



Annex to Solar Keymark Certificate		Licence Number		011-7S2939 F									
Supplementary Information		Issued		2019-08-26									
<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math></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
ENSOL ES2V/2.52S AL-CU		3 215	2 385	1 624	2 495	1 785	1 164	1 830	1 245	783	1 990	1 352	836
ENSOL ES2V/2.52B AL-CU		3 215	2 385	1 624	2 495	1 785	1 164	1 830	1 245	783	1 990	1 352	836
Annual output per m <sup>2</sup> gross area		1 276	946	645	990	708	462	726	494	311	790	536	332
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		5400										Pa	
Maximum tested negative load		3000										Pa	
Hail resistance using ice balls (diameter)		45										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, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code											
ENSOL ES2V/2.52S AL-CU	2.52	1,H-1234S-A:9,22340-C:20,1180											
ENSOL ES2V/2.52B AL-CU	2.52	1,H-1234S-A:9,22340-C:20,1180											
<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 ( $\eta_{col}$ )	64%					Zero-loss efficiency ( $\eta_0$ )	0.79			--			
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 ( $a_1$ )	3.21			W/(m <sup>2</sup> K)			
						Second-order coefficient ( $a_2$ )	0.015			W/(m <sup>2</sup> K <sup>2</sup> )			
						Incidence angle modifier IAM (50°)	0.94			--			
						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.							
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