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ISFH CalTeC

Annex to Solar Keymark Certificate		Licence Number	011-7S1891 F
		Date issued	2022-05-20
		Issued by	DIN CERTCO

Licence holder	SAILER GmbH	Country	Germany
Brand (optional)		Web	http://www.sailergmbh.de
Street, Number	Zementwerkstraße 17	E-mail	info@sailergmbh.de
Postcode, City	D- 89584 Ehingen (Donau)	Tel	+49 7391 5002-0

Collector Type	Flat plate collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	88 K
	m²	mm	mm	mm	W	W	W	W	W	W
FOCUS HTF	2.61	2 151	1 215	80	1 840	1 746	1 539	1 309	1 056	808
Power output per m² gross area					704	668	589	501	404	309

Performance parameters test method	Steady state - indoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0.726	3.52	0.011			4 100				0.80

Incidence angle modifier test method		Quasi dynamic - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1.00	0.98	0.96	0.92	0.86	0.75	0.52	0.26	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	0.98	0.96	0.92	0.86	0.75	0.52	0.26	0.00

Heat transfer medium for testing		Water	
Flow rate for testing (per gross area, A_G)		dm/dt	0.030 kg/(sm²)
Maximum temperature difference during thermal performance test		$(\vartheta_m-\vartheta_a)_{max}$	58 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	190 °C
Maximum operating temperature		$\vartheta_{max\ op}$	100 °C
Maximum operating pressure		$p_{max,op}$	1000 kPa
Testing laboratory	ISFH CalTeC	https://isfh.de/	
Test report(s)	071-22/B	Dated	20.05.2022

Comments of testing laboratory	Ver. 6.2 (13.01.2022)
	Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500

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Supplementary Information	Issued	2022-05-20

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m

Standard Locations	Athens			Davos			Stockholm			Würzburg		
Collector name / ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
FOCUS HTF	2 728	1 876	1 180	2 044	1 375	839	1 504	956	566	1 629	1 020	592
Gross Thermal Yield per m² gross area	1 044	718	452	782	526	321	575	366	217	623	390	226
Annual efficiency, η_a	59%	41%	26%	48%	32%	20%	49%	31%	19%	50%	31%	18%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
Mean annual ambient air temperature	18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking mode	South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/

Additional Information

Collector heat transfer medium				Water-Glycole	
The collector is deemed to be suitable for roof integration				No	
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)				A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m²) >	600
Maximum tested positive load				5000	Pa
Maximum tested negative load				2950	Pa
Hail resistance using steel ball (maximum drop height)				2	m

Additional collector attribute(s)

Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information

	Reference Area, A_{sol} (m²)
FOCUS HTF	2.61

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	55%

Remark: Collector efficiency (ηcol) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m², expressed in % and rounded to the nearest integer. Deviating from the regulation ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Additional Informative Technical Data

	Hydraulic Designation Code	Aperture Area, A_a (m²)
FOCUS HTF	5,5-VH-12V-A:7.3,2056_C:16.8,1087	2.33

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0.70	--
First-order coefficient (a_1)	3.52	W/(m²K)
Second-order coefficient (a_2)	0.011	W/(m²K²)
Incidence angle modifier IAM (50°)	0.84	--

Remark: The data given in this section are related to collector reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.

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