



Keymark Certificate



078/000182

AENOR certifies that the organization

SUNEX, S.A.

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

supplies **Solar collectors**

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

Trade Mark SX 2.0 AL, SX 2.51 AL, SX 2.85 AL
Technical information Specified in Annexes to the Certificate

Production site UL. PIASKOWA, 4A 47-400 RACIBÓRZ (Silesia - 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 078/000182, dated 2023-11-28

First issued on 2013-04-24
Modified on 2024-08-06
Validity 2028-04-24

Rafael GARCÍA MEIRO
CEO





Annex to Solar Keymark Certificate					Licence Number		078/000182							
					Date issued		2024-08-06							
					Issued by		AENOR							
Licence holder		SUNEX S.A.			Country		Poland							
Brand (optional)		SX AL			Web		http://www.sunex.pl							
Street, Number		Ul. Piaskowa 7			E-mail		sale@sunex.pl							
Postcode, City		47-400 Racibórz, Śląskie			Tel		+48 32 414 92 12							
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 $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	81 K				
					m ²	mm	mm	mm	mm	mm	mm			
SX 2.0 AL					2,01	1.900	1.060	98	1.435	1.370	1.225	1.058	871	759
SX 2.51 AL					2,52	2.246	1.226	98	1.799	1.718	1.535	1.327	1.092	951
SX 2.85 AL					2,87	2.246	1.276	98	2.049	1.956	1.749	1.511	1.243	1.083
Power output per m ² gross area					714	682	609	526	433	377				
Performance parameters test method		Steady state - indoor												
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		0,726	3,10	0,013	0,000	0,00	5.124	0,000	0,00	0,0E+00	0,89			
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	0,99	0,98	0,97	0,94	0,89	0,79	0,47	0,00			
Longitudinal		K _{θL, coll}	1,00	0,99	0,98	0,97	0,94	0,89	0,79	0,47	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}	51	K							
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)					ϑ_{stg}	217	°C							
Maximum operating temperature					$\vartheta_{max, op}$	230	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory		Fundación CENER, LEST					http://www.cener.com							
Test report(s)		30.4278.0-001 30.4278.0-002 / 30.4278.0-003 30.4278.0					Dated		14/11/2023					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
- The collectors models SX 2.0 AL and SX 2.85 AL were tested according to ISO 9806:2017. According to SKM rules, the results of the collector model SX 2.85 AL are representative for the whole SX AL family.														
<p>AENOR CONFÍA, S.A.U. - Génova, 6. - 28004 - Madrid, España - Tel. 91 432 60 00 - www.aenor.com</p> <p>Product certification body accredited by ENAC, number 1/C-PR271</p>														



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	078/000182
	Issued	2024-08-06

Gross Thermal Yield 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
SX 2.0 AL		2.282	1.658	1.104	1.754	1.233	788	1.288	859	529	1.398	928	562
SX 2.51 AL		2.860	2.079	1.384	2.199	1.546	988	1.615	1.077	663	1.753	1.163	704
SX 2.85 AL		3.258	2.368	1.577	2.504	1.760	1.125	1.839	1.227	755	1.996	1.325	802
Gross Thermal Yield per m ² gross area		1.135	825	549	873	613	392	641	427	263	696	462	280
Annual efficiency, η_a		64%	47%	31%	54%	38%	24%	55%	37%	23%	56%	37%	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. 6.2 (13.01.2022). 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)				B	--
G (W/m ²) >	900	ϑ_a (°C) >	15	H_x (MJ/m ²) >	540
Maximum tested positive load				1750	Pa
Maximum tested negative load				1000	Pa
Hail resistance using ice balls (diameter)				25	mm

Additional collector attribute(s)			
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Façade collector(s)	No

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
SX 2.0 AL	2,01	10-V-1234S-A:6,1790-C:20,1120-D	1,84
SX 2.51 AL	2,52	10-V-1234S-A:6,2136-C:20,1180-D	2,31
SX 2.85 AL	2,87	12-V-1234S-A:6,2136-C:20,1330-D	2,64

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})	57%	Zero-loss efficiency (η_0)	0,71
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)	3,10
		Second-order coefficient (a_2)	0,013
		Incidence angle modifier IAM (50°)	0,93
		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.	