
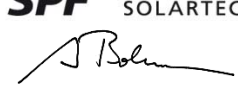


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2744 F					
					Date issued		2017-03-10					
					Issued by							
Licence holder	Cirelius, Lda.				Country	Portugal						
Brand (optional)	--				Web	www.solius.pt						
Street, Number	Rua Inocencio Osorio L. Gondim, 103; Zona Industrial				E-mail	info@solius.pt						
Postcode, City	PT-4430-662, Avintes				Tel	+35 1227843817						
Collector Type					Flat plate collector, glazed							
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ∅ _m - ∅ _a							
					0 K W	10 K W	30 K W	50 K W	70 K W	130 K W		
Solius SilverSol3	2.11	2'037	1'036	90	1'481	1'397	1'220	1'032	833	168		
Solius SilverSol3 L	2.31	2'037	1'136	90	1'624	1'532	1'338	1'132	913	184		
Solius SilverSol3 XL	2.52	2'037	1'235	90	1'766	1'666	1'455	1'230	993	200		
Power output per m ² gross area					702	662	578	489	395	80		
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A _G)		η _{0,hem}	a ₁	a ₂								
Units		-	W/(m ² K)	W/(m ² K ²)								
Test results		0.702	3.930	0.007								
Incidence angle modifier test method		Steady state - 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	0.99	0.97	0.91	0.78	0.63	0.36	0.00	
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.97	0.91	0.78	0.63	0.36	0.00	
Heat transfer medium for testing		Water-Glycole										
Flow rate for testing (per gross area, A _G)		dm/dt	0.021	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}	195	°C								
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	5.26	kJ/(Km ²)								
Maximum operating temperature		∅ _{max, op}	110	°C								
Maximum operating pressure		p _{max, op}	1000	kPa								
Testing laboratory		SPF, CH-8640 Rapperswil				www.spf.ch						
Test report(s)		C1720LPEN C1721LPEN C1721QPEN				Dated		09.03.2017 09.03.2017 09.03.2017				
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01							
--					 INSTITUT FÜR SOLARTECHNIK 							
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de												

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2744 F
	Issued	2017-03-10

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on EN ISO 9806:2013 test results													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
Solius SilverSol3		2'282	1'546	973	1'690	1'129	697	1'244	779	462	1'354	836	487
Solius SilverSol3 L		2'503	1'695	1'068	1'854	1'238	765	1'365	855	507	1'485	917	534
Solius SilverSol3 XL		2'721	1'843	1'161	2'016	1'346	831	1'484	929	551	1'614	997	580
Annual output per m ² gross area		1'081	733	461	801	535	330	590	369	219	642	396	231
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	3000	Pa
Maximum tested negative load	3000	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}		
Solius SilverSol3	2.11	Collector efficiency (η_{col})	53	%
Solius SilverSol3 L	2.31	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.		
Solius SilverSol3 XL	2.52			
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
		Zero-loss efficiency (η_0)	0.702	--
		First-order coefficient (a_1)	3.93	W/(m ² K)
		Second-order coefficient (a_2)	0.007	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.91	--
		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.		