


Annex to Solar Keymark Certificate					Licence Number		011-7S1965 F														
					Date issued		2021-07-15														
					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					Power output per collector																
					G_b = 850 W/m², G_d = 150 W/m² & u = 1.3 m/s																
					ϑ_m - ϑ_a																
					0 K		10 K		30 K		50 K										
					70 K		118 K														
					W		W		W		W										
					W		W		W		W										
FK 8200 L2A Cu-Al-M/M					2.02		1 170		1 730		85										
FK 8200 N2A Cu-Al-M/M					2.02		1 730		1 170		85										
FK 8200 N4A Cu-Al-M/M					2.02		1 730		1 170		85										
FK 8230 L2A Cu-Al-M/M					2.34		1 170		2 000		85										
FK 8230 N2A Cu-Al-M/M					2.34		2 000		1 170		85										
FK 8230 N4A Cu-Al-M/M					2.34		2 000		1 170		85										
FK 8250 L2A Cu-Al-M/M					2.52		1 170		2 150		85										
FK 8250 N2A Cu-Al-M/M					2.52		2 150		1 170		85										
FK 8250 N4A Cu-Al-M/M					2.52		2 150		1 170		85										
Power output per m² gross area					731		690		602		505										
					400		110														
Performance parameters test method		Quasi dynamic																			
Performance parameters (related to A_G)		η ₀ , b		a1		a2		a3		a4		a5		a6		a7		a8		Kd	
Units		-		W/(m ² K)		W/(m ² K ²)		J/(m ³ K)		-		J/(m ² K)		s/m		W/(m ² K ⁴)		W/(m ² K ⁴)		-	
Test results		0.736		3.96		0.011		0.000		0.00		7 513		0.000		0.00		0.0		0.95	
Incidence angle modifier test method		Quasi dynamic - outdoor																			
Incidence angle modifier		Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal		K _{θT, coll}		1.00		1.00		1.00		0.99		0.97		0.89		0.68		0.34		0.00	
Longitudinal		K _{θL, coll}		1.00		1.00		1.00		0.99		0.97		0.89		0.68		0.34		0.00	
Heat transfer medium for testing		Water																			
Flow rate for testing (per gross area, A_G)		dm/dt		0.020		kg/(sm ²)															
Maximum temperature difference during thermal performance test		(ϑ _m -ϑ _a) _{max}		88		K															
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ _{stg}		200		°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)		20COL1539 20COL1540 20COL1538Q/2									Dated		15.07.2021 15.07.2021 15.07.2021								
Comments of testing laboratory		This data sheet replaces the data sheet 011-7S1969 F issued on 12.07.2012 and data sheet 011-7S1965 F issued on 24.04.2017 .									Datasheet version: 6.1, 2019-09-26										
											 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)										
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1965 F
	Issued	2021-07-15

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_m	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
FK 8200 L2A Cu-Al-M/M		2 392	1 645	1 030	1 781	1 188	713	1 312	825	477	1 435	894	509
FK 8200 N2A Cu-Al-M/M		2 392	1 645	1 030	1 781	1 188	713	1 312	825	477	1 435	894	509
FK 8200 N4A Cu-Al-M/M		2 392	1 645	1 030	1 781	1 188	713	1 312	825	477	1 435	894	509
FK 8230 L2A Cu-Al-M/M		2 771	1 906	1 193	2 063	1 376	826	1 520	956	552	1 663	1 036	590
FK 8230 N2A Cu-Al-M/M		2 771	1 906	1 193	2 063	1 376	826	1 520	956	552	1 663	1 036	590
FK 8230 N4A Cu-Al-M/M		2 771	1 906	1 193	2 063	1 376	826	1 520	956	552	1 663	1 036	590
FK 8250 L2A Cu-Al-M/M		2 984	2 052	1 284	2 222	1 482	890	1 637	1 030	595	1 791	1 116	635
FK 8250 N2A Cu-Al-M/M		2 984	2 052	1 284	2 222	1 482	890	1 637	1 030	595	1 791	1 116	635
FK 8250 N4A Cu-Al-M/M		2 984	2 052	1 284	2 222	1 482	890	1 637	1 030	595	1 791	1 116	635
Annual output per m ² gross area		1 184	814	510	882	588	353	650	409	236	711	443	252
Annual efficiency, η_a		67%	46%	29%	54%	36%	22%	56%	35%	20%	57%	36%	20%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
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 ϑ_m (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.1 (September 2019). 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/m ²) >	1000	ϑ_a (°C) >	20	H _x (MJ/m ²) >	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)				
<input type="checkbox"/> Using external power source(s) for normal operation			<input type="checkbox"/> Active or passive measure(s) for self-protection	
<input type="checkbox"/> Co-generating thermal and electrical power			<input type="checkbox"/> Façade collector(s)	

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A _{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A _g (m ²)
FK 8200 L2A Cu-Al-M/M	2.02	11-H-12S-7.2,1602-20.4,1150	1.90
FK 8200 N2A Cu-Al-M/M	2.02	6,6-V-12S-7.2,1610-20.4,1215	1.90
FK 8200 N4A Cu-Al-M/M	2.02	12-V-1234S-7.2,1582-20.4,1215-D	1.90
FK 8230 L2A Cu-Al-M/M	2.34	11-H-12S-7.2,1872-20.4,1150	2.22
FK 8230 N2A Cu-Al-M/M	2.34	6,6-V-12S-7.2,1880-20.4,1215	2.22
FK 8230 N4A Cu-Al-M/M	2.34	12-V-1234S-7.2,1852-20.4,1215-D	2.22
FK 8250 L2A Cu-Al-M/M	2.52	11-H-12S-7.2,2022-20.4,1150	2.40
FK 8250 N2A Cu-Al-M/M	2.52	6,6-V-12S-7.2,2030-20.4,1215	2.40
FK 8250 N4A Cu-Al-M/M	2.52	12-V-1234S-7.2,2002-20.4,1215-D	2.40

Data required for CDR (EU) No 811/2013 - Reference Area A _{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A _{sol}	
Collector efficiency (η_{col})	55%	Zero-loss efficiency (η_0)	0.73
Remark: Collector efficiency (η_{col}) 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/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A _{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient (a_1)	3.96
		Second-order coefficient (a_2)	0.011
		Incidence angle modifier IAM (50°)	0.98
		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.	