



<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S2774 R</b>
	<b>Issued</b>	<b>2017-06-20</b>

<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math>, based on EN ISO 9806:2013 test results</b>													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
HHG RK1-10		1.101	929	759	930	770	620	652	519	400	714	571	441
HHG RK1-18		1.894	1.599	1.306	1.601	1.325	1.068	1.123	894	689	1.229	982	759
HHG RK1-22		2.290	1.933	1.580	1.935	1.602	1.291	1.357	1.080	833	1.485	1.188	917
HHG RK1-30		3.079	2.598	2.124	2.602	2.153	1.735	1.825	1.452	1.119	1.997	1.597	1.233
Annual output per m <sup>2</sup> gross area		609	514	420	515	426	343	361	287	221	395	316	244
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. 5.01 (March 2016). 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	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	EN 12975-2	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	0	Pa
Hail resistance using ice balls (diameter)	0	mm

<b>Energy Labelling Information</b>				
	Reference Area, A <sub>sol</sub> (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area A <sub>sol</sub>		
HHG RK1-10	1,81	Collector efficiency ( $\eta_{col}$ )	31	%
HHG RK1-18	3,11	<i>Remark: Collector efficiency (<math>\eta_{col}</math>) 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 <math>\eta_{col}</math> 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 9806:2013.</i>		
HHG RK1-22	3,76			
HHG RK1-30	5,06			
		Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>		
		Zero-loss efficiency ( $\eta_0$ )	0,349	--
		First-order coefficient (a <sub>1</sub> )	0,89	W/(m <sup>2</sup> K)
		Second-order coefficient (a <sub>2</sub> )	0,003	W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	1,21	--
<i>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.</i>				