

# AENOR

## Keymark Certificate Solar thermal energy



078/000283

AENOR certifies that the organization

### SUNEX, S.A.

registered office UL. PIASKOWA, 7 47-400 RACIBÓRZ (Polonia)

supplies Solar collectors

in compliance with UNE-EN 12975-1:2006+A1:2011 (EN 12975-1:2006+A1:2010)

Trade Mark AMP AR 2.38, AMP AR 2.51  
Technical information Specified in Annexes to the Certificate

Production site UL. PIASKOWA, 7 47-400 RACIBÓRZ (Polonia)

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 2016-10-07

Last issued on 2021-10-07

Validity date 2026-10-07

Rafael GARCÍA MEIRO  
Chief Executive Officer

Original Electronic Certificate

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





Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000283
	Issued	2021-10-07

**Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$**

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
AMP AR 2.38		2.749	1.857	1.162	2.027	1.346	822	1.498	933	547	1.631	1.002	577
AMP AR 2.51		2.898	1.958	1.225	2.137	1.419	866	1.579	983	576	1.719	1.056	609
Annual output per m <sup>2</sup> gross area		1.155	780	488	852	565	345	629	392	230	685	421	243
Annual efficiency, $\eta_a$		65%	44%	28%	52%	35%	21%	54%	34%	20%	55%	34%	20%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 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. 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-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)	B --
G (W/m <sup>2</sup> ) >	900 $\vartheta_a$ (°C) >
	15 $H_x$ (MJ/m <sup>2</sup> ) >
	540
Maximum tested positive load	2400 Pa
Maximum tested negative load	2400 Pa
Hail resistance using steel ball (maximum drop height)	1 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 <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
AMP AR 2.38	2,38	10-VH-1234S-A:7.5,2140-C:21,1120-D	2,18
AMP AR 2.51	2,51	10-VH-1234S-A:7.5,2140-C:21,1180-D	2,31

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 ( $\eta_{col}$ )	56%
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 9806:2017.	Zero-loss efficiency ( $\eta_0$ )
	First-order coefficient ( $a_1$ )
	Second-order coefficient ( $a_2$ )
	Incidence angle modifier IAM (50°)
	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.