

Annex to Solar Keymark Certificate		Licence Number		011-7S2169 F											
Supplementary Information		Issued		2022-01-24											
Gross Thermal Yield 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		
Grant Solar Sahara		2 656	1 840	1 169	1 982	1 336	818	1 466	932	549	1 596	1 004	582		
Grant Solar Aurora		2 656	1 840	1 169	1 982	1 336	818	1 466	932	549	1 596	1 004	582		
Gross Thermal Yield per m ² gross area		1 147	794	505	856	577	353	633	402	237	689	434	251		
Annual efficiency, η_a		65%	45%	29%	53%	35%	22%	54%	34%	20%	55%	35%	20%		
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		3030										Pa			
Maximum tested negative load		2800										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)					
Grant Solar Sahara		2.32				1-VH-12S-A:11.3;16250				2.13					
Grant Solar Aurora		2.32				1-VH-12S-A:11.3;16250				2.13					
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}									
Collector efficiency (η_{col})		56%				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)				3.78				W/(m ² K)	
						Second-order coefficient (a_2)				0.010				W/(m ² K ²)	
						Incidence angle modifier IAM (50°)				0.92				--	
	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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