

Certificate no. **PSK – 001/2016**
Certificado nº



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:

ECO S150; ECO S200; ECO S230; ECO S260

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

ECO

Technical characteristics:
Características técnicas:

Summary of EN 12975 Test Results: *Registration No. PSK-001/2016,*
(in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975:
Registo Nº PSK-001/2016, (em anexo)

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

EN 12975-1:2006+A1:2010, EN ISO 9806:2013

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:
Relatórios de ensaios nº(s) / emitidos por:

Nº 4151 DE4 / DEMOKRITOS

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

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

2020-11-22

and supersedes certificate no:
e substitui o certificado nº:

PSK-024/2015

Date of issue:
Data de emissão:

2016-01-04



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-001/2016							
						Issued		2016-01-04							
Company holding the						Country		GREECE							
Brand (optional)						Website		www.eurostar-solar.com							
Street, street number						E-mail		export@sole.com							
Postal Code / City,						Tel/Fax		30 2102389500 / 2							
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)						Yes									
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					
ECO S260	2.52	2,135	1,238	81	2.64	1,923	1,789	1,518	1,244	968					
ECO S230	2.17	1,960	1,165	81	2.28	1,656	1,540	1,307	1,071	833					
ECO S200	1.78	1,960	960	81	1.88	1,358	1,263	1,072	879	683					
ECO S150	1.39	1,540	960	81	1.48	1,061	987	837	686	534					
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 ²)							
Test results - Flow rate and fluid see note 1						0.763	5.310	0.002							
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)					0.79				0.00
Incidence angle modifier not bi-directional - leave fields blank															
Stagnation temperature - Weather conditions see note 2						Tstg	164 °C								
Effective thermal capacity						ceff = C/Ag	10.7 kJ/(m ² K)								
Max. intended operation temperature - see note 3						Tmax,op	150 °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)	0.005	0.007	0.010	0.016	0.021	0.026	0.032							
Pressure drop, ΔP	Pa	77	113	171	308	458	671	890							
Optional weather data						Location	Link								
Testing Laboratory						Solar & Energy Systems Laboratory, NCSR "DEMOKRITOS"									
Website						www.solar.demokritos.gr									
Test report id. number						4154 DE4			Date of test report			2015/09/22			
During the test GDIF/GTOT was always between						0.1	and	0.2							
Comments of testing laboratory:															
- ECO S150 was thermal performance tested.															
- ECO S260 was thermal performance tested and reliability and durability															
- Test performed according to EN ISO9806:2013 which supersedes EN 12975-2:2006.															
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														
Datasheet version: 4.06, 2014-01-15															
<p>CERTIF Associação para a Certificação</p> <p>Rua José Afonso, 9E - 2810-237 Almada - Portugal</p> <p>Tel: +351 212 586 940 / Fax: +351 212 586 959 / mail@certif.pt / www.certif.pt</p>															

N.C.S.R "DEMOKRITOS"
SOLAR ENERGY LABORATORY
Head: Dr Vassilios Bellos
Tel: +210 6563815 - Fax: +210 6564115
153 10 Ag. Paraskevi - Attika - Greece



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	PSK-001/2016
	Issued	4/1/2016

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		
ECO S260	2,653	1,608	924	1,871	1,151	648	1,386	794	436	1,502	840	452		
ECO S230	2,284	1,384	795	1,611	991	558	1,193	684	375	1,293	723	389		
ECO S200	1,874	1,136	652	1,321	813	458	979	561	308	1,061	593	319		
ECO S150	1,463	887	510	1,032	635	358	764	438	240	828	463	249		

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

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: +351 212 586 959 / mail@certif.pt / www.certif.pt</p>	Datasheet version: 4.06, 2014-01-15
	ScenoCalc version: Ver. 4.06 (Jan, 2014)