Certificado

Certificate no.
Certificado nº **PSK – 009/2015**

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

SOLE S. A.
Lefktron and Laikon Agonon,
Acharnai – 13671, Athens
Greece

Product:
Produto:

Thermal solar collector
Coletor solar térmico

Type references:
Referências:

NS 1.75; NS 2.00; NS 2.50; NS 2.70

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

EUROSTAR, AQUASOL, OLYMPUS, SUNLIT

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: Registration No. PSK–009/2015 (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975: Registo Nº PSK-009/2015 (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) no. / issued by:
Relatório(s) de ensaios nº(s) / emitido(s) por:

Nº 33.V2/DER-LECS/2008 / INETI

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

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

2019-02-26

and supersedes certificate no:
e substitui o certificado nº:

PSK-002/2014

Date of issue:
Data de emissão:

2015-06-22

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

Certif – Associação para a Certificação
Rua José Afonso, 9 E – 2810-237 Almada – Portugal – Tel.: 351. 21 258 69 40 – Fax: 351. 21 258 69 59

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	PSK-009/2015
		Issued	2015-06-22

Company holding the	SOLE, S.A.	Country	Greece
Brand (optional)	EUROSTAR, AQUASOL, OLYMPUS, SUNLIT	Website	www.eurostar-solar.com
Street, street number	Lefktron and Laikon, Agonon	E-mail	export@sole.gr
Postal Code / City, province	13671 Acharnai - Athens	Tel/Fax	30 2102389500/2

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m², Tm-Ta 0 K	10 K	30 K	50 K	70 K
	m²	mm	mm	mm	m²	W	W	W	W	W
NS 1.75	1.59	1 760	1 000	86	1.76	1 154	1 053	830	582	308
NS 2.00	1.73	1 970	970	86	1.91	1 256	1 145	903	633	336
NS 2.50	2.12	1 970	1 175	86	2.32	1 539	1 403	1 107	776	411
NS 2.70	2.46	2 144	1 247	85	2.67	1 786	1 629	1 284	900	477

Performance test method	Glazed liquid heating collector - steady state - outdoor			
Performance parameters related to aperture	η0	a1	a2	
Units	-	W/(m²K)	W/(m²K²)	
Test results - Flow rate and fluid see note 1	0.726	6.200	0.020	

Bi-directional incidence angle	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)	0.99	0.97	0.94	0.87	0.77	0.59	0.20	0.00	0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	101	°C
Effective thermal capacity	ceff = C/Ag	3.8	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	150	°C
Max. operation pressure - see note 3	pmax,op	600	kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area

Flow rate	kg/(s m²)	---	---	---	---	---	---	---	---	---	---
Pressure drop, ΔP	Pa	---	---	---	---	---	---	---	---	---	---

Optional weather data	Location		Link	
Testing Laboratory	LNEG			
Website	www.lneg.pt			
Test report id. number	n.º33.V2/LES/2008	Date of test report	2015-06-03	
During the test GDIF/GTOT was always between	0.13	and	0.24	

Comments of testing laboratory:

Pressure drop was not measured.

Note 1	Flow rate	0.020	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

Maria José
LNEG, I.P.
Laboratório Nacional de Energia e Geologia
Laboratório de Energia Solar

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

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	PSK-009/2015
	Issued	2015-06-22

Annual collector output kWh/module

Collector name	Location and collector temperature (Tm)												
	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	
NS 1.75	1 536	780	311	998	482	162	759	353	119	826	370	130	
NS 2.00	1 671	849	338	1 086	524	176	826	384	130	899	402	142	
NS 2.50	2 048	1 040	414	1 331	643	216	1 012	471	159	1 102	493	174	
NS 2.70	2 377	1 207	481	1 545	746	251	1 174	546	185	1 279	572	202	

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °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°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	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 àccording to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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

Datasheet version: 4.06, 2014-01-15

ScenoCalc version: Ver. 4.06 (Jan, 2014)