



CERTIFICATION LICENCE TO USE KEYMARK

Certificate No OEM 10109.1.4

DQS Hellas grants the present certificate to the enterprise:

THERMADOR S.A.S.

80 Rue du Ruisseau CS 10710 - Parc d'Activités de Chesnes, 38297 Saint-Quentin-Fallavier, France

for the product:

**Flat plate Solar Collectors with type:
PSOL20VM-VS, PSOL25VM-VS**

which is produced in conformity with the normative document:

**EN 12975-1:2011
EN ISO 9806:2017**

at the following location:

**7th Km O.N.R. Thessaloniki – Kilkis
57022 Thessaloniki**



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: **2023-03-01**

Date of valid: **2024-04-20**

Ioannis Alexiou
Head of Products Certification

Panagiotis Giannoutsos
Director of Certification

Annex to Solar Keymark Certificate					Licence Number		OEM 10109.1.4							
					Date issued		2022-03-01							
					Issued by		DQS Hellas							
Licence holder		THERMADOR S.A.S.			Country		France							
Brand (optional)					Web		www.thermador.fr							
Street, Number		80 Rue du Ruisseau CS 10710 - Parc			E-mail		thermador@thermador.fr							
Postcode, City		38297 Saint-Quentin-Fallavier			Tel		+33 4 74 94 41 33							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	84 K				
					m ²	mm	mm	mm	W	W	W			
PSOL20VM-VS					1,90	1.970	965	80	1.472	1.388	1.198	979	731	538
PSOL25VM-VS					2,40	1.970	1.220	80	1.860	1.753	1.513	1.237	924	679
Power output per m ² gross area					775	730	630	515	385	283				
Performance parameters test method		Steady state - outdoor												
Performance parameters (related to A _G)		η_0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd			
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		0,786	4,24	0,019	0,000	0,00	0	0,000	0,00	0,0E+00	0,91			
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	0,99	0,98	0,94	0,87	0,74	0,48	0,00			
Longitudinal		$K_{\theta L, coll}$	1,00	1,00	0,99	0,98	0,94	0,87	0,74	0,48	0,00			
Heat transfer medium for testing		Water-Glycole												
Flow rate for testing (per gross area, A _G)		dm/dt		0,021		kg/(sm ²)								
Maximum temperature difference during thermal performance test		$(\vartheta_m - \vartheta_a)_{max}$		54,22		K								
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)		ϑ_{stg}		187		°C								
Maximum operating temperature		$\vartheta_{max, op}$		-		°C								
Maximum operating pressure		$p_{max, op}$		-		kPa								
Testing laboratory		NCSR Demokritos					http://www.solar.demokritos.gr							
Test report(s)		4284 DQ2 4288 DE2 4294 DE2					Dated		17/12/2020 30/10/2020 30/10/2020					
Comments of testing laboratory		Datasheet version: 6.1, 2019-09-26												
Example comment Qualification tests are in extension of test report 4207 DQ2		Stamp & signature of test lab												
DQS HELLAS Ltd, Central Offices: Kalavriton 4, 145 64 kifisia, Athens, Tel: +30 210 6233493-4, Fax: +30 210 6233495, http://www.dqs.gr , e-mail: i.alexiou@dqs.gr														



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	OEM 10109.1.4
	Issued	2022-03-01

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
PSOL20VM-VS		2.339	1.565	911	1.722	1.098	596	1.277	770	407	1.393	831	433
PSOL25VM-VS		2.955	1.976	1.151	2.175	1.387	752	1.613	973	514	1.759	1.050	546
Annual output per m ² gross area		1.231	824	480	906	578	313	672	405	214	733	437	228
Annual efficiency, η_a		70%	47%	27%	56%	35%	19%	58%	35%	18%	59%	35%	18%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane	1765 kWh/m ²			1630 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²			
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 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		
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/m ²) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
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_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
PSOL20VM-VS	1,90	10-VH-1234S-A:7.2,1890-C:20,1030-D	1,80
PSOL25VM-VS	2,40	11-VH-1234S-A:7.2,1890-C:20,1280-D	2,29

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
Collector efficiency (η_{col})	57%	Zero-loss efficiency (η_0)	0,77
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)	4,24
		Second-order coefficient (a_2)	0,019
		Incidence angle modifier IAM (50°)	0,95
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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.			