

Annex to Solar Keymark Certificate						Licence Number		011-7S2934 F					
Supplementary Information						Issued		2019-09-11					
Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
	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
SMART SOL CLASSIC 20		2 367	1 721	1 161	1 811	1 278	833	1 332	890	557	1 452	967	595
SMART SOL CLASSIC 23		2 625	1 908	1 288	2 008	1 417	923	1 477	987	618	1 610	1 072	660
SMART SOL CLASSIC 25		2 953	2 147	1 449	2 259	1 595	1 039	1 662	1 110	695	1 811	1 206	743
SMART SOL CLASSIC 29		3 422	2 488	1 679	2 618	1 848	1 203	1 925	1 287	805	2 099	1 398	860
Annual output per m ² gross area		1 172	852	575	896	633	412	659	441	276	719	479	295
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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													
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)										B		--	
G (W/m ²) >		900		ϑ_a (°C) >		15		H_x (MJ/m ²) >		540			
Maximum tested positive load										3000		Pa	
Maximum tested negative load										2000		Pa	
Hail resistance using steel ball (maximum drop height)										n.a.		m	
Additional collector attribute(s)													
<input type="checkbox"/> Using external power source(s) for normal operation				<input type="checkbox"/> Active or passive measure(s) for self-protection									
<input type="checkbox"/> Co-generating thermal and electrical power				<input type="checkbox"/> Wind and/or infrared sensitive collector(s) (WISC)									
<input type="checkbox"/> Façade collector(s)													
Energy Labelling Information													
	Reference Area, A_{sol} (m ²)			Hydraulic Designation Code									
SMART SOL CLASSIC 20	2.02			9-V-1234S-A:7.2,1894-C:20.6,1060-D									
SMART SOL CLASSIC 23	2.24			10-V-1234S-A:7.2,1779-C:20.6,1240-D									
SMART SOL CLASSIC 25	2.52			11-V-1234S-A:7.2,1894-C:20.6,1310-D									
SMART SOL CLASSIC 29	2.92			12-V-1234S-A:7.2,1894-C:20.6,1510-D									
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}													
Collector efficiency (η_{col})		58%			Zero-loss efficiency (η_0)				0.72		--		
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)				3.29		W/(m ² K)					
		Second-order coefficient (a_2)				0.010		W/(m ² K ²)					
		Incidence angle modifier IAM (50°)				0.94		--					
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.													
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