



Annex to Solar Keymark Certificate							Licence Number		011-7S2176 F						
Supplementary Information							Issued		2019-04-09						
<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>															
	<b>Standard Locations</b>	<b>Athens</b>			<b>Davos</b>			<b>Stockholm</b>			<b>Würzburg</b>				
<b>Collector name</b>	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C		
CFS 2.5		2 759	1 870	1 108	2 043	1 319	728	1 515	927	498	1 651	1 001	530		
Annual output per m <sup>2</sup> gross area		1 104	748	443	817	528	291	606	371	199	661	400	212		
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)													
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>				
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 $\vartheta_m$ (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 <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>															
<b>Additional Information</b>															
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 <sup>2</sup> ) >		900		$\vartheta_a$ (°C) >		15		H <sub>x</sub> (MJ/m <sup>2</sup> ) >			540				
Maximum tested positive load											5400		Pa		
Maximum tested negative load											3500		Pa		
Hail resistance using ice balls (diameter)											-		mm		
<b>Additional collector attribute(s)</b>															
<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)															
<b>Energy Labelling Information</b>															
	Reference Area, A <sub>sol</sub> (m <sup>2</sup> )					Hydraulic Designation Code									
CFS 2.5	2.50					1-H-1234S-9.2,2042-17.4,1180									
<b>Data required for CDR (EU) No 811/2013 - Reference Area A<sub>sol</sub></b>							<b>Data required for CDR (EU) No 812/2013 - Reference Area A<sub>sol</sub></b>								
Collector efficiency ( $\eta_{col}$ )							52%		Zero-loss efficiency ( $\eta_0$ )		0.69		--		
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ is based on reference area (A <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.							First-order coefficient (a <sub>1</sub> )		3.65		W/(m <sup>2</sup> K)				
							Second-order coefficient (a <sub>2</sub> )		0.017		W/(m <sup>2</sup> K <sup>2</sup> )				
							Incidence angle modifier IAM (50°)		0.94		--				
							Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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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