



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2089 F							
					Date issued		2017-07-18							
					Issued by		DIN CERTCO							
Licence holder		Apricus Solar Co., Ltd.			Country		China							
Brand (optional)		Apricus			Web		www.apricus.com							
Street, Number		No.19, Pusi Rd, Pukou New&High Tech Development Zone			E-mail		jasmine@apricus.com							
Postcode, City		210061, Nanjing			Tel		+86 (0)25 58649129 / 58648103							
Collector Type					Flat plate collector, glazed									
Collector name					Power output per collector Gb = 850 W/m <sup>2</sup> ; Gd = 150 W/m <sup>2</sup> θ <sub>m</sub> - θ <sub>a</sub>									
					0 K	10 K	30 K	50 K	70 K	77 K				
					m <sup>2</sup>	mm	mm	mm	W	W	W	W	W	W
FPC-A26					2.43	1 984	1 224	80	1 786	1 669	1 420	1 152	864	759
FPC-A32					2.99	2 444	1 223	80	2 198	2 054	1 747	1 417	1 063	934
Power output per m <sup>2</sup> gross area					735	687	584	474	356	312				
Performance parameters test method				Steady state - outdoor										
Performance parameters (related to AG)				η <sub>0</sub> ,hem	a1	a2								
Units				-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )								
Test results				0.735	4.719	0.010								
Incidence angle modifier test method				Quasi dynamic - outdoor										
Bi-directional incidence angle modifiers				No										
Incidence angle modifier				Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal				K <sub>θT, coll</sub>	1.00	0.98	0.96	0.92	0.85	0.74	0.50	0.00	0.00	
Longitudinal				K <sub>θL, coll</sub>	1.00	0.98	0.96	0.92	0.85	0.74	0.50	0.00	0.00	
Heat transfer medium for testing				Water-Glycole										
Flow rate for testing (per gross area, A <sub>G</sub> )				dm/dt	0.020	kg/(sm <sup>2</sup> )								
Maximum temperature difference for thermal performance calculations				(θ <sub>m</sub> -θ <sub>a</sub> ) <sub>max</sub>	77	K								
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; θ <sub>a</sub> = 30 °C)				θ <sub>stg</sub>	163	°C								
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )				C/m <sup>2</sup>	5.1	kJ/(Km <sup>2</sup> )								
Maximum operating temperature				θ <sub>max, op</sub>	100	°C								
Maximum operating pressure				p <sub>max, op</sub>	800	kPa								
Testing laboratory				TUV Rheinland (Shanghai) Co., Ltd.				www.tuv.com						
Test report(s)				154035430_EN_P_A26_Report_Gao 154027362_EN_A32_Report_Gao				Dated		13/5/2014 13/5/2014				
Comments of testing laboratory				Datashet version: 5.01, 2016-03-01										
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2089 F
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Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$ , based on ISO 9806:2013 test results

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
FPC-A26		2 600	1 622	911	1 855	1 139	608	1 376	794	416	1 498	845	434
FPC-A32		3 199	1 996	1 121	2 282	1 401	748	1 693	977	512	1 843	1 040	534
Annual output per m <sup>2</sup> gross area		1 070	668	375	763	469	250	566	327	171	616	348	179
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at [www.solarkeymark.org/scenocalc](http://www.solarkeymark.org/scenocalc)

Additional Information

Collector heat transfer medium	Water-Glycole
Hybrid Thermal and Photo Voltaic collector	No
The collector is deemed to be suitable for roof integration	No
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:	
Climate class (A, B or C)	C --
Maximum tested positive load	2400 Pa
Maximum tested negative load	- Pa
Hail resistance using steel ball (maximum drop height)	1.2 m

Energy Labelling Information

	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$		
FPC-A26	2.43	Collector efficiency ( $\eta_{col}$ )	53	%
FPC-A32	2.99	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 9806:2013.		
		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$		
		Zero-loss efficiency ( $\eta_0$ )	0.735	--
		First-order coefficient ( $a_1$ )	4.72	W/(m <sup>2</sup> K)
		Second-order coefficient ( $a_2$ )	0.010	W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.85	--
		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.		