





Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10014.1.1
	Issued	2023-02-26

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
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
ECOSOLAR AP4-NP/1.4		1.454	1.079	757	1.135	829	573	825	573	380	892	613	401
ECOSOLAR AP4-NP/1.8		1.956	1.452	1.018	1.527	1.116	771	1.110	771	512	1.200	825	540
ECOSOLAR AP4-NP/2.0		2.138	1.587	1.113	1.669	1.219	843	1.213	843	559	1.312	902	590
ECOSOLAR AP4-NP/2.3		2.470	1.833	1.285	1.928	1.408	973	1.401	974	646	1.515	1.042	681
Annual output per m <sup>2</sup> gross area		1.069	793	556	835	610	421	606	421	280	656	451	295
Annual efficiency, $\eta_a$													
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 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. 6.1 (September 2019). A detailed description of the calculations is available at <http://www.estif.org/solarkeymarknew/>

#### Additional Information

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	2400		Pa
Maximum tested negative load	3000		Pa
Hail resistance using steel ball (maximum drop height)	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"/> Façade collector(s)		

#### Energy Labelling Information

#### Additional Informative Technical Data

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
ECOSOLAR AP4-NP/1.4	1,36	10-VH-1234S-A:7.2,1392-C:20.6,1030-D	1,22
ECOSOLAR AP4-NP/1.8	1,83	10-VH-1234S-A:7.2,1390-C:20.6,1325-D	1,67
ECOSOLAR AP4-NP/2.0	2,00	10-VH-1234S-A:7.2,1935-C:20.6,1070-D	1,82
ECOSOLAR AP4-NP/2.3	2,31	10-VH-1234S-A:7.2,1895-C:20.6,1280-D	2,11

Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
Collector efficiency ( $\eta_{col}$ )	58%	Zero-loss efficiency ( $\eta_0$ )	0,71
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 ( $a_1$ )	2,87
		Second-order coefficient ( $a_2$ )	0,008
		Incidence angle modifier IAM (50°)	0,88
		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.	