


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2752 F							
						Date issued		2017-06-09							
						Issued by		DIN CERTCO							
Licence holder		GREENoneTEC Solarindustrie GmbH				Country		Austria							
Brand (optional)		-				Web		www.greenonetec.com							
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Postcode, City		A-9300 ST.Veit/Glan				Tel		+43 (0)4212 28136-245							
Collector Type						Flat plate collector, glazed									
						Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ; u = 3 m/s ϑ _m - ϑ _a									
							Gross area (A _G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K
Collector name						m ²	mm	mm	mm	W	W	W	W	W	W
FK 8200L 2H						2.02	1 170	1 730	83	1 437	1 365	1 210	1 039	851	496
FK 8230L 2H						2.34	1 170	2 000	83	1 665	1 582	1 402	1 203	986	574
FK 8250L 2H						2.52	1 170	2 150	83	1 793	1 703	1 510	1 296	1 062	618
Power output per m² gross area						711	676	599	514	421	245				
Performance parameters test method						Quasi dynamic									
Performance parameters (related to AG)						η _{0,b}	c ₁	c ₂	c ₃	c ₄	c ₆	K _d			
Units						-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results						0.712	3.441	0.010	0.000	0.000	0.000	0.994			
Incidence angle modifier test method						Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers						No									
Incidence angle modifier						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal						K _{θT, coll}	1.00	1.00	1.00	1.00	0.97	0.89	0.71	0.36	0.00
Longitudinal						K _{θL, coll}	1.00	1.00	1.00	1.00	0.97	0.89	0.71	0.36	0.00
Heat transfer medium for testing						Water-Glycole									
Flow rate for testing (per gross area, A_G)						dm/dt		0.020		kg/(sm ²)					
Maximum temperature difference for thermal performance calculations						(ϑ _m -ϑ _a) _{max}		104		K					
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)						ϑ _{stg}		197		°C					
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m ²		12		kJ/(Km ²)					
Maximum operating temperature						ϑ _{max, op}		197		°C					
Maximum operating pressure						p _{max, op}		1000		kPa					
Testing laboratory						TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de					
Test report(s)						16COL1345 16COL1346 16COL1346Q				Dated		15.05.2017 15.05.2017 15.05.2017			
Comments of testing laboratory						Datashet version: 5.01, 2016-03-01									
Documented performance parameters are taken from test report 16COL1345 (FK 8200L 2H).						 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2752 F
	Issued	2017-06-09

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results													
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 8200L 2H		2 374	1 704	1 131	1 806	1 259	807	1 325	873	536	1 449	951	575
FK 8230L 2H		2 750	1 974	1 310	2 092	1 459	934	1 535	1 011	621	1 679	1 101	667
FK 8250L 2H		2 961	2 126	1 411	2 253	1 571	1 006	1 653	1 089	669	1 808	1 186	718
Annual output per m ² gross area		1 175	844	560	894	623	399	656	432	265	718	471	285
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information		
Collector heat transfer medium	Water	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	2750	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
FK 8200L 2H	2.02	Collector efficiency (η_{col})	56 %
FK 8230L 2H	2.34	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 9806:2013.	
FK 8250L 2H	2.52		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.711 --
		First-order coefficient (a_1)	3.44 W/(m ² K)
		Second-order coefficient (a_2)	0.010 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.97 --
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.			