



Annex to Solar Keymark Certificate		Licence Number	OEM 10003.1
		Date issued	2024-02-07
		Issued by	DQS Hellas
Licence holder	CHARALAMPIDOU MARIA Co	Country	Greece
Brand (optional)	PLANETSOL	Web	http://www.planetsol.gr
Street, Number	2nd Km Malakasa – Oropou	E-mail	info@planetsol.gr
Postcode, City	19011 Malakasa	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 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	83 K
					W	W	W	W	W	W
PLS EPI 20 KNV	1,51	1.501	1.009	85	1.115	1.062	934	776	588	449
PLS EPI 30 KNV	1,95	1.500	1.300	85	1.435	1.367	1.202	999	757	579
PLS EPI 25 KNV	2,00	2.000	1.000	85	1.472	1.402	1.233	1.025	776	593
PLS EPI 16 KNV	2,24	1.900	1.180	85	1.650	1.572	1.383	1.148	870	665
PLS EPI 54 KNV	2,53	2.009	1.258	85	1.860	1.772	1.558	1.295	981	750
Power output per m² gross area					736	701	617	512	388	297

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	$\eta_{0, b}$	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	0,748	3,24	0,025	0,000	0,00	10.700	0,000	0,00	0,0E+00	0,89

Incidence angle modifier test method	Steady state - outdoor									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	K _{θT, coll}	1,00	1,00	0,99	0,97	0,93	0,85	0,71	0,46	0,00
Longitudinal	K _{θL, coll}	1,00	1,00	0,99	0,97	0,93	0,85	0,71	0,46	0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,021	kg/(sm ²)
Maximum temperature difference during thermal performance test	($\vartheta_m - \vartheta_a$) _{max}	53	K
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30$ °C)	ϑ_{stg}	146	°C
Maximum operating temperature	$\vartheta_{max, op}$	100	°C
Maximum operating pressure	p _{max, op}	1000	kPa

Testing laboratory	NCSR "DEMKRITOS"	www.solar.demokritos.gr
Test report(s)	4192 DE1, 4192 DE1 1247 DE1 4193 DQ1	Dated 1/1/2016 1/1/2016 1/1/2016

Comments of testing laboratory Ver. 6.2 (13.01.2022)

The data was obtained from the test reports 4193 DQ1 (Collector EPI 54NV) and 1247 DE1 (Collector EPI 20NV).

Stamp & signature of test lab



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10003.1
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Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_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
PLS EPI 20 KNV		1.767	1.242	750	1.342	887	493	989	624	340	1.075	674	361
PLS EPI 30 KNV		2.275	1.599	965	1.728	1.143	635	1.273	804	437	1.384	868	465
PLS EPI 25 KNV		2.334	1.640	990	1.772	1.172	652	1.306	824	449	1.420	891	477
PLS EPI 16 KNV		2.616	1.839	1.110	1.987	1.314	730	1.464	924	503	1.591	998	534
PLS EPI 54 KNV		2.949	2.073	1.251	2.240	1.481	823	1.650	1.041	567	1.794	1.125	602
Gross Thermal Yield per m ² gross area		1.167	820	495	886	586	326	653	412	224	710	445	238
Annual efficiency, η_a		66%	46%	28%	54%	36%	20%	56%	35%	19%	57%	36%	19%
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. 6.2 (13.01.2022). 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
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using steel ball (maximum drop height)	2	m

Additional collector attribute(s)			
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
PLS EPI 20 KNV	1,51	9-VH-1234S-A:7.2, 1350-C:20.6, 1090-D	1,35
PLS EPI 30 KNV	1,95	11-VH-1234S-A:7.2, 1350-C:20.6, 1150-D	1,80
PLS EPI 25 KNV	2,00	9-VH-1234S-A:7.2, 1850-C:20.6, 1090-D	1,83
PLS EPI 16 KNV	2,24	11-VH-1234S-A:7.2, 1820-C:20.6, 1265-D	2,07
PLS EPI 54 KNV	2,53	12-VH-1234S-A:7.2, 1850-C:20.6, 1350-D	2,33

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})	57%	Zero-loss efficiency (η_0)	0,74
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)	3,24
		Second-order coefficient (a_2)	0,025
		Incidence angle modifier IAM (50°)	0,93
		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.	