


Annex to Solar Keymark Certificate					Licence Number		011-7S3041 F					
					Date issued		2021-08-26					
					Issued by		DIN CERTCO					
Licence holder		Jiangsu Micoe Solar Energy Co., Ltd			Country		P.R.China					
Brand (optional)		Micoe			Web		http://www.micoe.com					
Street, Number		199#, Yingzhou Road			E-mail		certification@micoe.com					
Postcode, City		222000/Lianyungang City, Jiangsu Province			Tel		+86 518-85959563					
Collector Type					Flat plate collector							
Collector name					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	
FPC2.0M					2.00	2,000	1,000	80	1,468	1,374	1,168	936
FPC2.5M					2.50	2,000	1,250	80	1,835	1,718	1,460	1,170
FPC2.7M					2.68	2,000	1,340	80	1,967	1,841	1,565	1,254
FPC3.0M					3.00	2,000	1,500	80	2,202	2,061	1,752	1,404
Power output per m² gross area					734	687	584	468	339	207		
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A_G)		η₀, b	a₁	a₂	a₃	a₄	a₅	a₆	a₇	a₈	K_d	
Units		-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-	
Test results		0.754	4.518	0.016	0.000	0.000	5,800	0.000	0.000	0.000	0.822	
Incidence angle modifier test method		Steady state - outdoor										
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal		K_{θT, coll}	1.00	0.99	0.96	0.94	0.85	0.75	0.59	0.36	0.00	
Longitudinal		K_{θL, coll}	1.00	0.99	0.96	0.94	0.85	0.75	0.59	0.36	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}		58.72		K			
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ_{stg}		160		°C			
Maximum operating temperature					$\vartheta_{max, op}$		120		°C			
Maximum operating pressure					p_{max, op}		1200		kPa			
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou					http://www.intertek.com					
Test report(s)		200330105GZU-001					Dated		2020/12/9			
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26							
Above efficiency parameters come from test type FPC3.0M;					 Stamp & signature							
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Supplementary Information		Issued		2021-08-26									
Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_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
FPC2.0M		2,185	1,375	750	1,564	949	482	1,165	666	334	1,269	711	351
FPC2.5M		2,732	1,719	938	1,955	1,187	603	1,456	833	418	1,586	889	439
FPC2.7M		2,928	1,843	1,005	2,096	1,272	646	1,561	893	448	1,700	953	470
FPC3.0M		3,278	2,063	1,125	2,347	1,424	724	1,748	999	502	1,903	1,067	526
Annual output per m ² gross area		1,093	688	375	782	475	241	583	333	167	634	356	175
Annual efficiency, η_a		62%	39%	21%	48%	29%	15%	50%	29%	14%	51%	29%	14%
Fixed or tracking collector													
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 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)											B		--
G (W/m ²) >		900		ϑ_a (°C) >		15		H _x (MJ/m ²) >		540			
Maximum tested positive load											5900		Pa
Maximum tested negative load											3000		Pa
Hail resistance using steel ball (maximum drop height)											2		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 ²)		Hydraulic Designation Code				Aperture Area, A _a (m ²)					
FPC2.0M		2.00		8-VH-1234S-A:10,1885-C22,1060-D				1.85					
FPC2.5M		2.50		8-VH-1234S-A:10,1885-C22,1310-D				2.34					
FPC2.7M		2.68		8-VH-1234S-A:10,1885-C22,1400-D				2.52					
FPC3.0M		3.00		8-VH-1234S-A:10,1885-C22,1560-D				2.83					
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 (η_{col})		53%				Zero-loss efficiency (η_0)		0.73		--			
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/m ² , 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 9806:2017.				First-order coefficient (a ₁)		4.52		W/(m ² K)					
				Second-order coefficient (a ₂)		0.016		W/(m ² K ²)					
				Incidence angle modifier IAM (50°)		0.87		--					
						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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