



<b>Annex to Solar Keymark Certificate Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S2902 C</b>
	<b>Issued</b>	<b>2019-02-07</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
T160		5'112	4'723	4'372	4'622	4'291	4'003	3'317	3'006	2'735	3'247	2'940	2'680
Annual output per m <sup>2</sup> gross area		846	782	724	765	710	663	549	498	453	538	487	444
Fixed or tracking collector		EW-axis tracking											
Annual irradiation on collector plane		1955 kWh/m <sup>2</sup>			1891 kWh/m <sup>2</sup>			1268 kWh/m <sup>2</sup>			1318 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		Tracking			Tracking			Tracking			Tracking		

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 [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

<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> ) >	1100	$\vartheta_a$ (°C) >	40	$H_x$ (MJ/m <sup>2</sup> ) >	700
Maximum tested positive load	1000		Pa		
Maximum tested negative load	1000		Pa		
Hail resistance using steel ball (maximum drop height)	25		m		

<b>Additional collector attribute(s)</b>				
<input checked="" type="checkbox"/>	Using external power source(s) for normal operation	<input checked="" 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
T160	6.04	1-H-LRS-AC:22.4,5455

<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 ( $\eta_{col}$ )	58%	Zero-loss efficiency ( $\eta_0$ )	0.60
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 ( $a_1$ )	0.73
		Second-order coefficient ( $a_2$ )	0.000
		Incidence angle modifier IAM (50°)	0.83
		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.	