


Annex to Solar Keymark Certificate					Licence Number		011-7S3039 F				
					Date issued		2024-07-19				
					Issued by		DIN CERTCO				
Licence holder		Jiangsu Micoe Solar Energy Co., Ltd.			Country		China				
Brand (optional)		Micoe			Web		http://www.micoe.com				
Street, Number		No. 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						
					$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	77 K	
					W	W	W	W	W	W	
FPC1150D					1,119	1,086	1,001	894	764	716	
FPC1200D					1,492	1,447	1,335	1,192	1,019	954	
FPC1240D					1,791	1,737	1,602	1,430	1,223	1,145	
FPC1270D					2,000	1,940	1,789	1,597	1,365	1,279	
FPC1300D					2,239	2,171	2,002	1,788	1,528	1,432	
Power output per m ² gross area					746	724	667	596	509	477	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A _G)		$\eta_{0, b}$	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units		-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results		0.758	2.06	0.019	0.000	0.00	5,813	0.000	0.00	0.00	0.90
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	1.00	0.99	0.97	0.92	0.84	0.70	0.45	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.97	0.92	0.84	0.70	0.45	0.00
Heat transfer medium for testing					Water-Glycole						
Flow rate for testing (per gross area, A _G)					dm/dt	0.020	kg/(sm ²)				
Maximum temperature difference during thermal performance test					($\vartheta_m - \vartheta_a$) _{max}	46.67	K				
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30 \text{ °C}$)					ϑ_{stg}	170	°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 Branch					http://www.intertek.com				
Test report(s)		230628124GZU-001					Dated		2024/7/19		
Comments of testing laboratory					Ver. 6.2 (13.01.2022)						
All test results come from model FPC1300D					 Stamp & signature						
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Supplementary Information		Issued		2024-07-19											
Gross Thermal Yield 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		
FPC1150D		1,802	1,432	1,036	1,464	1,110	766	1,061	775	518	1,147	840	553		
FPC1200D		2,403	1,909	1,381	1,951	1,479	1,021	1,415	1,034	690	1,530	1,120	738		
FPC1240D		2,883	2,291	1,657	2,342	1,775	1,225	1,698	1,240	828	1,835	1,344	885		
FPC1270D		3,219	2,558	1,851	2,615	1,982	1,368	1,896	1,385	925	2,050	1,500	989		
FPC1300D		3,604	2,864	2,072	2,927	2,219	1,531	2,122	1,551	1,036	2,294	1,680	1,107		
Gross Thermal Yield per m ² gross area		1,201	955	691	976	740	510	707	517	345	765	560	369		
Annual efficiency, η_a		68%	54%	39%	60%	45%	31%	61%	44%	30%	61%	45%	30%		
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)													
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. 6.2 (13.01.2022). 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										No					
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)															
Using external power source(s) for normal operation					No		Active or passive measure(s) for self-protection					No			
Co-generating thermal and electrical power					No		Façade collector(s)					No			
Energy Labelling Information						Additional Informative Technical Data									
		Reference Area, A _{sol} (m ²)				Hydraulic Designation Code				Aperture Area, A _a (m ²)					
FPC1150D		1.50				8-VH-1234S-A:9,1885-C22,1060-D				1.38					
FPC1200D		2.00				8-VH-1234S-A:9,1885-C22,1060-D				1.85					
FPC1240D		2.40				8-VH-1234S-A:9,1885-C22,1310-D				2.24					
FPC1270D		2.68				8-VH-1234S-A:9,1885-C22,1400-D				2.52					
FPC1300D		3.00				8-VH-1234S-A:9,1885-C22,1560-D				2.84					
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}									
Collector efficiency (η_{col})		63%				Zero-loss efficiency (η_0)				0.75					
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)				2.06				W/(m ² K)					
		Second-order coefficient (a ₂)				0.019				W/(m ² K ²)					
		Incidence angle modifier IAM (50°)				0.93				--					
		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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