

Collector Test No. C181

Sunda Solartechnik GmbH, SEIDO 2-6

1. The following tests have been performed

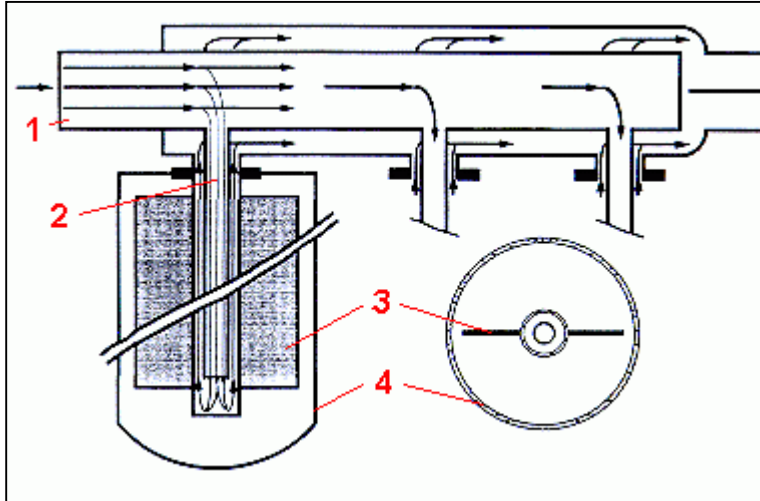
Test	Carried out	Section	Report*
Durability test according to ISO	No	3	LTS C181
Durability test according to prEN	No	3	
Measurement of stagnation temperature	No	3.1	
Efficiency measurement acc. SPF	Yes	4.1	
Efficiency measurement acc ISO, DIN, prEN	No	4.1	
Incidence angle modifier (IAM)	Yes	4.4	
Measurement of pressure drop	No	4.5	
Measurement of thermal capacity	No	4.6	
Measurement of time constant	No	4.6	

* = contact manufacturer for details!

2. Collector description

Contact	Sunda Solartechnik GmbH, D-89420 Höchstädt Tel. +49 (09074) 92 03 97, Fax +49 (09074) 92 03 99 DE
Distributed in *	Evacuated tube collector, direct circulation
Type	
Assembly	
Installation *	Installation on sloping roof, Installation on flat roof, Flat roof with support, Facade installation
Rated flowrate *	100 l/h
Absorber coating *	No specification
Dimensions (absorber, gross)	1.008 m ² , 1.512 m ²
Gross dimensions: l , w , h (in m)	2.115 x 0.715
Weight including glazing *	40 kg

* = manufacturer information



Legend

- 1 Header
- 2 Coaxial tube for heat transfer medium
- 3 Absorber
- 4 Glazing

3. Durability test and Swiss quality label

The collector has not been tested for durability.

3.1 Stagnation temperature

Standard values ISO 9806-2 and prEN 12975-2: 30°C / 1000 W/m ²

Collector Test No. C181

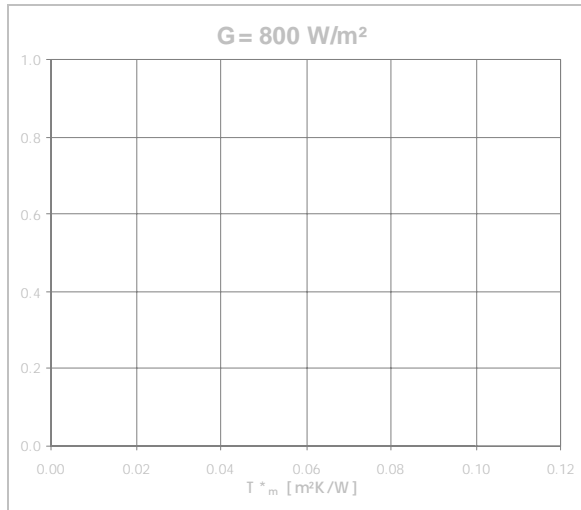
4. Thermal performance (flowrate at test: 102 l/h)

4.1 Efficiency characteristic curve

Measurement with wind (acc. to ISO, DIN, prEN)

Bezugsfläche:	Absorber	Apertur	Brutto
η_0 (-)			
a_1 (W/m ² K)			
a_2 (W/m ² K ²)			

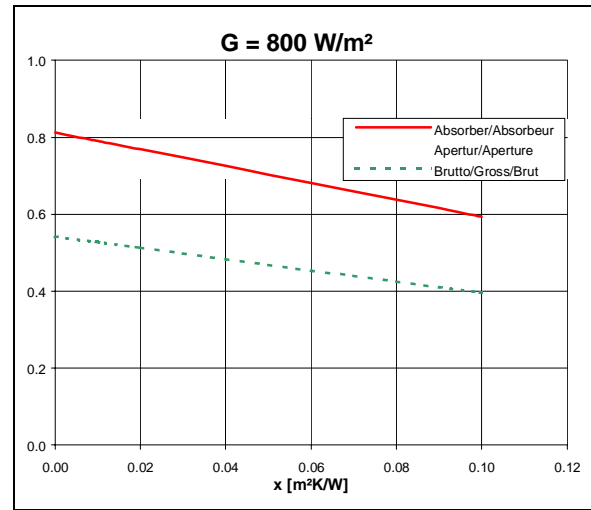
$\eta(T_m^*) = \eta_0 - a_1 \cdot T_m^* - a_2 \cdot G \cdot T_m^{*2}$ [$T_m^* = (t_m - t_a)/G$]
 t_m : avg. fluid temp, t_a : ambient temperature, G: irradiance



Measurement without wind (acc. to SPF)

Reference area	Absorber	Aperture	Gross
c_0 (-)	0.813		0.542
c_1 (W/m ² K)	2.19		1.46
c_2 (W/m ² K ²)	0.0000		0.0000

$\eta(x) = c_0 - c_1 \cdot x - c_2 \cdot G \cdot x^2$ [$x = (t_m - t_a)/G$]
 t_m : avg. fluid temp, t_a : ambient temperature, G: irradiance



4.2 Characteristic efficiency values (normal incidence, G = 800 W/m²)

Bezugsfläche:	Absorber	Apertur	Brutto
η ($T_m^* = 0.00$)			
η ($T_m^* = 0.05$)			
η ($T_m^* = 0.10$)			

Reference area	Absorber	Aperture	Gross
η ($x = 0.00$)	0.81		0.54
η ($x = 0.05$)	0.70		0.47
η ($x = 0.10$)	0.59		0.40

4.3 Power output (power in watts per collector, normal incidence, beam irradiation)

	400 W/m ²	700 W/m ²	1000 W/m ²
$t_m - t_a = 10$ K			
$t_m - t_a = 30$ K			
$t_m - t_a = 50$ K			

Irradiation	400 W/m ²	700 W/m ²	1000 W/m ²
$t_m - t_a = 10$ K	306	552	797
$t_m - t_a = 30$ K	262	507	753
$t_m - t_a = 50$ K	217	463	709

4.4 Incidence angle modifier (IAM)

	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$K(\theta)_{,long}$	1.0					0.92				0.0
$K(\theta)_{,trans}$	1.0					1.05				0.0

4.5 Pressure drop in Pa (test fluid 33.3% Ethylenglykol)

	100 l/h	150 l/h	250 l/h	350 l/h	500 l/h
20°C					
60°C					
80°C					

4.6 Thermal capacity and time constant

Thermal capacity (kJ/K)	Time constant (s)

SPF
 Hochschule Rapperswil (HSR)
 Oberseestr. 10
 CH-8640 Rapperswil
<http://www.solarenergy.ch>