



Annex to Solar Keymark Certificate					Licence Number		OEM 9999/1/5					
					Date issued		2022-07-27					
					Issued by		DQS Hellas					
Licence holder		CIRELIUS, Lda			Country		Portugal					
Brand (optional)		Solius SuperSol			Web		https://cirelius.pt					
Street, Number		Rua Inocencio Osorio L. Gondim, 103, Zona Industrial de Avintes			E-mail		info@cirelius.pt					
Postcode, City		4430-662, Avintes			Tel		+351 227843817					
Collector Type					Flat plate collector							
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 & u = 1.3 m/s $\vartheta_m - \vartheta_a$							
					0 K	10 K	30 K	50 K	70 K	84 K		
					W	W	W	W	W	W		
Solius SuperSol S	1,50	1.480	1.010	86	1.143	1.087	963	822	665	548		
Solius SuperSol S Horizontal	1,50	1.010	1.480	86	1.143	1.087	963	822	665	548		
Solius SuperSol M	1,82	1.480	1.230	86	1.387	1.319	1.168	997	807	664		
Solius SuperSol M Horizontal	1,82	1.230	1.480	86	1.387	1.319	1.168	997	807	664		
Solius SuperSol	2,00	1.980	1.010	86	1.524	1.449	1.284	1.096	886	730		
Solius SuperSol Horizontal	2,00	1.010	1.980	86	1.524	1.449	1.284	1.096	886	730		
Solius SuperSol XL	2,37	1.930	1.230	86	1.806	1.718	1.521	1.299	1.050	865		
Solius SuperSol XL Horizontal	2,37	1.230	1.930	86	1.806	1.718	1.521	1.299	1.050	865		
Solius SuperSol XXL	2,72	2.160	1.260	86	2.073	2.130	1.746	1.491	1.205	993		
Solius SuperSol XXL Horizontal	2,72	1.260	2.160	86	2.073	1.971	1.746	1.491	1.205	993		
Power output per m ² gross area					762	725	642	548	443	365		
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A _G)		η_0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd	
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-	
Test results		0,771	3,59	0,014	0,000	0,00	10.827	0,000	0,00	0,0E+00	0,92	
Incidence angle modifier test method		Steady state - outdoor										
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal		K _{θT, coll}	1,00	1,00	1,00	0,99	0,96	0,90	0,78	0,52	0,00	
Longitudinal		K _{θL, coll}	1,00	1,00	1,00	0,99	0,96	0,90	0,78	0,52	0,00	
Heat transfer medium for testing		Water										
Flow rate for testing (per gross area, A _G)		dm/dt	0,022	kg/(sm ²)								
Maximum temperature difference during thermal performance test		($\vartheta_m - \vartheta_a$) _{max}	53,7	K								
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)		ϑ_{stg}	190,5	°C								
Maximum operating temperature		$\vartheta_{max, op}$	200	°C								
Maximum operating pressure		P _{max, op}	1000	kPa								
Testing laboratory		NCSR Demokritos / Solar & other Energy System					www.solar.demokritos.gr					
Test report(s)		4195DE2 4196DE2 4197DQ3					Dated		16/11/2016 16/11/2016 2/6/2017			
Comments of testing laboratory		Ver. 6.2 (13.01.2022)										
Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +30 210 6233493-4 , Fax: +30 210 6233495, http://www.dqs.gr, e-mail: i.alexiou@dqs.gr												



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 9999/1/5
	Issued	2022-07-27

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m													
Collector name	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
Solius SuperSol S		1.848	1.320	859	1.405	970	605	1.034	675	405	1.125	731	431
Solius SuperSol S Horizontal		1.848	1.320	859	1.405	970	605	1.034	675	405	1.125	731	431
Solius SuperSol M		2.243	1.601	1.042	1.705	1.177	734	1.254	819	491	1.365	886	523
Solius SuperSol M Horizontal		2.243	1.601	1.042	1.705	1.177	734	1.254	819	491	1.365	886	523
Solius SuperSol		2.464	1.759	1.145	1.874	1.293	806	1.379	900	540	1.500	974	575
Solius SuperSol Horizontal		2.464	1.759	1.145	1.874	1.293	806	1.379	900	540	1.500	974	575
Solius SuperSol XL		2.920	2.085	1.357	2.221	1.532	955	1.634	1.066	639	1.778	1.154	682
Solius SuperSol XL Horizontal		2.920	2.085	1.357	2.221	1.532	955	1.634	1.066	639	1.778	1.154	682
Solius SuperSol XXL		3.352	2.393	1.558	2.549	1.759	1.097	1.875	1.223	734	2.040	1.325	782
Solius SuperSol XXL Horizontal		3.352	2.393	1.558	2.549	1.759	1.097	1.875	1.223	734	2.040	1.325	782
Gross Thermal Yield per m ² gross area		1.232	880	573	937	647	403	689	450	270	750	487	288
Annual efficiency, η_a		70%	50%	32%	57%	40%	25%	59%	39%	23%	60%	39%	23%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.2 (13.01.2022). A detailed description of the calculations is available at <http://www.estif.org/solarkeymarknew/>

Additional Information			
Collector heat transfer medium	Water-Glycole		
The collector is deemed to be suitable for roof integration	No		
The collector was tested successfully under the following conditions:			
Climate class (A+, A, B or C)	A		--
G (W/m ²) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
Maximum tested positive load	3000		Pa
Maximum tested negative load	3000		Pa
Hail resistance using steel ball (maximum drop height)	2		m
Additional collector attribute(s)			
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
Solius SuperSol S	1,50	9-V-1234S-A:7.2,1380-C:20.6,1080-D	1,38
Solius SuperSol S Horizontal	1,50	14-V-1234S-A:7.2,908-C:20.6,1560-D	1,38
Solius SuperSol M	1,82	11-V-1234S-A:7.2,1378-C:20.6,1300-D	1,72
Solius SuperSol M Horizontal	1,82	14-V-1234S-A:7.2,1128-C:20.6,1560-D	1,72
Solius SuperSol	2,00	9-V-1234S-A:7.2,1878-C:20.6,1080-D	1,86
Solius SuperSol Horizontal	2,00	18-V-1234S-A:7.2,908-C:20.6,2060-D	1,86
Solius SuperSol XL	2,37	11-V-1234S-A:7.2,1828-C:20.6,1300-D	2,23
Solius SuperSol XL Horizontal	2,37	18-V-1234S-A:7.2,1128-C:20.6,2010-D	2,23
Solius SuperSol XXL	2,72	11-V-1234S-A:7.2,2060-C:20.6,1320-D	2,57
Solius SuperSol XXL Horizontal	2,72	18-V-1234S-A:7.2,1158-C:20.6,2240-D	2,57

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
Collector efficiency (η_{col})	60%	Zero-loss efficiency (η_0)	0,76
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 9806:2017.		First-order coefficient (a_1)	3,59
		Second-order coefficient (a_2)	0,014
		Incidence angle modifier IAM (50°)	0,96
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		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.	