



Annex to Solar Keymark Certificate					Licence Number		011-7S2631 R					
Summary of EN ISO 9806 Test Results					Issued		2016-02-04					
Collector test standard			EN ISO 9806									
Licence holder			Sunerg Solar s.r.l.			Country		Italy				
Brand (optional)			--			Web		www.sunergsolar.com				
Street, Number			Via Donnini 51, Cinquemiglia			E-mail		daniele@sunergsolar.com				
Postcode, City			IT-06012 Citta di Castello			Tel		+39 075-8540018				
Collector Type					Evacuated tubular collector							
					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 134 K							
Collector name					m ²		mm		mm		mm	
					W		W		W		W	
HV12					2.17		1'605		1'353		100	
					1'174		1'153		1'107		1'055	
					998		775					
Power output per m² gross area					541		531		510		486	
					460		357					
Performance parameters test method			Steady state - outdoor									
Performance parameters (related to AG)			̑ _{0,hem}		a ₁		a ₂					
Units			-		W/(m ² K)		W/(m ² K ²)					
Test results			0.541		0.93		0.0033					
Incidence angle modifier test method			Steady state - outdoor									
Bi-directional incidence angle modifiers			Yes									
Incidence angle modifier			Angle		10°		20°		30°		40°	
					50°		60°		70°		80°	
					90°							
Transversal			K _{θT, coll}		1.00		1.02		1.04		1.07	
					1.10		1.11		0.90		0.50	
					0.00							
Longitudinal			K _{θL, coll}		1.00		1.00		0.98		0.95	
					0.90		0.81		0.66		0.41	
					0.00							
Fluid for testing					Water-Glycole							
Flow rate for testing (per gross area, AG)					dm/dt		0.020		kg/(sm ²)			
Maximum temperature difference for thermal performance calculations					(̑ _m -̑ _a) _{max}		134		K			
Standard stagnation temperature (G = 1000 W/m²; ̑_a = 30 °C)					̑ _{stg}		163		°C			
Effective thermal capacity (per gross area, AG)					C/m ²		8.9		kJ/(Km ²)			
Maximum operating temperature					̑ _{max, op}		--		°C			
Maximum operating pressure					p _{max, op}		600		kPa			
Testing laboratory			SPF, CH-8640 Rapperswil			www.spf.ch						
Test report(s)			C1678LPEN C1678QPEN			Dated		19.01.2016 19.01.2016				
Comments of testing laboratory												
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806 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
HV12		2'024	1'800	1'569	1'737	1'520	1'308	1'251	1'069	898	1'343	1'149	965
Annual output per m ² gross area		939	835	728	806	706	608	579	495	417	623	533	448
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 (July 2015). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													

Additional Information		
Collector heat transfer medium		Liquid
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 under the following conditions:		
Climate class (A, B or C)		A
Positive Mechanical Load		1000 Pa
Negative Mechanical Load		1000 Pa
Hail resistance using ice balls (diameter)		25 mm

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
HV12	2.17	Collector efficiency (η_{col})	50 %
		<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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.541
		First-order coefficient (a_1)	0.93 W/(m ² K)
		Second-order coefficient (a_2)	0.003 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.02
		<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>	