Solar Keymark Certificate

C900236

Issued to

Jiangsu Micoe Solar Energy Co., Ltd.

NingHai Industrial Zone, Lianyungang City, Jiangsu Province, P.R. China

Product name and description

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

Models:	FPC2.0M	FPC2.5M	FPC3.0M

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 2025-11-09 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.

Signed by: Martin Tillander
Reason: I am the author of this document
Date & Time: 2020-11-09 09:48:19 +01:00

Martin Tillander

2020-11-05

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

17839

Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate			
		Licence Number	**C900236**
		Date issued	**2020-11-09**
		Issued by	**RISE**

Licence holder	Jiangsu Micoe Solar Energy Co., Ltd	**Country**	China	
Brand (optional)	Micoe	**Web**	http://www.micoe.com	
Street, Number	NingHai Industrial Zone	**E-mail**	certification@micoe.com	
Postcode, City	Lianyungang City, Jiangsu Province	**Tel**	+86	518-85959563

Collector Type	Flat plate 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	89 K
	m²	mm	mm	mm	W	W	W	W	W	W
FPC2.0M	2,00	2 000	1 000	80	1 472	1 372	1 159	930	684	437
FPC2.5M	2,50	2 000	1 250	80	1 840	1 715	1 448	1 162	856	546
FPC3.0M	3,00	2 000	1 500	80	2 208	2 058	1 738	1 394	1 027	655
Power output per m² gross area					736	686	579	465	342	218

Performance parameters test method	Steady state - outdoor									
Performance parameters (related to A_G)	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	0,754	4,93	0,010	0,000	0,00	5 780	0,000	0,00	0,00	0,84

Incidence angle modifier test method		Steady state - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1,00	0,99	0,97	0,94	0,87	0,77	0,62	0,38	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	0,99	0,97	0,94	0,87	0,77	0,62	0,38	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		$(\vartheta_m-\vartheta_a)_{max}$	59 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	160 °C
Maximum operating temperature		ϑ_{max_op}	120 °C
Maximum operating pressure		$p_{max,op}$	1200 kPa

Testing laboratory	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch	http://www.intertek.com	
Test report(s)	200330105GZU-001	**Dated**	2020-10-30

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

Above efficiency parameters come from test type FPC3.0M;
The performance parameter based aperture area (2.83 m2) are: η0,b'=0.799, a1'=5.223, a2'=0.010.

intertek
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Annex to Solar Keymark Certificate

Annex to Solar Keymark Certificate	Licence Number	C900236
Supplementary Information	Issued	2020-11-09

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
FPC2.0M		2 214	1 371	753	1 564	946	492	1 168	661	337	1 275	706	354
FPC2.5M		2 767	1 714	941	1 955	1 182	615	1 460	826	421	1 593	883	442
FPC3.0M		3 321	2 056	1 130	2 346	1 418	738	1 752	991	505	1 912	1 059	531
Annual output per m² gross area		1 107	685	377	782	473	246	584	330	168	637	353	177
Annual efficiency, η_a		63%	39%	21%	48%	29%	15%	50%	28%	14%	51%	28%	14%
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					3000	Pa
Maximum tested negative load					3000	Pa
Hail resistance using steel ball (maximum drop height)					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)
FPC2.0M	2,00
FPC2.5M	2,50
FPC3.0M	3,00

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
8-VH-1234S-A:10,1885-C:22,1060-D	1,85
10-VH-1234S-A:10,1885-C:22,1310-D	2,34
12-VH-1234S-A:10,1885-C:22,1560-D	2,83

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

Collector efficiency (η_{col})	52%

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.

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

Zero-loss efficiency (η_0)	0,74	--
First-order coefficient (a_1)	4,93	W/(m²K)
Second-order coefficient (a_2)	0,010	W/(m²K²)
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.