

Holder/Issued to/Manufacturer

Guangdong Fivestar Solar Energy Co., Ltd.

No.1, the 1st Industry Zone Road, Liuchongwei, Wanjiang District, Dongguan City, Guangdong Province, P.R. China

Product name and description

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

Models: FS-PTY80-2.0 FS-PTY80-2.5 FS-PTY80-3.0

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 2022-12-06 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.

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Magnus Sturesson

Certificate No. SC1164-17 | issue 1 | 2017-12-07


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2017-08-08



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Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		SC1164-17								
					Date issued		2017-12-07								
					Issued by		RISE								
Licence holder		Guangdong Fivestar Solar Energy Co., Ltd			Country		China								
Brand (optional)		FIVESTAR			Web		www.fivestarpower.com								
Street, Number		No.1, the 1st Industry Zone Road, Liuchongwei, Wanjiang District			E-mail		oversea@fivestarsolar.com								
Postcode, City		523051, Dongguan City, Guangdong Province			Tel		+86 (0)769-22774668								
Collector Type					Flat plate collector, glazed										
Collector name					Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² θ _m - θ _a										
					Gross area (A _G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	49 K	
					m ²	mm	mm	mm	W	W	W	W	W	W	
FS-PTY80-2.0					2,00	2000	1000	80	1322	1225	1031	837	643	845	
FS-PTY80-2.5					2,50	2000	1250	80	1653	1531	1289	1046	804	1056	
FS-PTY80-3.0					3,00	2000	1500	80	1983	1838	1547	1256	965	1267	
Power output per m ² gross area									661	613	516	419	322	422	
Performance parameters test method					Steady state - outdoor										
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂								
Units					-	W/(m ² K)	W/(m ² K ²)								
Test results					0,661	4,850	0,000								
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 _{θT, coll}	1,00	0,99	0,97	0,94	0,89	0,80	0,62	0,06	0,00	
Longitudinal					K _{θL, coll}	1,00	0,99	0,97	0,94	0,89	0,80	0,62	0,06	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 for thermal performance calculations					(θ _m -θ _a) _{max}		49,21							K	
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)					θ _{stg}		170						°C		
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²		5,32						kJ/(Km ²)		
Maximum operating temperature					θ _{max, op}		120						°C		
Maximum operating pressure					p _{max, op}		800						kPa		
Testing laboratory					Intertek Testing Services Shenzhen Ltd. Guangzhou Branch			www.intertek.com							
Test report(s)					170802131GZU-001			Dated		2017-11-10					
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01										
- Second order loss coefficient (a ₂) turned out as non-significant from regression					 <i>William zheng</i>										
<p align="center">RISE Research Institutes of Sweden AB Certification</p> <p align="center">Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifiering@ri.se www.ri.se</p>															

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SC1164-17
	Issued	2017-12-07

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	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
FS-PTY80-2.0		1972	1198	679	1377	839	465	1026	581	311	1122	620	326
FS-PTY80-2.5		2464	1498	848	1721	1049	581	1283	726	389	1402	774	407
FS-PTY80-3.0		2957	1798	1018	2065	1258	698	1539	872	467	1683	929	489
Annual output per m ² gross area		986	599	339	688	419	233	513	291	156	561	310	163
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 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 steel ball (maximum drop height)	2.0	m

Energy Labelling Information				
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
FS-PTY80-2.0	2,00	Collector efficiency (η_{col})	47	%
FS-PTY80-2.5	2,50	<i>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.</i>		
FS-PTY80-3.0	3,00			
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}		
		Zero-loss efficiency (η_0)	0,661	--
		First-order coefficient (a_1)	4,85	W/(m ² K)
		Second-order coefficient (a_2)	0,000	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,89	--
<i>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.</i>				