

<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S3005 F</b>																	
					<b>Date issued</b>		<b>2021-02-25</b>																	
					<b>Issued by</b>		<b>DIN CERTCO</b>																	
<b>Licence holder</b>		<b>Jiangsu Micoe Solar Energy Co., Ltd</b>					<b>Country</b>		<b>China</b>															
<b>Brand (optional)</b>		<b>Micoe</b>					<b>Web</b>		<b><a href="http://www.micoe.com">http://www.micoe.com</a></b>															
<b>Street, Number</b>		<b>199#, Yingzhou Road</b>					<b>E-mail</b>		<b><a href="mailto:certification@micoe.com">certification@micoe.com</a></b>															
<b>Postcode, City</b>		<b>222000, Lianyungang City, Jiangsu Province</b>					<b>Tel</b>		<b>+86 518 85959563</b>															
<b>Collector Type</b>					<b>Flat plate collector</b>																			
<b>Collector name</b>					<b>Power output per collector</b> G <sub>b</sub> = 850 W/m <sup>2</sup> , G <sub>d</sub> = 150 W/m <sup>2</sup> & u = 1.3 m/s $\vartheta_m - \vartheta_a$																			
					Gross area (A <sub>G</sub> )		Gross length		Gross width		Gross height		0 K		10 K		30 K		50 K		70 K		104 K	
					m <sup>2</sup>		mm		mm		mm		W		W		W		W		W			
<b>FPC15.0B</b>					<b>15.02</b>		<b>2 520</b>		<b>5 960</b>		<b>166</b>		<b>12 645</b>		<b>12 169</b>		<b>11 089</b>		<b>9 841</b>		<b>8 425</b>		<b>5 632</b>	
<b>Power output per m<sup>2</sup> gross area</b>					<b>842</b>		<b>810</b>		<b>738</b>		<b>655</b>		<b>561</b>		<b>375</b>									
<b>Performance parameters test method</b>					<b>Steady state - outdoor</b>																			
<b>Performance parameters (related to A<sub>G</sub>)</b>					η <sub>0</sub> , b		a <sub>1</sub>		a <sub>2</sub>		a <sub>3</sub>		a <sub>4</sub>		a <sub>5</sub>		a <sub>6</sub>		a <sub>7</sub>		a <sub>8</sub>		K <sub>d</sub>	
<b>Units</b>					-		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> )		-	
<b>Test results</b>					<b>0.852</b>		<b>3.03</b>		<b>0.014</b>		<b>0.000</b>		<b>0.00</b>		<b>6 833</b>		<b>0.000</b>		<b>0.00</b>		<b>0.00</b>		<b>0.92</b>	
<b>Incidence angle modifier test method</b>					<b>Steady state - outdoor</b>																			
<b>Incidence angle modifier</b>					Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
<b>Transversal</b>					K <sub>θT, coll</sub>		1.00		1.00		1.00		0.99		0.96		0.90		0.78		0.52		0.00	
<b>Longitudinal</b>					K <sub>θL, coll</sub>		1.00		1.00		1.00		0.99		0.96		0.90		0.78		0.52		0.00	
<b>Heat transfer medium for testing</b>					<b>Water</b>																			
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					dm/dt		0.019		kg/(sm <sup>2</sup> )															
<b>Maximum temperature difference during thermal performance test</b>					(ϑ <sub>m</sub> - ϑ <sub>a</sub> ) <sub>max</sub>		74		K															
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; ϑ<sub>a</sub> = 30 °C)</b>					ϑ <sub>stg</sub>		200		°C															
<b>Maximum operating temperature</b>					ϑ <sub>max op</sub>		200		°C															
<b>Maximum operating pressure</b>					p <sub>max op</sub>		1000		kPa															
<b>Testing laboratory</b>		<b>Intertek Testing Services Shenzhen Ltd. Guangzhou Branch</b>					<b><a href="http://www.intertek.com">http://www.intertek.com</a></b>																	
<b>Test report(s)</b>		<b>201203081GZU-001</b>					<b>Dated</b>		<b>2021-02-22</b>															
<b>Comments of testing laboratory</b>					<b>Datasheet version: 6.1, 2019-09-26</b>																			
<i>The performance parameter based aperture area (13.95 m<sup>2</sup>) are: η<sub>0</sub>, b'=0.918, a<sub>1</sub>'=3.266, a<sub>2</sub>'=0.015.</i>					<i>Stamp &amp; signature of test lab</i>																			
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Supplementary Information		Issued		2021-02-25													
<b>Annual collector output in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>																	
Standard Locations		Athens		Davos		Stockholm		Würzburg									
Collector name	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C				
FPC15.0B		20 642	15 874	11 408	16 397	12 230	8 490	11 937	8 492	5 674	12 941	9 206	6 059				
Annual output per m <sup>2</sup> gross area		1 374	1 057	760	1 092	814	565	795	565	378	862	613	403				
Annual efficiency, $\eta_a$		78%	60%	43%	67%	50%	35%	68%	48%	32%	69%	49%	32%				
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 <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>																	
<b>Additional Information</b>																	
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 <sup>2</sup> ) >		900		$\vartheta_a$ (°C) >		15		H <sub>x</sub> (MJ/m <sup>2</sup> ) >		540							
Maximum tested positive load										5900		Pa					
Maximum tested negative load										3000		Pa					
Hail resistance using steel ball (maximum drop height)										2		m					
<b>Additional collector attribute(s)</b>																	
<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)																	
<b>Energy Labelling Information</b>						<b>Additional Informative Technical Data</b>											
		Reference Area, A <sub>sol</sub> (m <sup>2</sup> )				Hydraulic Designation Code				Aperture Area, A <sub>a</sub> (m <sup>2</sup> )							
FPC15.0B		15.02				24-H-12V-A:7.2,5807-C:40,2480				13.95							
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>											
Collector efficiency ( $\eta_{col}$ )		70%				Zero-loss efficiency ( $\eta_0$ )				0.84				--			
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 <sub>sol</sub> ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.						First-order coefficient (a <sub>1</sub> )				3.03				W/(m <sup>2</sup> K)			
						Second-order coefficient (a <sub>2</sub> )				0.014				W/(m <sup>2</sup> K <sup>2</sup> )			
						Incidence angle modifier IAM (50°)				0.97				--			
Remark: The data given in this section are related to collector reference area (A <sub>sol</sub> ) 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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