

KEYMARK CERTIFICATE

SK08055782401_rev01

TUV CYPRUS LTD Certifies that the organization

SUNERGY LTD

Address: 3, Mykonou Street
Tseri Industrial Area
2480, Nicosia
Cyprus

Supplies: Solar thermal collectors

In compliance with: EN 12975:2022 & EN ISO 9806:2017

Certified Product: Solar Collector

Model / Type ref: SU-FP1.5L, SU-FP1.5Ln, SU-FP1.8L, SU-FP2L, SU-FP2.5L
SU-FP1.5L-H, SU-FP1.5Ln-H, SU-FP1.8L-H, SU-FP2L-H,
SU-FP2.5L-H

Test Results: Annex to certificate

Certification scheme: The initial Certificate with number PSK-001/2024 of Solar Keymark Certification Body CEN020 was issued on 02/01/2024. In order to grant this certificate, TUV CYPRUS has visited the manufacturing site and verified the implementation of the quality management system. TUV CYPRUS performs these tasks periodically while the certificate has not been cancelled, in accordance with the Product Certification Regulations and the Rules for Authorization to use Conformity Mark for Solar Collectors.

TUV CYPRUS (TUV NORD) LTD
Certification Body

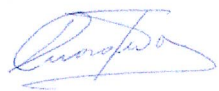
Nicosia , **30/09/2024**
Initial Certification : **09/09/2018**
Valid until : **09/09/2028**



**SOLAR KEYMARK
CERTIFICATION BODY
CEN 033**

**Accredited by
CYSAB
Certificate No. C 004**



Annex to Solar Keymark Certificate		Licence Number		SK08055782401_rev0							
		Date issued		2024-10-03							
		Issued by		TUV CYPRUS LTD							
Licence holder		SUNERGY LTD		Country		Cyprus					
Brand (optional)				Web							
Street, Number		3 Mykonou Str, Industrial Area Tseri		E-mail		sunergysolarheaters@gmail.com					
Postcode, City		2480, Nicosia		Tel		357 22542743					
Collector Type				Flat plate collector							
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 θ _m - θ _a						
					0 K W	10 K W	30 K W	50 K W	70 K W	78 K W	
SU-FP 1.5L	1.48	1,490	990	85	1,039	970	828	681	529	467	
SU-FP 1.5Ln	1.53	1,720	890	85	1,074	1,002	856	704	547	483	
SU-FP 1.8L	1.83	1,490	1,225	85	1,285	1,199	1,023	842	654	578	
SU-FP 2L	1.97	1,990	990	85	1,383	1,291	1,102	906	704	622	
SU-FP 2.5L	2.44	1,990	1,225	85	1,713	1,599	1,364	1,122	873	770	
SU-FP 1.5L-H	1.48	990	1,490	85	1,039	970	828	681	529	467	
SU-FP 1.5Ln-H	1.53	890	1,720	85	1,074	1,002	856	704	547	483	
SU-FP 1.8L-H	1.83	1,225	1,490	85	1,285	1,199	1,023	842	654	578	
SU-FP 2L-H	1.97	990	1,990	85	1,383	1,291	1,102	906	704	622	
SU-FP 2.5L-H	2.44	1,225	1,990	85	1,713	1,599	1,364	1,122	873	770	
Power output per m ² gross area					702	655	559	460	358	316	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A _G)		η ₀ , b	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d
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		0.712	4.64	0.004	0.000	0.00	8,581	0.000	0.00	0.0E+00	0.91
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	0.98	0.95	0.88	0.75	0.50	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	0.00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A _G)		dm/dt	0.020		kg/(sm ²)						
Maximum temperature difference during thermal performance test		(θ _m -θ _a) _{max}	48		K						
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	165		°C						
Maximum operating temperature		θ _{max op}	-		°C						
Maximum operating pressure		p _{max, op}	1000		kPa						
Testing laboratory		AELAB - Applied Energy Laboratory									
Test report(s)		Σ.11.05.18.01 Σ.16.02.18.01, Σ.16.02.18.01/PD, Σ.16.02.18.01/TC Σ.16.02.18.02, Σ.16.02.18.02/PD, Σ.16.02.18.02/TC									
		www.aelab.gov.cy									
		Dated									
		14/8/2018									
		14/8/2018									
		14/8/2018									
Comments of testing laboratory		Ver. 6.2 (13.01.2022)									
		 									
TÜV CYPRUS LTD, Papaflessa 2, 2235 Latsia, Nicosia, Cyprus P.O.Box: 20732, 1663 Nicosia - Cyprus											



Annex to Solar Keymark Certificate										Licence Number		SK08055782401_rev01			
Supplementary Information										Issued		2024-10-03			
Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m															
Standard Locations		Athens			Davos			Stockholm			Würzburg				
Collector name	ϑ_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		
SU-FP 1.5L		1,645	1,060	628	1,179	748	431	878	519	287	960	558	304		
SU-FP 1.5Ln		1,701	1,096	649	1,219	773	446	907	536	297	992	577	314		
SU-FP 1.8L		2,034	1,310	777	1,457	924	533	1,085	642	355	1,187	690	376		
SU-FP 2L		2,190	1,411	836	1,569	995	574	1,168	691	382	1,277	743	404		
SU-FP 2.5L		2,713	1,747	1,036	1,943	1,232	711	1,447	856	473	1,582	920	501		
SU-FP 1.5L-H		1,645	1,060	628	1,179	748	431	878	519	287	960	558	304		
SU-FP 1.5Ln-H		1,701	1,096	649	1,219	773	446	907	536	297	992	577	314		
SU-FP 1.8L-H		2,034	1,310	777	1,457	924	533	1,085	642	355	1,187	690	376		
SU-FP 2L-H		2,190	1,411	836	1,569	995	574	1,168	691	382	1,277	743	404		
SU-FP 2.5L-H		2,713	1,747	1,036	1,943	1,232	711	1,447	856	473	1,582	920	501		
Gross Thermal Yield per m ² gross area		1,112	716	424	796	505	291	593	351	194	648	377	205		
Annual efficiency, η_a		63%	41%	24%	49%	31%	18%	51%	30%	17%	52%	30%	16%		
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				
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											2380		Pa		
Maximum tested negative load											1190		Pa		
Hail resistance using steel ball (maximum drop height)											1.4		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															
	Reference Area, A_{sol} (m ²)		Hydraulic Designation Code		Aperture Area, A_a (m ²)										
SU-FP 1.5L	1.48		8-V-1234S-A:14.1,1368-C:20.6,1055		1.32										
SU-FP 1.5Ln	1.53		7-V-1234S-A:14.1,1598-C:20.6,950		1.37										
SU-FP 1.8L	1.83		10-V-1234S-A:14.1,1368-C:20.6,1285		1.72										
SU-FP 2L	1.97		8-V-1234S-A:14.1,1868-C:20.6,1055		1.85										
SU-FP 2.5L	2.44		10-V-1234S-A:14.1,1868-C:20.6,1285		2.23										
SU-FP 1.5L-H	1.48		12-V-1234S-A:14.1,868-C:20.6,1560		1.32										
SU-FP 1.5Ln-H	1.53		14-V-1234S-A:14.1,768-C:20.6,1790		1.37										
SU-FP 1.8L-H	1.83		12-V-1234S-A:14.1,1103-C:20.6,1560		1.72										
SU-FP 2L-H	1.97		17-V-1234S-A:14.1,868-C:20.6,2060		1.85										
SU-FP 2.5L-H	2.44		17-V-1234S-A:14.1,1103-C:20.6,2060		2.23										
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}															
Collector efficiency (η_{col})	51%														
Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}															
Zero-loss efficiency (η_0)														0.70	--
First-order coefficient (a_1)														4.64	W/(m ² K)
Second-order coefficient (a_2)														0.004	W/(m ² K ²)
Incidence angle modifier IAM (50°)														0.95	--
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.														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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