

Annex to Solar Keymark Certificate						Licence Number			011-7S2925 F				
Supplementary Information						Issued			2019-06-03				
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
s1.		2 858	1 991	1 292	2 129	1 447	910	1 574	1 007	607	1 724	1 095	649
Annual output per m² gross area		1 221	851	552	910	619	389	672	431	259	737	468	278
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/m²) >		900		ϑ_a (°C) >		15		H_x (MJ/m²) >		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} (m²)				Hydraulic Designation Code								
s1.	2.34				1-VH-12S-A:11.3,16250-C:X								
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})				58%				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 (a₁)				4.04		W/(m ² K)			
				Second-order coefficient (a₂)				0.007		W/(m ² K ²)			
				Incidence angle modifier IAM (50°)				0.93		--			
				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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