



Certificate no. **PSK-002/2023**
Certificado nº

Name and address of the certificate holder:
Nome e morada do titular do certificado:
SUNERGY, LTD.
3, Mykonou Street
Tseri Industrial Area
2480 Nicosia
Cyprus

Product:
Produto:
Thermal solar collector
Colector Solar Térmico

Type references:
Referências:
SUNERGY-FP1.5L, SUNERGY-FP1.8L, SUNERGY-FP2L,
SUNERGY-FP2.5L

Trademark(s):
Marca(s) comercial(is):
SUNERGY

Technical characteristics:
Características técnicas:
Annex to Solar Keymark Certificate No. PSK-002/2023
Anexo ao Certificado Solar Keymark com Nº PSK-002/2023

This product is in conformity with:
Este produto está em conformidade com:
EN 12975-1:2006+A1:2010, EN ISO 9806:2017

and with the Specific Keymark Scheme Rules for Solar Thermal Products
e com as Regras Particulares do CEN Keymark Scheme para Produtos Solares Térmicos.

Test report(s) no. / issued by:
Relatório(s) de ensaios nº(s) / emitido(s) por:
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 / AEL

Additional information (if any):
Informação adicional (se existir):

This certificate is valid until:
Este certificado é válido até:
2023-12-31

and supersedes certificate no:
e substitui o certificado nº:


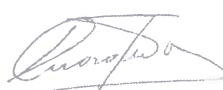
Date of issue:
Data de emissão:
2023-09-28



Francisco Barroca
General Manager / *Diretor Geral*



This Certificate includes one Annex with 2 (two) pages
Este Certificado é constituído por um Anexo com 2 (duas) páginas

Annex to Solar Keymark Certificate					Licence Number		PSK-002/2023				
					Date issued		2023-09-28				
					Issued by		CERTIF				
Licence holder		SUNERGY LTD			Country		Cyprus				
Brand (optional)		SUNERGY			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					Power output per collector						
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	78 K	
					W	W	W	W	W	W	
SUNERGY - FP 1.5L					1 039	970	828	681	529	467	
SUNERGY - FP 1.8L					1 285	1 199	1 023	842	654	578	
SUNERGY - FP 2L					1 383	1 291	1 102	906	704	622	
SUNERGY - FP 2.5L					1 713	1 599	1 364	1 122	873	770	
Power output per m² gross area					702	655	559	460	358	316	
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		0,712	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					($\vartheta_m - \vartheta_a$) _{max}	48	K				
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30^\circ\text{C}$)					ϑ_{stg}	165	°C				
Maximum operating temperature					$\vartheta_{max, op}$	-	°C				
Maximum operating pressure					p _{max, op}	1000	kPa				
Testing laboratory		AELAB - Applied Energy Laboratory			www.aelab.gov.cy						
Test report(s)		Σ.11.05.18.01			Dated		14/08/2018				
		Σ.16.02.18.01./PD, Σ.16.02.18.01./TC					14/08/2018				
		Σ.16.02.18.02, Σ.16.02.18.02./PD, Σ.16.02.18.02./TC					14/08/2018				
Comments of testing laboratory					Ver. 6.2 (13.01.2022)						
					 						
CERTIF Associação para a Certificação Rua José Afonso, 9E - 2810-237 Almada - Portugal Tel: +351 212 586 940 / Fax: +351 212586959 / mail@certif.pt / www.certif.pt											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	PSK-002/2023
	Issued	2023-09-28

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
SUNERGY - FP 1.5L		1 646	1 061	629	1 179	748	432	878	520	287	960	559	304
SUNERGY - FP 1.8L		2 035	1 311	778	1 458	925	534	1 086	642	355	1 187	691	376
SUNERGY - FP 2L		2 191	1 412	837	1 570	996	575	1 169	692	383	1 278	744	405
SUNERGY - FP 2.5L		2 714	1 749	1 037	1 944	1 233	712	1 448	857	474	1 583	921	501
Gross Thermal Yield per m ² gross area		1 112	717	425	797	505	292	593	351	194	649	378	206
Annual efficiency, η_a		63%	41%	24%	49%	31%	18%	51%	30%	17%	52%	30%	17%
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		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
SUNERGY - FP 1.5L	1,48	8-V-1234S-A:14.1,1370-C:20.6,1055	1,32
SUNERGY - FP 1.8L	1,83	10-V-1234S-A:14.1,1370-C:20.6,1285	1,72
SUNERGY - FP 2L	1,97	8-V-1234S-A:14.1,1868-C:20.6,1055	1,85
SUNERGY - FP 2.5L	2,44	10-V-1234S-A:14.1,1868-C:20.6,1285	2,23

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})	51%	Zero-loss efficiency (η_0)	0,70
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)	4,64
		Second-order coefficient (a_2)	0,004
		Incidence angle modifier IAM (50°)	0,95
		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.	