

Issued to

Beijing Sunda Solar Energy Technology Co., Ltd.

No.3 Hua Yuan Road, Haidian District, Beijing 100191, China

Product name and description

Vacuum tube solar thermal collectors for water heating.
For technical information see Appendix (2 pages).

Models: SEIDO2-6 SEIDO2-8 SEIDO2-12 SEIDO2-16

Performance specification

The product is found to comply with the requirements in EN 12975-1:2006+A1:2010 Solar collectors, Part 1: General requirements and the Specific CEN Keymark Scheme Rules for Solar Thermal Products, and are based on test results according to EN ISO 9806:2017 Solar thermal collectors – Test methods.

Marking

Products conforming to this certificate shall be marked in accordance with the requirements in the Specific CEN Keymark Scheme Rules for Solar Thermal Products. The marking shall, together with the Keymark logo, show the identification code of the empowered certification body (RISE Research Institutes of Sweden AB, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.


Validity

This certificate is valid until 2025-11-27 provided that the conditions in the Solar Keymark Rules are fulfilled and the standard or rules are not modified significantly. The validity of the certificate can be checked in the database, see Solar Keymark website <http://www.solarkeymark.org>.

Miscellaneous

The manufacturer's factory production control procedures are under surveillance by the responsibility of RISE. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

Martin Tillander

Annex to Solar Keymark Certificate					Licence Number		C900238				
					Date issued		2020-11-27				
					Issued by		RISE				
Licence holder		Beijing Sunda Solar Energy Technology Co., Ltd			Country		China				
Brand (optional)		Sunda			Web		www.sundasolar.com				
Street, Number		No.3 Hua Yuan Road, Haidian District			E-mail		info@sundasolar.com				
Postcode, City		100191, Beijing			Tel		+86 10 57930251				
Collector Type					Evacuated tubular 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	85 K	
					m ²	mm	mm	mm	W	W	W
SEIDO2-6					1,54	2 160	713	151	888	875	832
SEIDO2-8					2,06	2 160	953	151	1 189	1 170	1 113
SEIDO2-12					3,10	2 160	1 433	151	1 789	1 761	1 674
SEIDO2-16					4,13	2 160	1 913	151	2 383	2 346	2 231
Power output per m ² gross area					577	568	540	499	443	393	
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		0,586	0,718	0,017	0,000	0,00	8 690	0,000	0,00	0,00	0,90
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		$K_{\theta T, coll}$	1,03	1,05	1,08	1,10	1,12	0,84	0,56	0,28	0,00
Longitudinal		$K_{\theta L, coll}$	0,99	0,97	0,96	0,94	0,92	0,70	0,47	0,23	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					$(\vartheta_m - \vartheta_a)_{max}$		55		K		
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)					ϑ_{stg}		270		°C		
Maximum operating temperature					$\vartheta_{max, op}$		120		°C		
Maximum operating pressure					$p_{max, op}$		600		kPa		
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com				
Test report(s)		190909133GZU-001					Dated		2020-11-20		
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26						
<p>Above efficiency parameters come from test type SEIDO2-6; The performance parameter based aperture area (1.10 m²) are: $\eta_0, b' = 0.821$, $a1' = 1.005$, $a2' = 0.024$.</p>					 <i>Constant Zhao</i>						
<p>RISE Research Institutes of Sweden AB Certification Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifying@ri.se www.ri.se</p>											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	C900238
	Issued	2020-11-27

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
SEIDO2-6		1 489	1 299	1 032	1 284	1 059	803	921	746	552	987	804	590
SEIDO2-8		1 991	1 737	1 381	1 718	1 417	1 074	1 232	998	739	1 321	1 075	789
SEIDO2-12		2 997	2 614	2 078	2 585	2 132	1 616	1 854	1 502	1 112	1 987	1 618	1 188
SEIDO2-16		3 993	3 482	2 768	3 444	2 841	2 153	2 469	2 001	1 482	2 648	2 155	1 582
Annual output per m ² gross area		967	843	670	834	688	521	598	485	359	641	522	383
Annual efficiency, η_a		55%	48%	38%	51%	42%	32%	51%	42%	31%	52%	42%	31%
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	No		
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			2400 Pa
Maximum tested negative load			2400 Pa
Hail resistance using steel ball (maximum drop height)			1,4 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 ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
SEIDO2-6	1,54	6-V-12S-A:9,3914-C:22,719	1,10
SEIDO2-8	2,06	8-V-12S-A:9,3914-C:22,959	1,45
SEIDO2-12	3,10	12-V-12S-A:9,3914-C:22,1439	2,18
SEIDO2-16	4,13	16-V-12S-A:9,3914-C:22,1919	2,93

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})	52%	Zero-loss efficiency (η_0)	0,58
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)	0,72
		Second-order coefficient (a_2)	0,017
		Incidence angle modifier IAM (50°)	1,01
		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.	