DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

CERTIFICATE

Certificate holder	**Sunex S.A.** **ul. Piaskowa 7** **47-400 Racibórz** **POLAND**
Production facility	Racibórz
Product	Solar collectors
Type, Model	SX 2,0 m², 2,51 m², 2,85 m²
Testing basis	DIN EN 12975-1:2011-01 DIN EN ISO 9806:2014-06 Specific CEN Keymark Scheme Rules for Solar Thermal Products Version 29.00 (2016-12)
Mark of conformity	
Registration No.	011-7S140 F
Valid until	2022-07-31
Right of use	This certificate entitles the holder to use the mark of conformity shown above in conjunction with the specified registration number. See annex for further information.

DAkkS
Deutsche Akkreditierungsstelle
D-ZE-11125-01-00

2017-07-20

Dipl.-Wi.-Ing. (FH) Sören Scholz
Head of Certification Body

GESELLSCHAFT FÜR KONFORMITÄTSBEWERTUNG MBH
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ANNEX

Certificate

011-7S140 F dated 2017-07-20

Technical Data

See data sheet, part of the test report of 2017-07-06

Note(s):

- The freeze resistance test according to DIN EN ISO 9806, clause 15 was not necessary. According to the manufacturer's declaration, the certified solar collectors may be used in frost exposed areas only in combination with appopriate frost protection mixtures or with appropriate frost protection controller.

Testing laboratory/ Inspection body

Fraunhofer Institut für
Solare Energiesysteme (ISE)
Therm. Anlagen u. Komponenten
Heidenhofstr. 2
79110 Freiburg
GERMANY

Test report(s)

ktb-2017-02, ktb-2017-03 dated 2017-07-06

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Fraunhofer ISE

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results		Licence Number	011-7S140 F
		Date issued	2017-07-10
		Issued by	Din Certco

Licence holder	Sunex S.A.	**Country**	Poland
Brand (optional)		**Web**	www.sunex.pl
Street, Number	ul. Piaskowa 7	**E-mail**	info@sunex.pl
Postcode, City	47-400 Raciborz	**Tel/Fax**	+48324149214

Collector Type	Flat plate collector, glazed

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m²; Gd = 150 W/m² ϑm - ϑa: 0 K	10 K	30 K	50 K	70 K	75 K
	m²	mm	mm	mm	W	W	W	W	W	W
SX 2.0	2,01	1.900	1.060	100	1.429	1.358	1.207	1.044	870	825
SX 2.51	2,51	2.240	1.120	100	1.785	1.695	1.507	1.304	1.087	1.030
SX 2.85	2,85	2.240	1.270	100	2.026	1.925	1.711	1.480	1.234	1.170
Power output per m² gross area					711	675	600	519	433	411

Performance parameters test method	Steady state - outdoor								
Performance parameters (related to AG)	η0,hem	a1	a2						
Units	-	W/(m²K)	W/(m²K²)						
Test results	0,711	3,48	0,007						

Incidence angle modifier test method	Steady state - outdoor									
Bi-directional incidence angle modifiers	No									
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1,00	0,99	0,98	0,95	0,90	0,81	0,66	0,41	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	0,99	0,98	0,95	0,90	0,81	0,66	0,41	0,00

Heat transfer medium for testing	Water		
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference for thermal performance calculations	$(\vartheta_m-\vartheta_a)_{max}$	75	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	204	°C
Effective thermal capacity, incl. fluid (per gross area, A_G)	C/m²	4,9	kJ/(Km²)
Maximum operating temperature	$\vartheta_{max\ op}$	95	°C
Maximum operating pressure	$p_{max,op}$	600	kPa

Testing laboratory	TestLab Solar Thermal Systems, Fraunhofer ISE	http://www.collectortest.com	
Test report(s)	ktb-2017-02	**Dated**	06.07.2017
	ktb-2017-03		06.07.2017

Comments of testing laboratory — Datasheet version: 5.01, 2016-03-01

According to Scenocalc v5.01 the power output per collector unit of a steady state performance test does not consider the fraction of the diffuse irradiance, but it is calculated based on η0,hem for a global hemispherical irradiance of 1000 W/m².

TestLab
Solar Thermal
Systems
Heidenhofstraße 2
D-79110 Freiburg
Tel: +49 (0)761 4588 5354

Annex to Solar Keymark Certificate	Licence Number	011-7140 F
Supplementary Information	Issued	2017-07-10

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on EN ISO 9806:2013 test results

Standard Locations	Athens			Davos			Stockholm			Würzburg		
Collector name ϑ_m	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	2.211	1.568	1.043	1.675	1.168	764	1.230	809	506	1.335	868	535
SX 2.51	2.762	1.957	1.302	2.092	1.459	954	1.536	1.010	632	1.667	1.085	669
SX 2.85	3.136	2.223	1.479	2.376	1.657	1.083	1.744	1.147	718	1.893	1.231	759
Annual output per m² gross area	1.100	780	519	834	581	380	612	402	252	664	432	266
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1714 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (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

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)	B	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	1200	Pa
Hail resistance using ice balls (diameter)	0	mm

Energy Labelling Information

	Reference Area, A_{sol} (m^2)
SX 2.0	2,01
SX 2.51	2,51
SX 2.85	2,85

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	56	%

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/m², 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 9806:2013.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0,711	--
First-order coefficient (a_1)	3,48	W/(m²K)
Second-order coefficient (a_2)	0,007	W/(m²K²)
Incidence angle modifier IAM (50°)	0,90	--

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.