



Certificate no. **PSK-002/2021**
Certificado nº

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

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

Product:
Produto:

Thermal Solar System and components - Factory Made Systems
Instalação Solar Térmica prefabricada e seus componentes

Type references:
Referências:

120-1-T200; 150-1-T200; 150-1-T250; 150-1-T270; 200-1-T200; 200-1-T250; 200-1-T270; 200-2-T200; 300-2-T200; 300-2-T250; 300-2-T270

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

EUROSTAR, AQUASOL, OLYMPUS, SUNLIT

Technical characteristics:
Características técnicas:

Summary of EN 12976 Test Results: Registration No. PSK-002/2019, (in annex)
Resumo dos resultados dos ensaios realizados segundo a norma EN 12976: Registo Nº PSK-002/2021 (em anexo)

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

EN 12976-1:2017, EN 12976-2:2017

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:

6117 DE1, 6118 DE1, 6118 F1 / DEMOKRITOS

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

Type reference is always preceded by trademark
A referência é sempre precedida da marca comercial

This certificate is valid until:
Este certificado é válido até:
and supersedes certificate no:
e substitui o certificado nº:

2026-01-17

Date of issue:
Data de emissão:


2021-01-18



Francisco Barroca
General Manager / *Diretor Geral*



This Certificate includes one Annex with 12 (twelve) pages
Este Certificado é constituído por um Anexo com 12 (doze) páginas

Summary of		EN12976-2	SOLAR SYSTEM test results		Licence Number		PSK-002/2021					
Annex to Solar KEYMARK Certificate					Issued		2021-01-18					
Company		SOLE S.A.			Country		Greece					
Brand (optional)		BrandName			Website		www.sole.gr					
Street		Laikon Agonon & Lefktron			E-mail		export@sole.gr					
Postal Code		13671	Acharnes, Attica		Tel. / Fax		30	210 2389500				
System classification												
Application(s)					Hot water							
Solar loop, circulation principle					Thermosyphon							
Direct solar loop / heat exchanger					Heat exchanger							
Open, vented or closed solar loop					Closed							
Drain back/down					Always filled (no drain)							
Store location					Outdoor							
Store orientation (of main axis)					Horizontal							
Type of auxiliary heating (internal back-up heat)					Electric							
If other auxiliary/internal back-up heating, please specify:												
Solar+supplementary OR Solar-only / Solar pre-heat					Solar only / Solar preheat							
Collector(s)					Heat store(s)							
Company		SOLE S.A.			Company		SOLE S.A.					
Keymark lic.no. if available		PSK-001/2021			Keymark lic.no. if available		-					
Collector name		Per module			Store name		Total nominal volume	Gross height	Gross width	Gross depth	Auxiliary heated volume	Electrical aux. heating power
		Gross Area (Ag)	Gross length	Gross width								
		m ²	mm	mm								
CLIMASOL 2.00		1.91	1970	970	EUROSTAR 120		120	1080	500			
CLIMASOL 2.50		2.31	1970	1175	EUROSTAR 150		150	1320	500			
CLIMASOL 2.70		2.68	2146	1248	EUROSTAR 200		200	1320	530			
					EUROSTAR 300		300	2080	530			
Solar loop controller					Solar loop fluid							
Keymark lic.no. if available		-			Recommended/required		Required					
Company Name		-			Company Name		-					
Solar loop pump - power range		- W to - W			Freezing point		-15 °C					
System family overview												
Collector name		Number of collectors in each configuration for each store										
		Store name										
		EUROSTAR 120		EUROSTAR 150		EUROSTAR 200		EUROSTAR 300				
CLIMASOL 2.00		1		1		1	2	2				
CLIMASOL 2.50				1		1		2				
CLIMASOL 2.70				1		1		2				
Testing Laboratory					Solar & other Energy Systems Laboratory							
Website					www.solar.demokritos.gr							
Test report id. number					6117DE1, 6118DE1, 6118F1							
Date of test report					17/12/2020, 17/12/2020, 15/12/2020							
Comments of test lab												
					<p>N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 85033815 - Fax: +210 6844582 PO BOX 60037, 15310 Ag. Paraskevi, Greece</p> 							

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021										
Annex to Solar KEYMARK Certificate			Issued	2021-01-18										
Company	SOLE S.A.		Country	Greece										
Brand (optional)	BrandName		Website	www.sole.gr										
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr										
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500										
System family overview														
Collector name	For each storage and collector size, give number of collectors													
	EUROSTAR 120	EUROSTAR 150				EUROSTAR 200				EUROSTAR 300				
CLIMASOL 2.00	1				1	2			2					
CLIMASOL 2.50					1				2					
CLIMASOL 2.70					1				2					
Name of system configuration			EUROSTAR 120-1-T200											
Collector name	CLIMASOL 2.00	No. Collectors	1	Storage name	EUROSTAR 120									
Calculated annual results for "solar-only / preheat system"														
Location	Qd,sh MJ/y	Daily drawoff 80 l				Daily drawoff 110 l				Daily drawoff 140 l				
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	
Stockholm SE	-	4478	2507	0	56	6150	3065	0	50	7821	3406	0	44	
Würzburg DE	-	4289	2532	0	59	5897	3132	0	53	7506	3595	0	48	
Davos CH	-	4857	3784	0	78	6654	4573	0	69	8483	5077	0	60	
Athens GR	-	3343	2964	0	89	4573	3816	0	83	5834	4478	0	77	
Perf. Indicators for the table above														
Qd,sh	MJ/y	Not relevant for solar domestic hot water system												
Qd	MJ/y	Annual heat demand for domestic hot water												
QL	MJ/y	Annual heat energy delivered by the solar system												
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)												
$f_{sol} = Q_L / Q_d$	-	Solar fraction												
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR									
	G	1,157	1,230	1,684	1,736									
	T _{a,ave}	7.5	9.0	3.2	18.5									
	T _{c,ave}	8.5	10.0	5.4	17.8									
	± ΔTc	6.4	3.0	0.8	7.4									
G	kWh/m ²	Annual Irradiation South, 45°												
T _{a,ave}	°C	Annual average outdoor air temperature												
T _{c,ave}	°C	Annual average mains cold water temp.												
ΔTc	K	Seasonal variation of Tc												
Th	45 °C	Desired hot water temperature (mixing valve temperature).												
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa							
Testing Laboratory		Solar & other Energy Systems Laboratory												
Website		www.solar.demokritos.gr												
Test report id. number		6117DE1, 6118DE1, 6118F1												
Date of test report		17/12/2020, 17/12/2020, 15/12/2020												
Test method		ISO 9459-5 (DST)												
Comments of test lab		EXTRAPOLATED												
		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 5544582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece												

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
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Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration													
Collector name			EUROSTAR 150-1-T200										
Collector name		No. Collectors	Storage name	EUROSTAR 150									
CLIMASOL 2.00		1	EUROSTAR 150										
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 110 				Daily drawoff 140 				Daily drawoff 170 			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	6150	3065	0	50	7821	3437	0	44	9492	3690	0	39
Würzburg DE	-	5897	3141	0	53	7506	3595	0	48	9114	3942	0	43
Davos CH	-	6654	4573	0	69	8483	5109	0	60	10281	5456	0	53
Athens GR	-	4573	3816	0	83	5834	4510	0	77	7064	5109	0	72
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f_{sol}=Q_L/Q_d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T_c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab		EXTRAPOLATED											
		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6504502 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece											

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
Company	SOLE S.A.		Country	Greece									
Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration			EUROSTAR 150-1-T250										
Collector name	CLIMASOL 2.50	No. Collectors	1	Storage name									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 110				Daily drawoff 140				Daily drawoff 170			
		Qd,hw MJ/y	Ql MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	Ql MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	Ql MJ/y	Qpar MJ/y	fsol %
Stockholm SE	-	6150	3311	0	54	7821	3784	0	48	9492	4100	0	43
Würzburg DE	-	5897	3374	0	57	7506	3910	0	52	9114	4352	0	48
Davos CH	-	6654	4983	0	75	8483	5708	0	67	10281	6181	0	60
Athens GR	-	4573	3974	0	87	5834	4793	0	82	7064	5456	0	77
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
Ql	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
$f_{sol} = Q_l / Q_d$	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
T _h	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab		EXTRAPOLATED											
		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6644592 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece											

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
Company	SOLE S.A.		Country	Greece									
Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration			EUROSTAR 150-1-T270										
Collector name	CLIMASOL 2.70	No. Collectors	1	Storage name									
				EUROSTAR 150									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 110				Daily drawoff 140				Daily drawoff 170			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %
Stockholm SE	-	6150	3469	0	56	7821	4037	0	52	9492	4415	0	47
Würzburg DE	-	5897	3500	0	59	7506	4131	0	55	9114	4636	0	51
Davos CH	-	6654	5235	0	79	8483	6086	0	72	10281	6717	0	65
Athens GR	-	4573	4100	0	90	5834	4951	0	85	7064	5708	0	81
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
$f_{sol} = Q_L / Q_d$	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual Irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side									
				1333	kPa								
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6603815 - Fax: +210 5514582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece											
EXTRAPOLATED													

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
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Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration			EUROSTAR 200-1-T200										
Collector name	CLIMASOL 2.00	No. Collectors	1	Storage name									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	3753	0	40	11164	3974	0	36	13939	4163	0	30
Würzburg DE	-	9114	3974	0	44	10691	4226	0	40	13371	4510	0	34
Davos CH	-	10281	5519	0	54	12110	5803	0	48	15137	6150	0	41
Athens GR	-	7064	5140	0	73	8326	5645	0	68	10407	6276	0	60
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
$f_{sol} = Q_L / Q_d$	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
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Comments of test lab													
EXTRAPOLATED													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6644592 P.O. BOX 60037, 15316 Ag. Paraskevi, Greece													

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 %

Version 4.5, 2017-10-24

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
Company	SOLE S.A.		Country	Greece									
Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration			EUROSTAR 200-1-T250										
Collector name	CLIMASOL 2.50	No. Collectors	1	Storage name									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	Ql	Qpar	fsol	Qd,hw	Ql	Qpar	fsol	Qd,hw	Ql	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	4194	0	44	11164	4478	0	40	13939	4730	0	34
WürzburgDE	-	9114	4415	0	48	10691	4762	0	45	13371	5140	0	38
Davos CH	-	10281	6276	0	61	12110	6623	0	55	15137	7064	0	47
Athens GR	-	7064	5519	0	78	8326	6118	0	73	10407	6906	0	66
Perf. Indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
Ql	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
$f_{sol} = Q_l / Q_d$	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	Ta,ave	7.5	9.0	3.2	18.5								
	Tc,ave	8.5	10.0	5.4	17.8								
	$\pm \Delta Tc$	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
Ta,ave	°C	Annual average outdoor air temperature											
Tc,ave	°C	Annual average mains cold water temp.											
ΔTc	K	Seasonal variation of Tc											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
EXTRAPOLATED													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 684582 P.O. BOX 00037, 15310 Ag. Paraskevi, Greece													

Summary of		EN12976-2	test results		Certification No.		PSK-002/2021						
Annex to Solar KEYMARK Certificate					Issued		2021-01-18						
Company		SOLE S.A.			Country		Greece						
Brand (optional)		BrandName			Website		www.sole.gr						
Street		Laikon Agonon & Lefktron			E-mail		export@sole.gr						
Postal Code		13671	Acharnes, Attica		Tel. / Fax		30	210 2389500					
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120		EUROSTAR 150		EUROSTAR 200		EUROSTAR 300						
CLIMASOL 2.00	1		1		1	2	2						
CLIMASOL 2.50			1		1		2						
CLIMASOL 2.70			1		1		2						
Name of system configuration													
					EUROSTAR 200-1-T270								
Collector name		CLIMASOL 2.70	No. Collectors		1		Storage name		EUROSTAR 200				
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 l				Daily drawoff 200 l				Daily drawoff 250 l			
		Qd,hw	QL	Qpar	f _{sol}	Qd,hw	QL	Qpar	f _{sol}	Qd,hw	QL	Qpar	f _{sol}
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	4573	0	48	11164	4983	0	45	13939	5330	0	38
Würzburg DE	-	9114	4793	0	53	10691	5267	0	49	13371	5771	0	43
Davos CH	-	10281	6969	0	68	12110	7506	0	62	15137	8073	0	53
Athens GR	-	7064	5834	0	83	8326	6528	0	78	10407	7506	0	72
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f _{sol} =Q _l /Q _d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔTc	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔTc	K	Seasonal variation of Tc											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory				Solar & other Energy Systems Laboratory									
Website				www.solar.demokritos.gr									
Test report id. number				6117DE1, 6118DE1, 6118F1									
Date of test report				17/12/2020, 17/12/2020, 15/12/2020									
Test method				ISO 9459-5 (DST)									
Comments of test lab													
TESTED													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6944582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
Company	SOLE S.A.		Country	Greece									
Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration													
Collector name			EUROSTAR 200-2-T200										
Collector name		No. Collectors	Storage name	EUROSTAR 200									
CLIMASOL 2.00		2	EUROSTAR 200										
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh	Daily drawoff 170 				Daily drawoff 200 				Daily drawoff 250 			
		Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol	Qd,hw	QL	Qpar	fsol
	MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%
Stockholm SE	-	9492	5172	0	54	11164	5708	0	51	13939	6276	0	45
Würzburg DE	-	9114	5298	0	58	10691	5897	0	55	13371	6686	0	50
Davos CH	-	10281	7884	0	77	12110	8672	0	72	15137	9618	0	64
Athens GR	-	7064	6213	0	88	8326	7064	0	85	10407	8262	0	79
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
f_{sol}=Q_l/Q_d	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T_{a,ave}	7.5	9.0	3.2	18.5								
	T_{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT_c	6.4	3.0	0.8	7.4								
G	kWh/m²	Annual irradiation South, 45°											
T_{a,ave}	°C	Annual average outdoor air temperature											
T_{c,ave}	°C	Annual average mains cold water temp.											
ΔT_c	K	Seasonal variation of T_c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab													
EXTRAPOLATED													
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6944982 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece													

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021									
Annex to Solar KEYMARK Certificate			Issued	2021-01-18									
Company	SOLE S.A.		Country	Greece									
Brand (optional)	BrandName		Website	www.sole.gr									
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr									
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500									
System family overview													
For each storage and collector size, give number of collectors													
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300									
CLIMASOL 2.00	1	1	1 2	2									
CLIMASOL 2.50		1	1	2									
CLIMASOL 2.70		1	1	2									
Name of system configuration			EUROSTAR 300-2-T200										
Collector name	CLIMASOL 2.00	No. Collectors	2	Storage name									
				EUROSTAR 300									
Calculated annual results for "solar-only / preheat system"													
Location	Qd,sh MJ/y	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l			
		Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %	Qd,hw MJ/y	QL MJ/y	Qpar MJ/y	fsol %
Stockholm SE	-	13939	6780	0	49	16746	7253	0	43	22327	8010	0	36
Würzburg DE	-	13371	7001	0	52	16052	7695	0	48	21413	8546	0	40
Davos CH	-	15137	10092	0	67	18165	10848	0	60	24220	11794	0	49
Athens GR	-	10407	8515	0	82	12488	9650	0	77	16651	11258	0	68
Perf. indicators for the table above													
Qd,sh	MJ/y	Not relevant for solar domestic hot water system											
Qd	MJ/y	Annual heat demand for domestic hot water											
QL	MJ/y	Annual heat energy delivered by the solar system											
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)											
$f_{sol} = Q_L / Q_d$	-	Solar fraction											
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR								
	G	1,157	1,230	1,684	1,736								
	T _{a,ave}	7.5	9.0	3.2	18.5								
	T _{c,ave}	8.5	10.0	5.4	17.8								
	± ΔT _c	6.4	3.0	0.8	7.4								
G	kWh/m ²	Annual irradiation South, 45°											
T _{a,ave}	°C	Annual average outdoor air temperature											
T _{c,ave}	°C	Annual average mains cold water temp.											
ΔT _c	K	Seasonal variation of T _c											
Th	45 °C	Desired hot water temperature (mixing valve temperature).											
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa						
Testing Laboratory		Solar & other Energy Systems Laboratory											
Website		www.solar.demokritos.gr											
Test report id. number		6117DE1, 6118DE1, 6118F1											
Date of test report		17/12/2020, 17/12/2020, 15/12/2020											
Test method		ISO 9459-5 (DST)											
Comments of test lab		EXTRAPOLATED											
		N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6545822 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece											

Summary of	EN12976-2	test results	Certification No.	PSK-002/2021												
Annex to Solar KEYMARK Certificate			Issued	2021-01-18												
Company	SOLE S.A.		Country	Greece												
Brand (optional)	BrandName		Website	www.sole.gr												
Street	Laikon Agonon & Lefktron		E-mail	export@sole.gr												
Postal Code	13671	Acharnes, Attica	Tel. / Fax	30 210 2389500												
System family overview																
For each storage and collector size, give number of collectors																
Collector name	EUROSTAR 120	EUROSTAR 150	EUROSTAR 200	EUROSTAR 300												
CLIMASOL 2.00	1	1	1 2	2												
CLIMASOL 2.50		1	1	2												
CLIMASOL 2.70		1	1	2												
Name of system configuration																
Collector name			EUROSTAR 300-2-T250													
Collector name		No. Collectors	Storage name	EUROSTAR 300												
CLIMASOL 2.50		2														
Calculated annual results for "solar-only / preheat system"																
Location	Qd,sh	Daily drawoff 250 l				Daily drawoff 300 l				Daily drawoff 400 l						
		Qd,hw		QL	Qpar	fsol	Qd,hw		QL	Qpar	fsol	Qd,hw		QL	Qpar	fsol
		MJ/y	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%	MJ/y	MJ/y	MJ/y	%		
Stockholm SE	-	13939	7348	0	53	16746	7979	0	48	22327	8988	0	40			
Würzburg DE	-	13371	7506	0	56	16052	8357	0	52	21413	9524	0	44			
Davos CH	-	15137	11006	0	73	18165	12110	0	67	24220	13340	0	55			
Athens GR	-	10407	8925	0	86	12488	10218	0	82	16651	12141	0	73			
Perf. indicators for the table above																
Qd,sh	MJ/y	Not relevant for solar domestic hot water system														
Qd	MJ/y	Annual heat demand for domestic hot water														
QL	MJ/y	Annual heat energy delivered by the solar system														
Qpar	MJ/y	Annual parasitic energy: (electricity for pumps/controllers)														
f_{sol}=Q_l/Q_d	-	Solar fraction														
Ref. conditions		Stockholm SE	Würzburg DE	Davos CH	Athens GR											
	G	1,157	1,230	1,684	1,736											
	T_{a,ave}	7.5	9.0	3.2	18.5											
	T_{c,ave}	8.5	10.0	5.4	17.8											
	± ΔT_c	6.4	3.0	0.8	7.4											
G	kWh/m²	Annual irradiation South, 45°														
T_{a,ave}	°C	Annual average outdoor air temperature														
T_{c,ave}	°C	Annual average mains cold water temp.														
ΔT_c	K	Seasonal variation of T_c														
Th	45 °C	Desired hot water temperature (mixing valve temperature).														
Max. operating press. - collector side		250	kPa	Max. operating press. - tank side		1333	kPa									
Testing Laboratory		Solar & other Energy Systems Laboratory														
Website		www.solar.demokritos.gr														
Test report id. number		6117DE1, 6118DE1, 6118F1														
Date of test report		17/12/2020, 17/12/2020, 15/12/2020														
Test method		ISO 9459-5 (DST)														
Comments of test lab																
EXTRAPOLATED																
N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 8503815 - Fax: +210 6844592 P.O. BOX 08037, 15310 Ag. Paraskevi, Greece																

Summary of		EN12976-2		test results		Certification No.		PSK-002/2021				
Annex to Solar KEYMARK Certificate						Issued		2021-01-18				
Company		SOLE S.A.				Country		Greece				
Brand (optional)		BrandName				Website		www.sole.gr				
Street		Laikon Agonon & Lefktron				E-mail		export@sole.gr				
Postal Code		13671		Acharnes, Attica		Tel. / Fax		30 210 2389500				
System family overview												
For each storage and collector size, give number of collectors												
Collector name		EUROSTAR 120		EUROSTAR 150		EUROSTAR 200		EUROSTAR 300				
CLIMASOL 2.00		1		1		1 2		2				
CLIMASOL 2.50				1		1		2				
CLIMASOL 2.70				1		1		2				
Name of system configuration												
Collector name						EUROSTAR 300-2-T270						
		CLIMASOL 2.70		No. Collectors		2		Storage name				
								EUROSTAR 300				
Calculated annual results for "solar-only / preheat system"												
Location		Q_{d,sh}		Daily drawoff 250			Daily drawoff 300			Daily drawoff 400		
		MJ/y		MJ/y			MJ/y			MJ/y		
		Q _{d,hw}		Q _L			Q _{par}			f _{sol}		
		MJ/y		MJ/y			MJ/y			%		
Stockholm SE		-		13939 7726 0 55			16746 8515 0 51			22327 9745 0 44		
Würzburg DE		-		13371 7852 0 59			16052 8830 0 55			21413 10249 0 48		
Davos CH		-		15137 11668 0 77			18165 12961 0 71			24220 14570 0 60		
Athens GR		-		10407 9209 0 88			12488 10565 0 85			16651 12772 0 77		
Perf. indicators for the table above												
Q _{d,sh}		MJ/y		Not relevant for solar domestic hot water system								
Q _d		MJ/y		Annual heat demand for domestic hot water								
Q _L		MJ/y		Annual heat energy delivered by the solar system								
Q _{par}		MJ/y		Annual parasitic energy: (electricity for pumps/controllers)								
f _{sol} =Q _L /Q _d		-		Solar fraction								
Ref. conditions				Stockholm SE		Würzburg DE		Davos CH		Athens GR		
		G		1,157		1,230		1,684		1,736		
		T _{a,ave}		7.5		9.0		3.2		18.5		
		T _{c,ave}		8.5		10.0		5.4		17.8		
		± ΔT _c		6.4		3.0		0.8		7.4		
G		kWh/m ²		Annual irradiation South, 45°								
T _{a,ave}		°C		Annual average outdoor air temperature								
T _{c,ave}		°C		Annual average mains cold water temp.								
ΔT _c		K		Seasonal variation of T _c								
T _h		45 °C		Desired hot water temperature (mixing valve temperature).								
Max. operating press. - collector side				250		kPa		Max. operating press. - tank side				
				1333		kPa						
Testing Laboratory				Solar & other Energy Systems Laboratory								
Website				www.solar.demokritos.gr								
Test report id. number				6117DE1, 6118DE1, 6118F1								
Date of test report				17/12/2020, 17/12/2020, 15/12/2020								
Test method				ISO 9459-5 (DST)								
Comments of test lab				N.C.S.R. "DEMOKRITOS" SOLAR ENERGY LABORATORY Tel: +210 6503815 - Fax: +210 6504582 P.O. BOX 60037, 15310 Ag. Paraskevi, Greece								
EXTRAPOLATED												