

AENOR

Keymark Certificate Solar thermal energy



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.

This certificate supersedes 078/000194, dated 2020-03-10

First issued on 2013-05-06
Modified on 2020-09-08
Validity date 2023-05-06

Rafael GARCÍA MEIRO
Chief Executive Officer

Original Electronic Certificate

AENOR INTERNACIONAL S.A.U.
Génova, 6. 28004 Madrid. España
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Product certification body accredited by ENAC, number 1/C-PR271



Annex to Solar Keymark Certificate					Licence Number		078/000194							
					Date issued		2020-09-08							
					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 G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s ϑ _m - ϑ _a									
					0 K	10 K	30 K	50 K	70 K	90 K				
					W	W	W	W	W	W				
AMX 2.85					2,87	2.246	1.277	90	2.122	2.028	1.803	1.530	1.206	834
AMX 2.51					2,53	2.246	1.126	90	1.871	1.788	1.590	1.349	1.064	736
AMX 2.38					2,39	2.246	1.066	90	1.772	1.693	1.505	1.277	1.007	696
Power output per m ² gross area					740	707	629	533	421	291				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to A _G)					η ₀ , b	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d
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 _{θT, coll}	1,00	1,00	0,99	0,98	0,94	0,87	0,73	0,48	0,00
Longitudinal					K _{θL, 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					(ϑ _m - ϑ _a) _{max}	60	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}	143	°C							
Maximum operating temperature					ϑ _{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					Datashet version: 6.1, 2019-09-26									
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														
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000194
	Issued	2020-09-08

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)	
<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 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
		Second-order coefficient (a_2)	0,021
		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.	