



<b>Annex to Solar Keymark Certificate</b> <b>Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S860 F</b>
	<b>Issued</b>	<b>2019-07-03</b>

<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>													
Collector name	Standard Locations $\vartheta_m$	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
SUNblue 21		2 511	1 785	1 154	1 905	1 305	807	1 397	908	544	1 531	989	581
BWK 90/1		2 511	1 785	1 154	1 905	1 305	807	1 397	908	544	1 531	989	581
SUNblue 25		2 903	2 064	1 334	2 203	1 509	933	1 615	1 050	629	1 770	1 143	672
BWK 90/2		2 903	2 064	1 334	2 203	1 509	933	1 615	1 050	629	1 770	1 143	672
Annual output per m <sup>2</sup> gross area		1 152	819	529	874	599	370	641	417	250	702	454	267
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)				A	--
G (W/m <sup>2</sup> ) >	1000	$\vartheta_a$ (°C) >	20	$H_x$ (MJ/m <sup>2</sup> ) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				2500	Pa
Hail resistance using steel ball (maximum drop height)				1.2	m

<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, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code
SUNblue 21	2.18	10-VH-12V-A:7.3,1752-C:16.4,1154-NoD
BWK 90/1	2.18	10-VH-12V-A:7.3,1752-C:16.4,1154-NoD
SUNblue 25	2.52	10-VH-12V-A:7.3,2042-C:16.4,1154-NoD
BWK 90/2	2.52	10-VH-12V-A:7.3,2042-C:16.4,1154-NoD

<b>Data required for CDR (EU) No 811/2013 - Reference Area <math>A_{sol}</math></b>		<b>Data required for CDR (EU) No 812/2013 - Reference Area <math>A_{sol}</math></b>	
Collector efficiency ( $\eta_{col}$ )	56%	Zero-loss efficiency ( $\eta_0$ )	0.72
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 ( $A_{sol}$ ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient ( $a_1$ )	3.40
		Second-order coefficient ( $a_2$ )	0.013
		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.			