CERTIFICATION
LICENCE TO USE KEYMARK

Certificate No SKM 10209.3

DQS Hellas grants the present certificate to the enterprise:

SOLE S.A.
26, Amarousiou Chalandriou, 15125 Marousi

for the product:

Type of Solar Collector:
X-TREME 300

which is produced in conformity with the normative document:

EN 12975:2022
EN ISO 9806:2017

at the following location:

Laikon Agonon & Lefktron, 13671 Acharnai

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The present certificate is granted in accordance with:

- *the DQS Hellas General Rules for the Certification of Products,*
- *the Specific Rule for Certification ΕΚΠΠ.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: ***2025-12-10***
Date of valid: ***2027-11-20***

Panagiotis Giannoutsos
Director of Certification

Dr. Emmanuel Deliyannakis
Managing Director

Annex to Solar Keymark Certificate		Licence Number	SKM 10209.3
		Date issued	2025-12-02
		Issued by	DQS Hellas

Licence holder	SOLE S.A.	Country	Greece
Brand (optional)	-	Web	http://www.sole.gr
Street, Number	Lefktron 1 & L. Agonon	E-mail	info@sole.gr
Postcode, City	13674 Acharnai, Athens	Tel	+30 210 2389500

Collector Type	Flat plate collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	109 K
	m²	mm	mm	mm	W	W	W	W	W	W
X-TREME 300	3.01	2'400	1'256	93	2'350	2'242	1'999	1'721	1'406	688
Power output per m² gross area					781	745	664	572	467	229

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0.783	3.43	0.015	0.000	0.00	7'340	0.000	0.00	0.0	0.98

Incidence angle modifier test method		Steady state - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1.00	1.00	1.00	0.99	0.96	0.85	0.62	0.31	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	1.00	1.00	0.99	0.96	0.85	0.62	0.31	0.00

Heat transfer medium for testing		Water	
Flow rate for testing (per gross area, A_G)	dm/dt	0.020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	79	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	210	°C
Maximum operating temperature	ϑ_{max_op}	160	°C
Maximum operating pressure	$p_{max,op}$	2250	kPa

Testing laboratory	Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)	http://www.igte.uni-stuttgart.de	
Test report(s)	25COL1812 25COL1812Q	Dated	24.11.2025 24.11.2025

Comments	Ver. 6.2 (13.01.2022)
Documented performance parameters are taken from 25COL1812 (X-TREME 300)	TZS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)

Annex to Solar Keymark Certificate	Licence Number	SKM 10209.3
Supplementary Information	Issued	2025-12-02

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m

Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	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
X-TREME 300		3'846	2'809	1'868	2'965	2'084	1'329	2'168	1'447	888	2'368	1'575	953
Gross Thermal Yield per m² gross area		1'278	933	621	985	692	442	720	481	295	787	523	317
Annual efficiency, η_a		72%	53%	35%	60%	42%	27%	62%	41%	25%	63%	42%	25%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
Mean annual ambient air temperature		18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑm (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 6.2 (13.01.2022). A detailed description of the calculations is available at http://www.estif.org/solarkeymarknew/

Additional Information

Collector heat transfer medium				Water-Glycole	
The collector is deemed to be suitable for roof integration				No	
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)				A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_X (MJ/m²) >	600
Maximum tested positive load				2500	Pa
Maximum tested negative load				1750	Pa
Hail resistance using steel ball (maximum drop height)				2	m

Additional collector attribute(s)

Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information

	Reference Area, A_{sol} (m²)
X-TREME 300	3.01

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
15-V-1234S-7.2,2320-16.6,1320	2.90

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	62%

Remark: Collector efficiency (ηcol) 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/m², expressed in % and rounded to the nearest integer. Deviating from the regulation ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0.78	--
First-order coefficient (a_1)	3.43	W/(m²K)
Second-order coefficient (a_2)	0.015	W/(m²K²)
Incidence angle modifier IAM (50°)	0.98	--

Remark: The data given in this section are related to collector reference area (A_{sol}) 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.

Central Offices: Kalavriton 2, 145 64 kifisia, Athens, Tel: +301 6233493-4 , Fax: +301 6233495, http://www.dqsglobal.com, e-mail: i.alexiou@dqs.gr