



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No SKM 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 12976-1:2021

EN 12976-2:2017

EN 12975:2022

EN 12975-2:2006

ISO 9806:2013

at the following location:



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,*
- *the Annex of Solar Keymark Certificate.*

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

Date of issue: **2025-10-10**

Date of valid: **2026-10-10**

Ioannis Alexiou
Head of Products Certification



Summary of		EN12976-2		SOLAR SYSTEM test results		Licence Number		SKM 9909.3.4				
Annex to Solar KEYMARK Certificate						Issued		2025-10-10				
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)							
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		Auxiliary heated volume	Electrical aux. heating power		
		Gross Area (Ag) m ²	Gross length mm	Gross width mm			litres	Gross height mm			Gross width mm	Gross depth mm
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										
		Store name										
		SUNRAY 150		SUNRAY 200								
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						
Integrated collector-store system. (*) Contains 4 cylindrical stores inside the collector as absorbing surface												
Version 3.6, 2014-06-18												
Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqsglobal.com, e-mail: i.alexioi@dqsg.gr												

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Summary of		EN12976-2		test results				Certification No.		SKM 9909.3.4					
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Postal Code		1) 15125 2) 13671		1) Marousi 2) Acharnes		Tel. / Fax		+30		210 2389500					
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															
Collector name		SUNRAY 150				No. Collectors				1		Storage name		SUNRAY 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	
		MJ/y		MJ/y		MJ/y		%		MJ/y		MJ/y		%	
Stockholm SE		6150		2617		-		43		7821		2895		-	
Würzburg DE		5897		2703		-		46		7506		3062		-	
Davos CH		6654		3721		-		56		8483		4100		-	
Athens GR		4573		3437		-		75		5834		4005		-	
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					
Testing Laboratory															
		NCSR "DEMOKRITOS"- SOLAR & ENERGY SYSTEMS LAB													
Website															
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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															
		No comments													
Stamp & signature of test lab															
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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System family overview

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

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						
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Max. operating press. - collector side	-	kPa	Max. operating press. - tank side	1000	kPa
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Comments of test lab		Stamp & signature of test lab
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