



Annex to Solar Keymark Certificate		Licence Number	OEM 10110.2.2	
		Date issued	2024-03-30	
		Issued by	DQS Hellas	
Licence holder	CHARALAMPIDOU MARIA Co	Country	Greece	
Brand (optional)	PLANETSOL	Web	www.planetsol.gr	
Street, Number	Chiou 3	E-mail	info@planetsol.gr	
Postcode, City	12351 Ag. Barbara, Athens	Tel	+30	210 5694516

Collector Type	Flat plate collector
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Collector name	Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector $G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	92 K
					W	W	W	W	W	W
Solar clock 275	2,77	2.249	1.232	85	2.174	2.059	1.825	1.584	1.336	1.052
Power output per m ² gross area					785	743	659	572	482	380

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	η_0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results	0,793	4,11	0,003	0,000	0,00	0	0,000	0,00	0,0E+00	0,93

Incidence angle modifier test method	Steady state - outdoor									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T, coll}$	1,00	1,00	1,00	0,99	0,97	0,92	0,80	0,55	0,00
Longitudinal	$K_{\theta L, coll}$	1,00	1,00	1,00	0,99	0,97	0,92	0,80	0,55	0,00

Heat transfer medium for testing	Water									
Flow rate for testing (per gross area, A_G)	dm/dt	0,021		kg/(sm ²)						
AES-2.75	$(\vartheta_m - \vartheta_a)_{max}$	62,3		K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ }^\circ\text{C}$)	ϑ_{stg}	173		°C						
Maximum operating temperature	$\vartheta_{max, op}$			°C						
Maximum operating pressure	$p_{max, op}$			kPa						

Testing laboratory	NCSR Demokritos	www.solar.demokritos.gr								
Test report(s)	4297 DQ1 4304 DE1	Dated	2/12/2020 2/12/2020							

Comments of testing laboratory	Datasheet version: 6.1, 2019-09-26									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10110.2.2
	Issued	2024-03-30

Annual collector output in kWh/collector at mean fluid temperature ϑ_m

Collector name	Standard Locations info@alpi.gr	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
Solar clock 275		3.524	2.509	1.707	2.662	1.875	1.262	1.958	1.293	829	2.133	1.399	882
Annual output per m ² gross area		1.272	906	616	961	677	456	707	467	299	770	505	319
Annual efficiency, η_a		72%	51%	35%	59%	42%	28%	61%	40%	26%	62%	41%	26%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
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 ϑ_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 ²) >	1000 ϑ_a (°C) >
20	H_x (MJ/m ²) >
600	3000 Pa
Maximum tested positive load	3000 Pa
Maximum tested negative load	1,8 m
Hail resistance using steel ball (maximum drop height)	

Additional collector attribute(s)

<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 ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)	
Solar clock 275	2,77	14-VH-13S-A:7.2,1880-C:20.6,1300-D	
		2,62	

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 (η_{col})	62%	Zero-loss efficiency (η_0)	0,78 --
Remark: Collector efficiency (η_{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 ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{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)	4,11 W/(m ² K)
		Second-order coefficient (a_2)	0,003 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,97 --
		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.	