
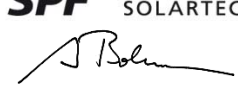


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2776 F							
					Date issued		2017-06-18							
					Issued by									
Licence holder		Sunerg Solar s.r.l.			Country		Italy							
Brand (optional)		--			Web		www.sunergsolar.com							
Street, Number		Via Donnini 51 Cinquemiglia			E-mail		info@sunergsolar.com							
Postcode, City		IT-06012, Citta di Castello			Tel		+39 075 8540018							
Collector Type					Flat plate collector, glazed									
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ̑ _m - ̑ _a									
					0 K	10 K	30 K	50 K	70 K	130 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
H1T+					2.00	2'002	998	100	1'403	1'327	1'172	1'013	851	339
H1TX+					2.58	2'002	1'286	100	1'808	1'710	1'511	1'306	1'097	437
Power output per m ² gross area									702	664	587	507	426	170
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to A _G)					̑ _{0,hem}	a ₁	a ₂							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.702	3.770	0.003							
Incidence angle modifier test method					Steady state - indoor									
Bi-directional incidence angle modifiers					Yes									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{̑T, coll}	1.00	0.99	0.98	0.97	0.94	0.89	0.72	0.40	0.00
Longitudinal					K _{̑L, coll}	1.00	1.00	0.99	0.97	0.93	0.86	0.72	0.47	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					(̑ _m -̑ _a) _{max}	130	K							
Standard stagnation temperature (G = 1000 W/m ² ; ̑ _a = 30 °C)					̑ _{stg}	204	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	6.1	kJ/(K m ²)							
Maximum operating temperature					̑ _{max, op}	200	°C							
Maximum operating pressure					p _{max, op}	600	kPa							
Testing laboratory					SPF, CH-8640 Rapperswil			www.spf.ch						
Test report(s) C1724LPEN C1725LPEN C1725QPEN					Dated		27.06.2017							
							27.06.2017							
							27.06.2017							
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
					 INSTITUT FÜR SOLARTECHNIK 									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2776 F
	Issued	2017-06-27

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 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
H1T+		2'219	1'554	1'040	1'664	1'157	769	1'224	798	505	1'332	860	536
H1TX+		2'860	2'003	1'340	2'144	1'492	991	1'577	1'029	651	1'717	1'108	690
Annual output per m ² gross area		1'111	778	520	833	579	385	613	400	253	667	430	268
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-Glycole	
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	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using ice balls (diameter)	45	mm

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
H1T+	2.00	Collector efficiency (η_{col})	55 %
H1TX+	2.58	<i>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/m², 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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.702 --
		First-order coefficient (a_1)	3.77 W/(m ² K)
		Second-order coefficient (a_2)	0.003 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.94 --
		<i>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.</i>	