



Annex to Solar Keymark Certificate						Licence Number		011-7S2620 F			
Summary of EN 12975-2 Test Results						Issued		2015-12-07			
Collector test standard		EN 12975-2									
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						Flat plate collector, glazed					
Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector G = 1000 W/m ² $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	130 K	
	m²	mm	mm	mm	W	W	W	W	W	W	
SHT	2.04	2'004	1'018	100	1'344	1'277	1'131	970	792	162	
Power output per m² aperture area. For aperture area, see page 2					736	699	620	532	436	97	
Performance parameters test method		Steady state - outdoor									
Performance parameters (aperture area)		η_0	a1	a2							
Units		-	W/(m ² K)	W/(m ² K ²)							
Test results		0.736	3.550	0.011							
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	1.00	0.99	0.95	0.87	0.78	0.66	0.38	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.95	0.87	0.78	0.66	0.38	0.00
Fluid for testing		Water-Glycole									
Flow rate for testing (per Aa)		dm/dt	0.021	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		($\vartheta_m - \vartheta_a$) _{max}	130	K							
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30$ °C)		ϑ_{stg}	200	°C							
Effective thermal capacity (per Aa)		C/m ²	6.6	kJ/(Km ²)							
Maximum operating temperature		$\vartheta_{max, op}$	180	°C							
Maximum operating pressure		p _{max, op}	1000	kPa							
Testing laboratory		SPF, CH-8640 Rapperswil				www.solarenergy.ch					
Test report(s)		C1611LPEN C1611QPEN				Dated		02.12.2015 02.12.2015			
Comments of testing laboratory						--					





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	Issued	2015-12-07

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN 12975-2 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
SHT		2'316	1'634	1'066	1'755	1'210	768	1'288	839	512	1'397	900	540
Annual output per m ² aperture area		1'135	801	523	860	593	377	632	411	251	685	441	265
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	Yes
The collector was tested successfully according to EN 12975-2 under the following conditions:	
No valid climate reference class	A --
Positive Mechanical Load	1000 Pa
Negative Mechanical Load	1000 Pa
Hail resistance using steel ball (maximum drop height)	-- m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SHT	1.83	Collector efficiency (η_{col})	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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.736 --
		First-order coefficient (a_1)	3.55 W/(m ² K)
		Second-order coefficient (a_2)	0.011 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.89 --
		<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>	