

# AENOR

## Keymark Certificate Solar thermal energy



078/000297

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 (EN 12975-1:2006)

Trade Mark PSH 1700, PSH 2000, PSH 2000 H, PSH 2500 H, PSH 2500  
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 2017-10-30  
Validity date 2022-10-30

Rafael GARCÍA MEIRO  
Chief Executive Officer

Original Electronic Certificate

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Product certification body accredited by ENAC, number 01/C-PR002.078





Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000297
	Issued	2017-10-30

**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
PSH 1700		2.094	1.533	1.015	1.615	1.133	710	1.189	793	480	1.290	859	511
PSH 2000		2.399	1.756	1.162	1.850	1.297	813	1.362	908	550	1.478	984	585
PSH 2000 H		2.399	1.756	1.162	1.850	1.297	813	1.362	908	550	1.478	984	585
PSH 2500 H		3.032	2.220	1.469	2.338	1.640	1.028	1.721	1.148	695	1.868	1.244	740
PSH 2500		3.032	2.220	1.469	2.338	1.640	1.028	1.721	1.148	695	1.868	1.244	740
Annual output per m <sup>2</sup> gross area		1.218	891	590	939	659	413	691	461	279	750	499	297
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 [www.solarkeymark.org/scenocalc](http://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	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using ice balls (diameter)	25	mm

**Energy Labelling Information**

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$	
PSH 1700	1,72	Collector efficiency ( $\eta_{col}$ )	60 %
PSH 2000	1,97	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.	
PSH 2000 H	1,97		
PSH 2500 H	2,49		
PSH 2500	2,49		
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
		Zero-loss efficiency ( $\eta_0$ )	0,753 --
		First-order coefficient ( $a_1$ )	3,13 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0,017 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.	