



Certificate no. PSK – 019/2016
Certificado n.º

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

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

Product:
Produto:

Thermal Solar Collector
Coletor Solar Térmico

Type references:
Referências:

CAS1-F8, CAS2-F8, CAS3-F8, CAS4-F8

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

VELPA

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK-019/2016
(in annex)
*Resumo dos resultados dos ensaios realizados segundo a norma EN 12975:
Registo N.º PSK-019/2016 (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 n.º(s) / Emitido(s) por:

11.V1/LES/2011 / LNEG-LES

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

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

2021-05-05

and supersedes certificate no:
e substitui o certificado n.º:

Date of issue:
Data de emissão:

2016-08-08




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





Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		PSK-019/2016							
						Issued		2016-08-08							
Company/holding the	VELPA SOLAR HEATERS, LTD					Country	Cyprus								
Brand (optional)	VELPA					Website	www.velpasolar.com								
Street, street number	25A Optikou Nikolaides					E-mail	velpa.solar@cytanet.com.cy								
Postal Code / City, province	3045 Limassol					Tel/Fax	357/25576031 / 25563815								
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed									
Thermal / photo voltaic hybrid collector? (PVT collector)						No									
Integration in the roof possible ? (manufacturers declaration)						No									
Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module									
						G = 1000 W/m ²									
						Tm-Ta									
						0 K	10 K	30 K	50 K	70 K					
						W	W	W	W	W					
CAS1-F8	1.32	1490	990	85	1.48	1028	968	844	715	580					
CAS2-F8	1.67	1490	1225	85	1.83	1301	1225	1068	904	734					
CAS3-F8	1.80	1990	990	85	1.97	1402	1320	1151	975	791					
CAS4-F8	2.24	1989	1226	85	2.44	1745	1643	1432	1213	984					
Performance test method						Glazed liquid heating collector - steady state - outdoor									
Performance parameters related to aperture						η_0	a1	a2							
Units						-	W/(m ² K)	W/(m ² K)							
Test results - Flow rate and fluid see note 1						0.779	4.500	0.005							
Bi-directional incidence angle						No <i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers K θ (θ)						Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
						K θ (θ)	1.00	0.98	0.95	0.91	0.84	0.71	0.45	0.00	0.00
Incidence angle modifier not bi-directional - leave fields blank															
Stagnation temperature - Weather conditions see note 2						Tstg	165	°C							
Effective thermal capacity						ceff = C/Ag	9	kJ/(m ² K)							
Max. intended operation temperature - see note 3						Tmax,op	--	°C							
Max. operation pressure - see note 3						pmax,op	1000	kPa							
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m ² aperture area															
Flow rate	kg/(s m ²)	0.000	0.005	0.011	0.002	0.024	0.030								
Pressure drop, ΔP	Pa	0	38	91	141	191	242								
Optional weather data						Location		Link							
Testing Laboratory						LNEG									
Website						www.lneg.pt									
Test report id. number						n ^o 11.V1/LES/2011			Date of test report			2011-05-04			
During the test GDIF/GTOT was always between						0.09	and	0.13							
Comments of testing laboratory:															
Collector CAS1-F8 was thermal performance tested.															
Collector CAS4-F8 was submitted to thermal performance and reliability tests.															
Dimensions for CAS1-F8, CAS2-F8 and CAS3-F8 are based on manufacturer informations															
Information on Tmax,op not available.															
Note 1	Flow rate	0.020 kg/(s m ²)	Fluid	Water											
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C														
Note 3	Given by manufacturer														
 <p>LNEG, I.P. Laboratório Nacional de Energia e Geologia Laboratório de Energia Solar</p>															
<p>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</p>															
sheet version: 4.06, 2014-01-15															



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	PSK-019/2016
	Issued	08-08-2016

Annual collector output kWh/module												
Collector name	Location and collector temperature (T _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
CAS1-F8	1 489	984	613	1 093	722	443	804	498	296	872	530	308
CAS2-F8	1 884	1 245	775	1 383	914	561	1 017	630	375	1 104	671	389
CAS3-F8	2 031	1 342	836	1 490	985	605	1 096	679	404	1 189	723	419
CAS4-F8	2 528	1 670	1 040	1 855	1 226	753	1 364	845	503	1 480	900	522

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °C	Collector orientation or tracking mode
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

<p align="center"> 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 </p>	Datasheet version:
	4.06, 2014-01-15
	ScenoCalc version:
	Ver. 4.06 (Jan, 2014)