



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No OEM 9909.3.4

DQS Hellas grants the present certificate to the enterprise:

SOLE S.A.

26, Amarousiou Chalandriou, 15125 Marousi
Lefktron 1 & Laikon Agonon, 13671 Acharnes

for the product:

**Solar Systems Family
SUNRAY 150, SUNRAY 200**

which is produced in conformity with the normative document:

EN 12976-1:2017
EN 12976-2:2017
EN 12975-1:2011
EN 12975-2:2006
ISO 9806:2013



at the following location:

13671 Acharnai of Attica

The present certificate is granted in accordance with:

- *the DQS Hellas General Rules for the Certification of Products,*
- *the Specific Rule for Certification EKIII.001 «Specific Rule for Certification of Solar Collectors, and Thermal Solar Heating Systems for Domestic Hot Water»,*
- *the Specific CEN Keymark Scheme Rules for Solar Thermal Products,*

and is ruled by the terms of the relevant contract between DQS Hellas and the enterprise.

Date of issue: **2024-07-10**

Date of valid: **2025-10-10**

Ioannis Alexiou
Head of Products Certification

Panagiotis Giannoutsos
Director of Certification



Summary of	EN12976-2	SOLAR SYSTEM test results	Licence Number	OEM 9909.3.4
Annex to Solar KEYMARK Certificate			Issued	2024-07-10
Company	SOLE S.A.		Country	Greece
Brand (optional)	SUNRAY		Website	www.sole.gr
Street	1) 26, Amarousiou Chalandriou 2) Lefktron 1 & Laikon Agonon		E-mail	contact@sole.gr
Postal Code	1) 15125 2) 13671	1) Marousi 2) Acharnes	Tel. / Fax	+30 210 2389500

System classification

Application(s)	Hot water
Solar loop, circulation principle	Thermosyphon
Direct solar loop / heat exchanger	Direct
Open, vented or closed solar loop	Open
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)

Collector(s)				Heat store(s)							
Company	SOLE S.A.			Company	SOLE S.A.						
Keymark lic.no. if available	-			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		litres	mm	mm	mm	litres	kW	
SUNRAY 150	1,97	1990	990	SUNRAY 150	142	*	*	*	-	1-4	
SUNRAY 200	2,34	1980	1180	SUNRAY 200	209	*	*	*	-	1-4	

Solar loop controller

Solar loop fluid

Keymark lic.no. if available	-	Recommended/required	No recommend./requirements
Company	-	Company	-
Name	-	Name	-
Solar loop pump - power range	- W to - W	Freezing point	- °C

System family overview

Collector name	Number of collectors in each configuration for each store															
	SUNRAY 150								SUNRAY 200							
	Store name															
SUNRAY 150	1															
SUNRAY 200								1								

Testing Laboratory	NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB
Website	www.solar.demokritos.gr
Test report id. number	6087 DE1, 6097 DE1
Date of test report	8/12/2017, 26/6/2018

Comments of test lab	Stamp & signature of test lab
<p>Intergrated collector-store system.</p> <p>(*) Contains 4 cylindrical stores inside the collector as absorbing surface</p>	



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System family overview

	For each storage and collector size, give number of collectors													
Collector name	SUNRAY 150				SUNRAY 200									
SUNRAY 150	1													
SUNRAY 200				1										

Name of system configuration						SUNRAY 150					
Collector name	SUNRAY 150			No. Collectors	1			Storage name	SUNRAY 150		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh MJ/y	Daily drawoff 110 l				Daily drawoff 140 l				Daily drawoff 170 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	%
Stockholm SE		6150	2617	-	43	7821	2895	-	37	9492	3059	-	32
WürzburgDE		5897	2703	-	46	7506	3062	-	41	9114	3280	-	36
Davos CH		6654	3721	-	56	8483	4100	-	48	10281	4352	-	42
Athens GR		4573	3437	-	75	5834	4005	-	69	7064	4447	-	63

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			
	± ΔTc	6,4	3,0	0,8	7,4			

G	kWh/m²	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	-	kPa	Max. operating press. - tank side	1000	kPa
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Website	www.solar.demokritos.gr
Test report id. number	6087 DE1, 6097 DE1
Date of test report	8/12/2017, 26/6/2018
Test method	ISO 9459-5 (DST)

Comments of test lab	Stamp & signature of test lab
No comments	

All values are subject to some uncertainty; e.g. the uncertainty on system output is typically in the range of ± 5 % to ± 15 % Version 3.6, 2014-06-18



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SUNRAY 150	1															
SUNRAY 200					1											

Name of system configuration					SUNRAY 200					
Collector name	SUNRAY 200			No. Collectors	1		Storage name	SUNRAY 200		

Calculated annual results for "solar-only / preheat system"

Location	Qd,sh MJ/y	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	%
Stockholm SE		9492	3879	-	41	11164	4194	-	38	13939	4541	-	33
WürzburgDE		9114	4131	-	45	10691	4510	-	42	13371	4920	-	37
Davos CH		10281	5676	-	55	12110	6086	-	50	15137	6591	-	44
Athens GR		7064	5235	-	74	8326	5866	-	70	10407	6654	-	64

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