Certificado

Certificate no.
Certificado nº **PSK-009/2019**

Name and address of certificate holder:
Nome e morada do titular do certificado:

VELPA SOLAR HEATERS, LTD.
25A Optikou Nikolaide Street
3045 Limassol
Cyprus

Product:
Produto:

Thermal Solar Collector
Coletor Solar Térmico

Type references:
Referências:

CAS1-F15, CAS2-F15, CAS3-F15, CAS4-F15

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

VELPA

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK-009/2019 (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo N.º PSK-009/2019 (em anexo)

This product is in conformity with:
Este produto está em conformidade com:

EN 12975-1:2006+A1:2010, EN 12975-2:2006

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) ref. / Issued by:
Relatório(s) de ensaios nº(s) / Emitido(s) por:

Σ.13.06.12.01, Σ.13.06.12.02, Σ.25.10.12.01 / AEL

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

This certificate is valid until:
Este certificado é válido até:

2024-11-27

and supersedes certificate no:
e substitui o certificado nº:

Date of issue:
Data de emissão:

2019-11-28

Francisco Barroca
General Manager / *Diretor Geral*

IPAC acreditação
C0004
ISO/IEC 17065
Produtos

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

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Associação para a Certificação

Annex to Solar Keymark Certificate

Licence Number	PSK-009/2019
Date issued	2019-11-28
Issued by	CERTIF

Licence holder	VELPA SOLAR HEATERS, LTD.	Country	Cyprus
Brand (optional)		Web	http://www.velpasolar.com
Street, Number	Optikou Nikolaide Street, 25A	E-mail	info@velpasolar.com
Postcode, City	3045, Limassol	Tel	+357 70003393

Collector Type	Flat plate collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	78 K
	m²	mm	mm	mm	W	W	W	W	W	W
CAS 1 F15	1,48	1.491	991	85	998	943	813	655	470	389
CAS 2 F15	1,83	1.490	1.225	85	1.234	1.166	1.005	810	581	481
CAS 3 F15	1,97	1.990	990	85	1.329	1.256	1.082	872	626	517
CAS 4 F15	2,42	1.976	1.225	85	1.632	1.542	1.329	1.071	769	636
Power output per m² gross area					674	637	549	443	318	263

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0,690	3,49	0,023	0,000	0,00	0	0,000	0,00	0,0E+00	0,85

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	0,99	0,97	0,94	0,88	0,78	0,63	0,39	0,00
Longitudinal	$K_{\theta l\ coll}$	1,00	0,99	0,97	0,94	0,88	0,78	0,63	0,39	0,00

Heat transfer medium for testing		Water	
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	48	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	185	°C
Maximum operating temperature	$\vartheta_{max\ op}$	200	°C
Maximum operating pressure	$p_{max\ op}$	1000	kPa

Testing laboratory	AELAB - Applied Energy Laboratory	www.aelab.gov.cy	
Test report(s)	Σ.13.06.12.01	Dated	09-01-2014
	Σ.13.06.12.02		09-01-2014
	Σ.25.10.12.01		09-01-2014

Comments of testing laboratory

Datasheet version: 6.1, 2019-09-26

CERTIF Associação para a Certificação
Rua José Afonso, 9E - 2810-237 Almada - Portugal
Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt

Annex to Solar Keymark Certificate	Licence Number	PSK-009/2019
Supplementary Information	Issued	2019-11-28

Annual collector output 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
CAS 1 F15		1.522	1.005	557	1.119	696	350	831	492	246	904	527	259
CAS 2 F15		1.881	1.243	689	1.384	860	433	1.027	608	304	1.117	652	321
CAS 3 F15		2.025	1.338	742	1.490	926	466	1.106	655	327	1.203	702	345
CAS 4 F15		2.488	1.643	911	1.830	1.137	573	1.359	804	402	1.478	863	424
Annual output per m² gross area		1.028	679	377	756	470	237	561	332	166	611	356	175
Annual efficiency, η_a		58%	38%	21%	46%	29%	15%	48%	28%	14%	49%	29%	14%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (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	
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)				B	--
G (W/m²) >	900	ϑ_a (°C) >	15	H_y (MJ/m²) >	540
Maximum tested positive load				1000	Pa
Maximum tested negative load				1000	Pa
Hail resistance using steel ball (maximum drop height)				-	m

Additional collector attribute(s)

- ☐ Using external power source(s) for normal operation
- ☐ Active or passive measure(s) for self-protection
- ☐ Co-generating thermal and electrical power
- ☐ Façade collector(s)

Energy Labelling Information

	Reference Area, A_{sol} (m²)
CAS 1 F15	1,48
CAS 2 F15	1,83
CAS 3 F15	1,97
CAS 4 F15	2,42

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
{8}-{V}-{1234S}-{A:14,1,1361}-	"[1,35]"
{10}-{V}-{1234S}-{A:14,1,1375}-	"[1,67]"
{8}-{V}-{1234S}-{A:14,1,1875}-	"[1,80]"
{10}-{V}-{1234S}-{A:14,1,1865}-	"[2,26]"

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	50%

Remark: Collector efficiency (ηcol) 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/m², expressed in % and rounded to the nearest integer. Deviating from the regulation ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0,67	--
First-order coefficient (a_1)	3,49	W/(m²K)
Second-order coefficient (a_2)	0,023	W/(m²K²)
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.

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