

Annex to Solar Keymark Certificate										Licence Number		011-7S 1925F				
Supplementary Information										Issued		2022-03-10				
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			
Vulcano FCC-2S		2 310	1 584	974	1 710	1 126	653	1 270	789	443	1 389	857	473			
Gross Thermal Yield per m ² gross area		1 105	758	466	818	539	313	608	377	212	664	410	226			
Annual efficiency, η_a		63%	43%	26%	50%	33%	19%	52%	32%	18%	53%	33%	18%			
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) >		1100		ϑ_a (°C) >		40		H _x (MJ/m ²) >		700						
Maximum tested positive load										4000		Pa				
Maximum tested negative load										3000		Pa				
Hail resistance using ice balls (diameter)										35		mm				
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)						
Vulcano FCC-2S							2.09			8-VH-1234S-A:5.2,1866-C:16.6,1070			1.95			
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})							52%									
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.							Zero-loss efficiency (η_0)			0.68		--				
							First-order coefficient (a ₁)			3.64		W/(m ² K)				
							Second-order coefficient (a ₂)			0.012		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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