

**Holder/Issued to/Manufacturer**

## Jiangsu Micoe Solar Energy Co., Ltd.

199#, Yingzhou Road, Lianyungang City, Jiangsu Province, China

**Product name and description**

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

Model: FPC1200D

**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 12975-2:2006 Solar collectors Part 2: 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 2023-12-04 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 2013-12-11. RISE certification rules SPCR 402 for Keymark – Solar Thermal Products applies.

Johan Åkesson

Certificate No. SC1396-13 | issue 3 | 2020-08-21



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2017-08-08



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Annex to Solar Keymark Certificate					Licence Number		SC1396-13				
					Date issued		2020-08-21				
					Issued by		RISE				
Licence holder		Jiangsu Micoe Solar Energy Co.,Ltd			Country		China				
Brand (optional)		Micoe			Web		http://en.micoe.com				
Street, Number		199 South Yingzhou Road,			E-mail		certification@micoe.com				
Postcode, City		Lianyungang 222000, Jiangsu Province			Tel		+86 518 85959563				
Collector Type					Flat plate collector						
Collector name					Power output per collector						
					Gb = 850 W/m <sup>2</sup> , Gd = 150 W/m <sup>2</sup> & u = 1.3 m/s $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	82 K	
					m <sup>2</sup>	mm	mm	mm	W	W	W
FPC1200D					2,00	2 000	1 000	80	1 413	1 319	1 104
Power output per m <sup>2</sup> gross area					706	660	552	426	282	188	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A <sub>G</sub> )		$\eta_0, b$	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-
Test results		0,723	4,456	0,023	0,000	0,00	2 570	0,000	0,00	0,00	0,847
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K <sub>θT, coll</sub>	1,00	0,99	0,97	0,94	0,88	0,78	0,63	0,39	0,00
Longitudinal		K <sub>θL, coll</sub>	1,00	0,99	0,97	0,94	0,88	0,78	0,63	0,39	0,00
Heat transfer medium for testing					Water						
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt	0,019	kg/(sm <sup>2</sup> )				
Maximum temperature difference during thermal performance test					( $\vartheta_m - \vartheta_a$ ) <sub>max</sub>	51,84	K				
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; $\vartheta_a = 30$ °C)					$\vartheta_{stg}$	170	°C				
Maximum operating temperature					$\vartheta_{max, op}$	120	°C				
Maximum operating pressure					p <sub>max, op</sub>	1200	kPa				
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com				
Test report(s)		130617017GZU-002					Dated		2020-08-12		
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26						
<p>Tests were performed based on EN 12975-2:2006; This data sheet replace the previous version issued on 2018-12-04.</p>					 						
<p>RISE Research Institutes of Sweden AB   Certification Box 857, SE-501 15 Borås, Sweden, Phone: +46 10-516 50 00, certifierng@ri.se   www.ri.se</p>											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	SC1396-13
	Issued	2020-08-21

Annual collector output in kWh/collector at mean fluid temperature $\vartheta_m$													
Collector name	Standard Locations $\vartheta_m$	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
FPC1200D		2 131	1 305	655	1 506	867	386	1 129	617	275	1 232	660	292
Annual output per m <sup>2</sup> gross area		1 066	653	328	753	434	193	564	308	138	616	330	146
Annual efficiency, $\eta_a$		60%	37%	19%	46%	27%	12%	48%	26%	12%	50%	27%	12%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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  $\vartheta_m$  (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
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)	C
G (W/m <sup>2</sup> ) >	800
$\vartheta_a$ (°C) >	10
$H_x$ (MJ/m <sup>2</sup> ) >	420
Maximum tested positive load	5900 Pa
Maximum tested negative load	3000 Pa
Hail resistance using steel ball (maximum drop height)	2,0 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 <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
FPC1200D	2,00	9-VH-1234S-A:8,1878-C:22,1061-D	1,85

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 ( $\eta_{col}$ )	49%	Zero-loss efficiency ( $\eta_0$ )	0,71
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ 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 ( $a_1$ )	4,46
		Second-order coefficient ( $a_2$ )	0,023
		Incidence angle modifier IAM (50°)	0,88
		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.	