



<b>Annex to Solar Keymark Certificate</b>							<b>Licence Number</b>		<b>011-7S2499 F</b>						
<b>Supplementary Information</b>							<b>Issued</b>		<b>2019-09-12</b>						
<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>	$\vartheta_m$	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>	<b>25°C</b>	<b>50°C</b>	<b>75°C</b>		
sunWin 24		2 586	1 823	1 139	1 961	1 319	776	1 443	926	534	1 571	1 000	563		
Annual output per m <sup>2</sup> gross area		1 087	766	478	824	554	326	606	389	224	660	420	237		
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										Yes					
The collector was tested successfully under the following conditions:															
Climate class (A+, A, B or C)										A		--			
G (W/m <sup>2</sup> ) >		1000		$\vartheta_a$ (°C) >		20		H <sub>x</sub> (MJ/m <sup>2</sup> ) >		600					
Maximum tested positive load										3250		Pa			
Maximum tested negative load										2400		Pa			
Hail resistance using ice balls (diameter)										35		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										
sunWin 24	2.38				10-V-1234S-A:7.3,1920-C:20.8,1200										
<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 ( $\eta_{col}$ )							56%		Zero-loss efficiency ( $\eta_0$ )		0.71		--		
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> )		3.15		W/(m <sup>2</sup> K)				
							Second-order coefficient (a <sub>2</sub> )		0.018		W/(m <sup>2</sup> K <sup>2</sup> )				
							Incidence angle modifier IAM (50°)		0.84		--				
							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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