


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S3047 F</b>																	
					<b>Date issued</b>		<b>2021-08-26</b>																	
					<b>Issued by</b>		<b>DIN CERTCO</b>																	
<b>Licence holder</b>		<b>ELIOTEKNOLOGY LTD</b>			<b>Country</b>		<b>P.R.China</b>																	
<b>Brand (optional)</b>		<b>ELIOTEKNOLOGY</b>			<b>Web</b>		<b>www.elioteknology.com</b>																	
<b>Street, Number</b>		<b>2318, Leighton centre, 77 Leighton Road, Causeway Bay</b>			<b>E-mail</b>		<b>contact@elioteknology.com</b>																	
<b>Postcode, City</b>		<b>-/HONG KONG</b>			<b>Tel</b>		<b>+852 3796 9688</b>																	
<b>Collector Type</b>					<b>Flat plate collector</b>																			
<b>Collector name</b>					<b>Gross area (A<sub>G</sub>)</b> m <sup>2</sup>		<b>Gross length</b> mm		<b>Gross width</b> mm		<b>Gross height</b> mm		<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 ϑ <sub>m</sub> - ϑ <sub>a</sub>											
													0 K		10 K		30 K		50 K		70 K		82 K	
<b>FPC1200D</b>					<b>2.00</b>		<b>2,000</b>		<b>1,000</b>		<b>80</b>		<b>1,413</b>		<b>1,319</b>		<b>1,104</b>		<b>852</b>		<b>564</b>		<b>375</b>	
<b>Power output per m<sup>2</sup> gross area</b>					<b>706</b>		<b>660</b>		<b>552</b>		<b>426</b>		<b>282</b>		<b>188</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>0.723</b>		<b>4.456</b>		<b>0.023</b>		<b>0.000</b>		<b>0.000</b>		<b>2,570</b>		<b>0.000</b>		<b>0.000</b>		<b>0.000</b>		<b>0.847</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		0.99		0.97		0.94		0.88		0.78		0.63		0.39		0.00	
<b>Longitudinal</b>					K <sub>θL, coll</sub>		1.00		0.99		0.97		0.94		0.88		0.78		0.63		0.39		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>		51.84		K															
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; ϑ<sub>a</sub> = 30 °C)</b>					ϑ <sub>stg</sub>		160.5		°C															
<b>Maximum operating temperature</b>					ϑ <sub>max op</sub>		120		°C															
<b>Maximum operating pressure</b>					p <sub>max, op</sub>		1200		kPa															
<b>Testing laboratory</b>					<b>Intertek Testing Services Shenzhen Ltd. Guangzhou</b>					<b>http://www.intertek.com</b>														
<b>Test report(s)</b>					<b>140321058GZU-001</b>					<b>Dated</b>		<b>2020/8/12</b>												
<b>Comments of testing laboratory</b>					<b><u>This OBL for Elioteknology is based on Micoe's OEM certificate 011-7S3039 F.</u></b>					 Stamp & signature														
<b>DIN CERTCO ● Alboinstraße 56 ● D-12103 Berlin</b> <b>Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de</b>																								

<b>Annex to Solar Keymark Certificate</b> <b>Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S3047 F</b>
	<b>Issued</b>	<b>2021-08-26</b>

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		2,134	1,307	657	1,508	869	388	1,130	618	276	1,233	661	293
Annual output per m <sup>2</sup> gross area		1,067	654	329	754	435	194	565	309	138	616	331	147
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 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 W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.023 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.88
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		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.	