



Keymark Certificate



078/000194

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 AMX 2.38, AMX 2.51, AMX 2.85
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 2013-05-06
Last issued on 2023-05-06
Validity 2028-05-06

Rafael GARCÍA MEIRO
CEO





Annex to Solar Keymark Certificate					Licence Number		078/000194				
					Date issued		2023-05-06				
					Issued by		AENOR				
Licence holder		SUNEX, S.A.			Country		Poland				
Brand (optional)		AMX			Web		www.sunex.pl				
Street, Number		Ul. Piaskowa 7			E-mail		+48 32 414 92 12				
Postcode, City		47-400 Racibórz, Śląskie			Tel		+48 32 414 92 13				
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	90 K	
					W	W	W	W	W	W	
AMX 2.85					2.122	2.028	1.803	1.530	1.206	834	
AMX 2.51					1.871	1.788	1.590	1.349	1.064	736	
AMX 2.38					1.772	1.693	1.505	1.277	1.007	696	
Power output per m² gross area					740	707	629	533	421	291	
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		0,752	3,06	0,021	0,000	0,00	8.285	0,000	0,00	0,0E+00	0,90
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	0,73	0,48	0,00
Longitudinal		$K_{\theta L, coll}$	1,00	1,00	0,99	0,98	0,94	0,87	0,73	0,48	0,00
Heat transfer medium for testing					Water						
Flow rate for testing (per gross area, A_G)					dm/dt	0,020	kg/(sm ²)				
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$	60	K				
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30$ °C)					ϑ_{stg}	143	°C				
Maximum operating temperature					$\vartheta_{max, op}$	230	°C				
Maximum operating pressure					$p_{max, op}$	1000	kPa				
Testing laboratory		INTA			www.inta.es						
Test report(s)		CA/RPT/4451/006/INTA/13 Ed.01			Dated		25/04/2013				
Comments											
Based on the test report(s) from INTA the data sheet was updated to the newest version. The data sheet update was done at the TestLab Solar Thermal Systems, Fraunhofer ISE, Freiburg, Germany (collectortest.com).											
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 Supplementary Information	Licence Number	078/000194
	Issued	2023-05-06

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_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
AMX 2.85		3.392	2.451	1.560	2.611	1.791	1.068	1.917	1.254	726	2.081	1.356	773
AMX 2.51		2.991	2.161	1.376	2.302	1.579	942	1.690	1.105	640	1.835	1.196	682
AMX 2.38		2.831	2.046	1.302	2.179	1.495	892	1.600	1.046	606	1.737	1.132	645
Annual output per m ² gross area		1.183	855	544	910	624	372	668	437	253	726	473	269
Annual efficiency, η_a		67%	48%	31%	56%	38%	23%	57%	37%	22%	58%	38%	22%
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-Glycole
The collector is deemed to be suitable for roof integration	Yes
The collector was tested successfully under the following conditions:	
Climate class (A+, A, B or C)	C
G (W/m ²) >	850
ϑ_a (°C) >	10
H_x (MJ/m ²) >	420
Maximum tested positive load	1000 Pa
Maximum tested negative load	1000 Pa
Hail resistance using ice balls (diameter)	- mm

Additional collector attribute(s)

- Using external power source(s) for normal operation Active or passive measure(s) for self-protection
 Co-generating thermal and electrical power 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)
AMX 2.85	2,87	12-VH-12S-A:7,2135-C:20,1330	2,67
AMX 2.51	2,53	10-VH-12S-A:7,2135-C:20,1180	2,32
AMX 2.38	2,39	10-VH-12S-A:7,2135-C:20,1120	2,19

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})	58%	Zero-loss efficiency (η_0)	0,74
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)	3,06 W/(m ² K)
		Second-order coefficient (a_2)	0,021 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,94
		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.	