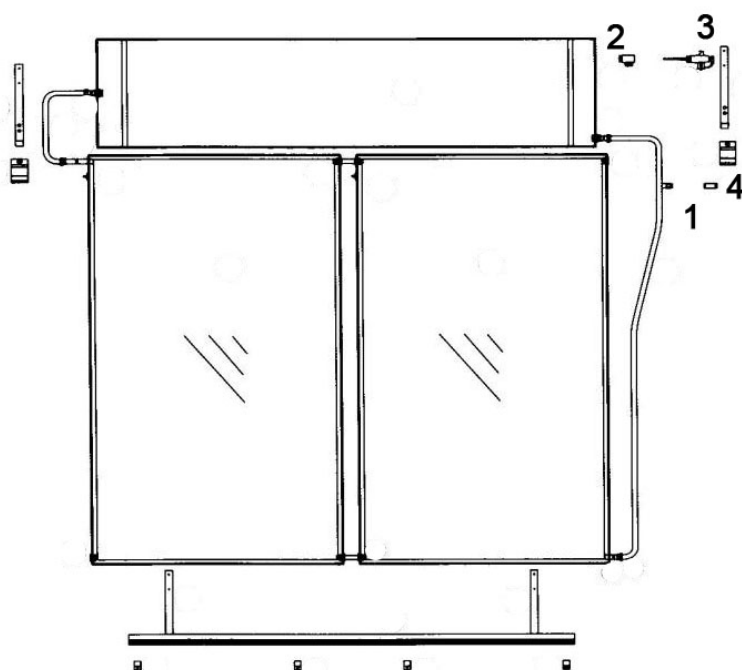
Performance measurement and durability tests according to EN 12976

System model:	Summer CE 300/2
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Sample received:	25.07.2011
Test standard:	EN 12976:2006
Note:	Manufacturers' information is printed in <i>italics</i> .

1. Description of the system

System	
Model:	Summer CE 300/2
Type:	Thermosiphon system
Classification:	Direct / closed / filled / close-coupled system
No. of collector modules:	2
Design load ¹ :	n.a.
Collector	
Model:	Summer CX
Type:	Flat plate collector
Certifications:	Solar Keymark, Register No. -- (in process)
Test report:	-- (in process)
Storage tank	
Model:	Summer CE 300
Volume:	300 l
Material:	Steel
Insulation material:	Polyurethane
Insulation thickness:	40 mm
Max. operating pressure:	8.5 bar
Protection against corrosion:	Enamelled

2. Schematic of system



- 1. Cold water inlet
- 2. Hot water outlet
- 3. T,p-relief valve
- 4. Combined pressure relief (8.5 bar) and non-return valve

¹ The design load of the system is the typical draw-off volume of domestic hot water withdrawn per day, at a temperature of 45°C.

3. Durability test

Tests are carried out according to the EN 12976-2:2006

Test	Results
Freeze resistance	In process
Over temperature protection	Passed
Pressure resistance	Passed
Water contamination	Passed
Safety equipment	In process
Labelling	In process
Reverse flow protection	Passed
Electrical safety	Not applicable
Documentation	In process

4. Thermal performance characterization

Performance measurement according to the EN 12976-2:2006 chapter 5.8

Test method: ISO/DIS 9459-5

4.1 Description of the measured data

The solar radiation is an average value of the solar irradiation in the collector plane. For a valid day, the irradiation in the collector plane shall exceed 12 MJ/m^2 during this day. The ambient air temperature is an average value measured close to the collector array.

Sequence number	1	2	3	4
Sequence type	S_{solA}	S_{solB}	S_{sto}	S_{aux}
Solar radiation [W/m^2]	229	196	104	n/a
Ambient air temperature [$^{\circ}\text{C}$]	21.6	17.1	21.4	n/a
Start date	04.08.2011	07.08.2011	14.08.2011	n/a
Number of days	3	4	4	n/a
Number of valid days	3	3	2	n/a

4.2 System parameters

Effective collector area	A_c^*	2.001	m^2
Effective collector loss coefficient	u_c^*	8.942	$\text{W m}^{-2} \text{K}^{-1}$
Total store heat loss coefficient	U_s	2.699	W/K
Total store heat capacity	C_s	1.07	MJ/K
Fraction of the store used for auxiliary heating	f_{aux}	n/a	-
Mixing constant	D_L	0.1206	-
Stratification parameter	S_c	0.1358	-
Thermal resistance of load heat exchanger	R_L	n/a	K/W
Wind speed dependence of u_c^*		n/a	
Wind option used		W_{ignore}	
Wind correction used		n/a	
Effective store volume		258	l

4.3 Annual performance prediction in accordance with the EN 12976-2 for European Locations

Nomenclature:

Q_d Heat demand

Q_L Heat delivered by the solar heating system (load)

f_{sol} Solar fraction: the energy supplied by the solar part of a system divided by the total system load

Q_{par} Parasitic energy (electricity) e.g. for pump, controller etc.

Performance indicators for solar-only and solar preheat systems on annual base for a ...				
Demand volume of 80 l/d				
Location (latitude)	Q_d MJ	Q_L MJ	f_{sol} %	Q_{par} MJ
Stockholm (59.6° N)	4478	2705	60.4	0
Würzburg (49.5° N)	4289	2723	63.5	0
Davos (46.8° N)	4857	4065	83.7	0
Athens (38.0° N)	3343	3122	93.4	0
Demand volume of 110 l/d				
Stockholm (59.6° N)	6150	3511	57.1	0
Würzburg (49.5° N)	5897	3538	60.0	0
Davos (46.8° N)	6654	5250	78.9	0
Athens (38.0° N)	4573	4138	90.5	0
Demand volume of 140 l/d				
Stockholm (59.6° N)	7821	4176	53.4	0
Würzburg (49.5° N)	7506	4233	56.4	0
Davos (46.8° N)	8483	6210	73.2	0
Athens (38.0° N)	5834	5070	86.9	0
Demand volume of 170 l/d				
Stockholm (59.6° N)	9492	4737	49.9	0
Würzburg (49.5° N)	9114	4858	53.3	0
Davos (46.8° N)	10281	7001	68.1	0
Athens (38.0° N)	7064	5891	83.4	0

Demand volume of 200 l/d				
Location (latitude)	Q_d MJ	Q_L MJ	f_{sol} %	Q_{par} MJ
Stockholm (59.6° N)	11164	5202	46.6	0
Würzburg (49.5° N)	10691	5367	50.2	0
Davos (46.8° N)	12110	7653	63.2	0
Athens (38.0° N)	8326	6644	79.8	0
Demand volume of 250 l/d				
Stockholm (59.6° N)	13939	5715	41.0	0
Würzburg (49.5° N)	13371	6044	45.2	0
Davos (46.8° N)	15137	8386	55.4	0
Athens (38.0° N)	10407	7691	73.9	0
Demand volume of 300 l/d				
Stockholm (59.6° N)	16746	6062	36.2	0
Würzburg (49.5° N)	16052	6453	40.2	0
Davos (46.8° N)	18165	8774	48.3	0
Athens (38.0° N)	12488	8505	68.1	0

Rapperswil, 14.09.2011
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