



Annex to Solar Keymark Certificate											Licence Number		
Supplementary Information											011-7S2918 F		
											Issued		
											2019-03-21		
Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
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
ökoTech GS <sup>2</sup> *		4 647	3 222	2 072	3 459	2 343	1 458	2 561	1 632	973	2 792	1 765	1 035
ökoTech GS <sup>2</sup> *		18 490	12 819	8 246	13 765	9 323	5 800	10 191	6 493	3 872	11 111	7 022	4 118
Annual output per m <sup>2</sup> gross area		1 091	756	486	812	550	342	601	383	228	656	414	243
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											4500		Pa
Maximum tested negative load											3000		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								
ökoTech GS <sup>2</sup> *		4.26			4,3,4,3-VH-23S-A:9,1940-C:26,1950								
ökoTech GS <sup>2</sup> *		16.95			16-H-12S-A:9,6940-C:26,2230								
<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 ( $\eta_0$ )				0.67		
							First-order coefficient ( $a_1$ )				3.65		
							Second-order coefficient ( $a_2$ )				0.007		
							Incidence angle modifier IAM (50°)				0.96		
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 collector inlet and the collector outlet of 60 K and a solar													

between the solar collector and the surrounding air or 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.

*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.*

**DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany**

**Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: [info@dincertco.de](mailto:info@dincertco.de) • [www.dincertco.de](http://www.dincertco.de)**