AENOR

Keymark Certificate
Solar thermal energy

078/000026

AENOR certifies that the organization

DELPASO SOLAR, S.L.

registered office	PARQUE TECNOLÓGICO DE ANDALUCÍA, AVENIDA JUAN LÓPEZ DE PEÑALVER, 3 29590 MÁLAGA *(Malaga - España)*
supplies	Solar collectors
in compliance with	UNE-EN 12975-1:2006+A1:2011 *(EN 12975-1:2006+A1:2010)*
Trade Mark Technical information	DPS HSM2200, DPS HSM2600, DPS VSM2200, DPS VSM2600 Specified in Annexes to the Certificate
Production site	PARQUE TECNOLÓGICO DE ANDALUCÍA, AVENIDA JUAN LÓPEZ DE PEÑALVER, 3 29590 MÁLAGA *(Malaga - España)*
Certification scheme	In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP 078.01.
First issued on	2011-11-25
Last issued on	2021-11-25
Validity date	2026-11-25

Rafael GARCÍA MEIRO
Chief Executive Officer

Original Electronic Certificate

AENOR INTERNACIONAL S.A.U.
Génova, 6. 28004 Madrid. España
Tel. 91 432 60 00.- www.aenor.com

Product certification body accredited by ENAC, number 1/C-PR271

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results		Licence Number	078/000026
		Date issued	2021-11-25
		Issued by	

Licence holder	**DELPASO SOLAR, S.L.**	**Country**	España
Brand (optional)	--	**Web**	http://www.delpasosolar.es
Street, Number	Par. Tec. Andalucía, Av Juan López de Peñalver 3	**E-mail**	calidad@delpasosolar.com
Postcode, City	29590 Málaga	**Tel**	+34 952 11 15 24

Collector Type	Flat plate collector, glazed

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m²; Gd = 150 W/m² ϑm - ϑa: 0 K	10 K	30 K	50 K	70 K	52 K
	m²	mm	mm	mm	W	W	W	W	W	W
DPS HSM 2200	2,21	1.069	2.069	98	1.631	1.553	1.379	1.177	949	1.160
DPS VSM 2200	2,21	2.069	1.069	98	1.631	1.553	1.379	1.177	949	1.160
DPS HSM 2600	2,55	1.234	2.069	98	1.882	1.792	1.591	1.358	1.095	1.338
DPS VSM 2600	2,55	2.069	1.234	98	1.882	1.792	1.591	1.358	1.095	1.338
Power output per m² gross area					738	703	624	533	430	525

Performance parameters test method	Steady state - indoor								
Performance parameters (related to AG)	η0,hem	a1	a2						
Units	-	W/(m²K)	W/(m²K²)						
Test results	0,738	3,357	0,015						

Incidence angle modifier test method		Steady state - outdoor								
Bi-directional incidence angle modifiers	No									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$					0,93				0,00
Longitudinal	$K_{\theta L,coll}$					0,93				0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,015	kg/(sm²)
Maximum temperature difference for thermal performance calculations	$(\vartheta_m-\vartheta_a)_{max}$	51,6	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	214,4	°C
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	4,99	kJ/(Km²)
Maximum operating temperature	$\vartheta_{max\ op}$	200	°C
Maximum operating pressure	$p_{max,op}$	1000	kPa

Testing laboratory	Fundación CENER-CIEMAT, LEST	http://www.cener.com	
Test report(s)	30.1699.0-4-1	**Dated**	28/10/2011
	30.1699.0-5-1 30.1699.0-6-1		07/11/2011
	30.1699.1 R		21/12/2011

Comments of testing laboratory — Datasheet version: 5.01, 2016-03-01

DPS HSM 2600 is representative collector of the collectors DPS SM.
These collectors were tested according to EN 12975-2 in 2011.

Annex to Solar Keymark Certificate	Licence Number	078/000026
Supplementary Information	Issued	2021-11-25

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results

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
DPS HSM 2200	2.581	1.843	1.190	1.966	1.351	832	1.447	943	561	1.571	1.019	595
DPS VSM 2200	2.581	1.843	1.190	1.966	1.351	832	1.447	943	561	1.571	1.019	595
DPS HSM 2600	2.979	2.126	1.373	2.268	1.559	960	1.669	1.089	647	1.813	1.175	687
DPS VSM 2600	2.979	2.126	1.373	2.268	1.559	960	1.669	1.089	647	1.813	1.175	687
Annual output per m² gross area	1.168	834	538	889	612	377	655	427	254	711	461	269
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	C	--
Maximum tested positive load	1000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using steel ball (maximum drop height)	--	m

Energy Labelling Information

	Reference Area, A_{sol} (m^2)
DPS HSM 2200	2,21
DPS VSM 2200	2,21
DPS HSM 2600	2,55
DPS VSM 2600	2,55

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
Collector efficiency (η_{col})	58	%

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/m², 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 9806:2013.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
Zero-loss efficiency (η_0)	0,738	--
First-order coefficient (a_1)	3,36	W/(m²K)
Second-order coefficient (a_2)	0,015	W/(m²K²)
Incidence angle modifier IAM (50°)	0,93	--

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.