Annex to Solar Keymark Certificate		Licence Number	011-7S1874 F
		Date issued	2022-07-14
		Issued by	DIN CERTCO

Licence holder	GREENoneTEC Solarindustrie GmbH	**Country**	Austria
Brand (optional)		**Web**	www.greenonetec.com
Street, Number	Industriepark St. Veit, Energieplatz 1	**E-mail**	info@greenonetec.com
Postcode, City	A – 9300 St. Veit/Glan	**Tel**	+43 (0) 4212 28136-0

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	116 K
	m^2	mm	mm	mm	W	W	W	W	W	W
FK8250 N 4M	2.52	2 150	1 170	83	1 863	1 778	1 568	1 305	990	67
FK8250 L 4M	2.52	1 170	2 150	83	1 863	1 778	1 568	1 305	990	67
Power output per m^2 gross area					739	705	622	518	393	27

Performance parameters test method	Quasi dynamic									
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	0.742	3.13	0.026	0.000	0.00	6 566	0.000	0.00	0.0	0.98
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	1.00	1.00	1.00	0.98	0.93	0.65	0.33	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	1.00	1.00	1.00	0.98	0.93	0.65	0.33	0.00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0.020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	86	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	210	°C
Maximum operating temperature	ϑ_{max_op}	-	°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)	http://www.igte.uni-stuttgart.de	
Test report(s)	21COL1626 21COL1627 21COL1627Q	**Dated**	14.07.2022 14.07.2022 14.07.2022

Comments of testing laboratory Ver. 6.2 (13.01.2022)

Documented performance parameters are taken from 21COL1627 (FK8250 N 4M)

TZS Forschungs- und Testzentrum für Solaranlagen
Institut für Thermodynamik und Wärmetechnik
Universität Stuttgart
Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)

Annex to Solar Keymark Certificate	Licence Number	011-7S1874 F
Supplementary Information	Issued	2022-07-14

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
FK8250 N 4M	3 066	2 197	1 349	2 351	1 576	886	1 726	1 108	609	1 886	1 207	655
FK8250 L 4M	3 066	2 197	1 349	2 351	1 576	886	1 726	1 108	609	1 886	1 207	655
Gross Thermal Yield per m² gross area	1 217	872	535	933	626	352	685	440	242	748	479	260
Annual efficiency, η_a	69%	49%	30%	57%	38%	22%	59%	38%	21%	60%	38%	21%
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				3000	Pa
Maximum tested negative load				2500	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)
FK8250 N 4M	2.52
FK8250 L 4M	2.52

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

Collector efficiency (η_{col})	57%

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)
1-H-1234S-7.2,22498-20.4,1215-D	2.39
1-H-1234S-7.2,21156-20.4,2196-D	2.39

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

Zero-loss efficiency (η_0)	0.74	--
First-order coefficient (a_1)	3.13	W/(m²K)
Second-order coefficient (a_2)	0.026	W/(m²K²)
Incidence angle modifier IAM (50°)	1.00	--

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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