

# AENOR

## Keymark Certificate Solar thermal energy



078/000028

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 **DPS HSH-42200, DPS HSH-42600, DPS VSH-42200, DPS VSH-42600**  
Technical information **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.**  
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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		078/000028				
					Date issued		2021-11-25				
					Issued by		AENOR				
Licence holder	DELPASO SOLAR, S.L.				Country	España					
Brand (optional)	--				Web	<a href="http://www.delpasosolar.es">http://www.delpasosolar.es</a>					
Street, Number	Par. Tec. Andalucía, Av Juan López de Peñalver 3				E-mail	calidad@energiasolardps.com					
Postcode, City	29590 Málaga				Tel	+34 952 11 15 24					
Collector Type	Flat plate collector, glazed										
Collector name	Gross area ( $A_G$ ) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Power output per collector G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> $\vartheta_m - \vartheta_a$						
					0 K W	10 K W	30 K W	50 K W	70 K W	50 K W	
DPS HSH 42200	2,21	1.069	2.069	98	1.551	1.479	1.315	1.127	914	1.123	
DPS VSH 42200	2,21	2.069	1.069	98	1.551	1.479	1.315	1.127	914	1.123	
DPS HSH 42600	2,55	1.234	2.069	98	1.790	1.706	1.518	1.301	1.055	1.296	
DPS VSH 42600	2,55	2.069	1.234	98	1.790	1.706	1.518	1.301	1.055	1.296	
Power output per m <sup>2</sup> gross area					702	669	595	510	414	508	
Performance parameters test method		Steady state - indoor									
Performance parameters (related to A <sub>G</sub> )		$\eta_{0,hem}$	a1	a2							
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results		0,702	3,139	0,014							
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		$K_{\vartheta T, coll}$					0,95				0,00
Longitudinal		$K_{\vartheta L, coll}$					0,95				0,00
Heat transfer medium for testing		Water									
Flow rate for testing (per gross area, A <sub>G</sub> )		dm/dt	0,018		kg/(sm <sup>2</sup> )						
Maximum temperature difference for thermal performance calculations		$(\vartheta_m - \vartheta_a)_{max}$	50,4		K						
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; $\vartheta_a = 30$ °C)		$\vartheta_{stg}$	210,8		°C						
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )		C/m <sup>2</sup>	4,83		kJ/(Km <sup>2</sup> )						
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)	30.1699.0-1-1 30.1699.0-2-1 30.1699.0-3-1 30.1699.0 R				Dated	28/10/2011 21/12/2011					
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01									
DPS VSH 42600 is representative collector of the collectors DPS SH. These collectors were tested according to EN 12975-2 in 2011.											
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000028
	Issued	2021-11-25

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$ , based on ISO 9806:2013 test results													
Collector name	Standard Locations $\vartheta_m$	Athens			Davos			Stockholm			Würzburg		
		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 HSH 42200		2.503	1.806	1.183	1.913	1.327	827	1.410	927	558	1.532	1.004	594
DPS VSH 42200		2.503	1.806	1.183	1.913	1.327	827	1.410	927	558	1.532	1.004	594
DPS HSH 42600		2.888	2.083	1.365	2.207	1.531	955	1.627	1.070	643	1.767	1.159	685
DPS VSH 42600		2.888	2.083	1.365	2.207	1.531	955	1.627	1.070	643	1.767	1.159	685
Annual output per m <sup>2</sup> gross area		1.133	817	535	865	601	374	638	420	252	693	455	269
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane	1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>			
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 $\vartheta_m$ (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at <a href="http://www.solarkeymark.org/scenocalc">www.solarkeymark.org/scenocalc</a>													

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 <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
DPS HSH 42200	2,21	Collector efficiency ( $\eta_{col}$ )	55 %
DPS VSH 42200	2,21	Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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.	
DPS HSH 42600	2,55		
DPS VSH 42600	2,55		
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0,702 --
		First-order coefficient ( $a_1$ )	3,14 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0,014 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0,95 --
		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.	