



Certificate no.
Certificado n° **PSK-008/2020**

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
Colector 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-014/2018,*
(in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12975:
Registo N° PSK-014/2018, (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 n°(s) / emitidos por:

N° 6.V1/LES/2018 and/e N° 9.V1/LES/2018 / LNEG
N° 4151 DE4 / DEMOKRITOS

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

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

2025-11-22

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

Date of issue:
Data de emissão:


2020-11-23



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-008/2020				
					Date issued		2020-11-23				
					Issued by		CERTIF				
Licence holder		Sole, S.A.			Country		Greece				
Brand (optional)		ECO			Web		www.eurostar-solar.com				
Street, Number		Lefktron & Laikon Agonon			E-mail		export@sole.com				
Postcode, City		13671, Acharnai – Athens			Tel		+30 2102389500				
Collector Type					Flat plate collector						
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s θ _m - θ _a						
					0 K	10 K	30 K	50 K	70 K	130 K	
					W	W	W	W	W	W	
ECO S260	2.64	2 135	1 230	81	1 921	1 807	1 558	1 284	985	0	
ECO S230	2.28	1 960	1 165	81	1 660	1 561	1 346	1 109	851	0	
ECO S200	1.88	1 960	960	81	1 369	1 287	1 110	915	702	0	
ECO S150	1.48	1 540	960	81	1 075	1 010	871	718	551	0	
Power output per m ² gross area					728	685	590	487	373	0	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A _G)		η _{0,b}	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d
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		0.746	4.23	0.012			0				0.84
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{gT, coll}	1.00	0.98	0.95	0.90	0.82	0.68	0.38	0.00	0.00
Longitudinal		K _{gL, coll}	1.00	0.98	0.95	0.90	0.82	0.68	0.38	0.00	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					(θ _m -θ _a) _{max}		100	K			
Standard stagnation temperature (G = 1000 W/m ² ; θ _s = 30 °C)					θ _{stg}		164	°C			
Maximum operating temperature					θ _{max, op}		150	°C			
Maximum operating pressure					P _{max, op}		1000	kPa			
Testing laboratory		LNEG			http://www.lneg.pt						
Test report(s)		n.6.V1/LES/2018 (Thermal performance test - ECO n.9.V1/LES/2018 (Thermal performance test - ECO 4154 DE4 (Reliability and durability tests - ECO S260)			Dated		29-06-18 07-09-18 22-09-15				
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26						
Reliability and durability tested by NCSR "Demokritos" (www.solar.demokritos.gr). Performance parameters related to aperture area obtained applying the correction factor: Gross Area/Aperture Area. η _{0,b} = 0,792; a ₁ = 4,492; a ₂ = 0,013 Aperture area based on manufacturer information.					 LNEG, I.P. Laboratório Nacional de Energia e Geologia Laboratório de Energia Solar						
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Annex to Solar Keymark Certificate		Licence Number													
Supplementary Information		Issued													
		PSK-008/2020													
		2020-11-23													
Annual collector output in kWh/collector at mean fluid temperature θ_m															
Collector name	Standard Locations			Athens			Davos			Stockholm			Würzburg		
	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		
ECO S260		2 819	1 824	1 062	2 045	1 293	714	1 513	903	492	1 651	967	513		
ECO S230		2 435	1 576	918	1 767	1 117	617	1 308	780	425	1 426	836	443		
ECO S200		2 008	1 299	757	1 457	921	509	1 078	643	350	1 176	689	365		
ECO S150		1 576	1 020	594	1 144	723	399	846	505	275	923	541	287		
Annual output per m ² gross area															
Annual efficiency, η_a															
Fixed or tracking collector															
Annual irradiation on collector plane															
Mean annual ambient air temperature															
Collector orientation or tracking mode															
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. 6.1 (September 2019). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/															
Additional Information															
Collector heat transfer medium										Water-Glycöle					
The collector is deemed to be suitable for roof integration										Yes					
The collector was tested successfully under the following conditions:															
Climate class (A+, A, B or C)															
G (W/m ²) >			9 _g (°C) >			20			H _g (MJ/m ²) >			A		--	
Maximum tested positive load										3000		Pa			
Maximum tested negative load										3000		Pa			
Hail resistance using steel ball (maximum drop height)										2		m			
Additional collector attribute(s)															
<input type="checkbox"/> Using external power source(s) for normal operation						<input type="checkbox"/> Active or passive measure(s) for self-protection									
<input type="checkbox"/> Co-generating thermal and electrical power						<input type="checkbox"/> Façade collector(s)									
Energy Labelling information				Additional Informative Technical Data											
	Reference Area, A _{ref} (m ²)			Hydraulic Designation Code						Aperture Area, A _a (m ²)					
ECO S260	2.64			10-VH-1234S-A:16.4,2037-C:7.2,1240.5						"[Aa]"					
ECO S230	2.28			9-VH-1234S-A:16.4,1860-C:7.2,1157.5						"[Aa]"					
ECO S200	1.88			7-VH-1234S-A:16.4,1860-C:7.2,955						"[Aa]"					
ECO S150	1.48			7-VH-1234S-A:16.4,1440-C:7.2,955						"[Aa]"					
Data required for CDR (EU) No 811/2013 - Reference Area A _{ref}				Data required for CDR (EU) No 812/2013 - Reference Area A _{ref}											
Collector efficiency (η_{col})				54%			Zero-loss efficiency (η_0)			0.73			--		
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)			4.23			W/(m ² K)					
				Second-order coefficient (a_2)			0.012			W/(m ² K ²)					
				Incidence angle modifier IAM (50°)			0.81			--					
Remark: The data given in this section are related to collector reference area (A _{ref}) 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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