CERTIFIKAT

Solar Keymark Certificate
No. SP SC0872-15

Holder/Issued to

Company: Sun Heating Tec Co., Ltd.
Address: No. 8 Puhui Rd., Economic Development Zone, Shengzhou, Zhejiang, China

Product name and description

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

Model:	**SHT 4X10A**

Certificate

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 (SP Technical Research Institute of Sweden, No. 012), also see CEN-CENELEC Internal Regulations Part 4 Certification, Annex A.

Validity

This certificate is valid until 2020-12-22 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 SP. This is the first version of this certificate.

Borås, Sweden 2015-12-22

SP Technical Research Institute of Sweden
Certification

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ISO/IEC 17065

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Annex to Solar Keymark Certificate

Summary of ISO 9806:2013 Test Results, annex to Solar KEYMARK Certificate		Licence Number	SP SC0872-15
		Issued	2015-12-22

Company holding the	Sun Heating Tec Co., ltd.		Country	China
Brand (optional)	SHT		Website	www.sunheatingtec.com
Street, street number	No.8 Puhui Rd, Economic Development Zone		E-mail	info@sunheatingtec.com
Postal Code / City, province	312400	Shengzhou, Zhejiang	Tel/Fax	+86 575-8138-9722/'575-8138-9726

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module G = 1000 W/m², Tm-Ta				
						0 K	10 K	30 K	50 K	70 K
Collector name	m²	mm	mm	mm	m²	W	W	W	W	W
SHT 4×10A	3.51	3 050	1 220	85	**3.72**	2 682	2 509	2 165	1 820	1 475

Performance test method	Glazed liquid heating collector - steady state - outdoor			
Performance parameters related to aperture	η0	a1	a2	
Units	-	W/(m²K)	W/(m²K²)	
Test results - Flow rate and fluid see note 1	0.764	4.910	--[1)]	

Bi-directional incidence angle modifiers?	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)					0.92				0.00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	176 °C
Effective thermal capacity	ceff = C/Ag	3.00 kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	120 °C
Max. operation pressure - see note 3	pmax,op	800 kPa

Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area											
Flow rate	kg/(s m²)	0.000	0.005	0.011	0.018	0.024	0.030				
Pressure drop, ΔP	Pa	0	18	48	84	129	183				

Optional weather data	Location		Link

Testing Laboratory	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Website	www.intertek.com
Test report id. number	150506078GZU-003
Date of test report	2015-11-30

During the test GDIF/GTOT was always between	0.13	and	0.17	

Comments of testing laboratory:

[1)] The second order loss term turned out as not significant in the performance evaluation.
Aperture area, as referenced to above, is according to definition in ISO 9488:2008.

Note 1	**Flow rate**	0.020	kg/(s m²)	**Fluid**	Water
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

5P08101

Datasheet version: 4.06, 2014-01-15

Annex to Solar Keymark Certificate

Annual collector output based on ISO 9806 Test Results, annex to Solar KEYMARK Certificate	Licence Number	SP SC0872-15
	Issued	2015-12-22

Annual collector output kWh/module

	Location and collector temperature (Tm)											
	Athens			Davos			Stockholm			Würzburg		
Collector name	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
SHT 4×10A	4 158	2 721	1 689	3 001	1 960	1 209	2 228	1 355	797	2 430	1 453	840

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	Ta °C	**Collector orientation or tracking mode**
Athens	38	1 765	18.5	South, 25°
Davos	47	1 714	3.2	South, 30°
Stockholm	59	1 166	7.5	South, 45°
Würzburg	50	1 244	9.0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

Certification Body:
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Datasheet version: 4.06, 2014-01-15

ScenoCalc version: Ver. 4.06 (Jan, 2014)