Solar Keymark Certificate

SC0022-16

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:	SEIDO8-8	SEIDO8-12	SEIDO8-16

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 9806:2013 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 2026-03-17 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. This certificate was first issued 2016-03-17. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

Signed by: Martin Tillander
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2020-11-05

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Accred. no. 1002 Certification of Products ISO/IEC 17065

Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate		Licence Number	SC0022-16
		Date issued	2021-01-27
		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, Huayuan Road, Haidian District	**E-mail**	info@sundasolar.com
Postcode, City	100191, Beijing	**Tel**	+86 10 57930251

Collector Type	Evacuated tubular collector

Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	93 K
	m²	mm	mm	mm	W	W	W	W	W	W
SEIDO 8-8	2,08	2 162	962	132	1 015	987	915	823	711	554
SEIDO 8-12	3,09	2 162	1 430	132	1 509	1 467	1 359	1 223	1 056	823
SEIDO 8-16	4,15	2 162	1 920	132	2 026	1 969	1 825	1 642	1 418	1 106
Power output per m² gross area					488	474	440	395	342	266

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0,492	1,252	0,012	0,00	0,00	4 190	0,00	0,00	0,00	0,947

Incidence angle modifier test method		Steady state - outdoor							
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1,01	1,02	1,03	1,04	1,03	1,01	0,67	0,34	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	1,00	1,00	0,99	0,97	0,92	0,81	0,55	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 during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	63	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	260	°C
Maximum operating temperature	$\vartheta_{max\ op}$	150	°C
Maximum operating pressure	$p_{max,op}$	600	kPa

Testing laboratory	Intertek Testing Services Shenzhen Ltd.	http://www.intertek.com	
Test report(s)	150831007-002	**Dated**	2016-02-24

Comments of testing laboratory — Datasheet version: 6.1, 2019-09-26

This data sheet replace the previous version issued on 2016-03-17;
The performance parameter based aperture area (1.45 m2) are: η0,b'=0.705, a1'=1.795, a2'=0.017.

intertek
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Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate	Licence Number	SC0022-16
Supplementary Information	Issued	2021-01-27

Annual collector output in kWh/collector at mean fluid temperature ϑ_m

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
SEIDO 8-8		1 712	1 393	1 040	1 408	1 094	782	1 017	765	530	1 100	830	569
SEIDO 8-12		2 545	2 070	1 546	2 093	1 626	1 162	1 511	1 137	788	1 636	1 234	845
SEIDO 8-16		3 418	2 780	2 075	2 810	2 183	1 560	2 029	1 526	1 057	2 196	1 656	1 135
Annual output per m² gross area		823	670	500	677	526	376	489	368	255	529	399	273
Annual efficiency, η_a		47%	38%	28%	42%	32%	23%	42%	32%	22%	43%	32%	22%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m²			1630 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. 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)					B	--
G (W/m²) >	900	ϑ_a (°C) >	15	H_x (MJ/m²) >		540
Maximum tested positive load					2400	Pa
Maximum tested negative load					2400	Pa
Hail resistance using steel ball (maximum drop height)					1,2	m

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

	Reference Area, A_{sol} (m²)
SEIDO 8-8	2,08
SEIDO 8-12	3,09
SEIDO 8-16	4,15

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

Collector efficiency (η_{col})	42%

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
8-H-12S-C:22,980-D	1,45
12-H-12S-C:22,1460-D	2,18
16-H-12S-C:22,1940-D	2,90

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

Zero-loss efficiency (η_0)	0,49	--
First-order coefficient (a_1)	1,25	W/(m²K)
Second-order coefficient (a_2)	0,012	W/(m²K²)
Incidence angle modifier IAM (50°)	1,02	--

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.

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