


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S1941 F							
						Date issued		2017-04-19							
						Issued by		DIN CERTCO							
Licence holder			Solimpeks Solar Energy Corp.			Country		Turkey							
Brand (optional)						Web		www.solimpeks.com							
Street, Number			Fevzi Çakmak Mah. 10753 Sk. No:3/3A			E-mail		yusuf.akay@solimpeks.com							
Postcode, City		42050	Karatay Konya			Tel		+90 4 440 602							
Collector Type						Flat plate collector, glazed									
Collector name						Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² ; u = 3 m/s ̑m - ̑a									
						Gross area (A _G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	116 K
						m ²	mm	mm	mm	W	W	W	W	W	W
Wunder ALS 1809						1.80	1 929	933	91	1 301	1 238	1 099	944	774	322
Wunder ALS 2110						2.07	1 988	1 041	90	1 497	1 424	1 264	1 086	890	370
Wunder ALS 2412						2.40	1 980	1 210	90	1 735	1 651	1 465	1 259	1 032	429
Wunder ALS 2512						2.43	1 990	1 222	91	1 757	1 671	1 484	1 275	1 045	434
Power output per m ² gross area						723	688	611	525	430	179				
Performance parameters test method			Quasi dynamic												
Performance parameters (related to AG)			̑ _{0,b}	c1	c2	c3	c4	c6	Kd						
Units			-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-						
Test results			0.730	3.416	0.011	0.000	0.000	0.000	0.936						
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 _{̑T, coll}	1.00	0.99	0.98	0.97	0.94	0.90	0.80	0.51	0.00			
Longitudinal			K _{̑L, coll}	1.00	0.99	0.98	0.97	0.94	0.90	0.80	0.51	0.00			
Heat transfer medium for testing			Water												
Flow rate for testing (per gross area, A _G)			dm/dt	0.018	kg/(sm ²)										
Maximum temperature difference for thermal performance calculations			(̑ _m -̑ _a) _{max}	116	K										
Standard stagnation temperature (G = 1000 W/m ² ; ̑ _a = 30 °C)			̑ _{stg}	203	°C										
Effective thermal capacity, incl. fluid (per gross area, A _G)			C/m ²	8.658	kJ/(Km ²)										
Maximum operating temperature			̑ _{max, op}	n.a.	°C										
Maximum operating pressure			p _{max, op}	1000	kPa										
Testing laboratory			TZS, ITW University Stuttgart			www.itw.uni-stuttgart.de									
Test report(s)			12COL1079/2 12COL1079Q/2 12COL1078/1			Dated		10.03.2016 10.03.2016 06.11.2013							
Comments of testing laboratory			Datashet version: 5.01, 2016-03-01												
This data sheet replaces the data sheet issued on 10.03.2016 The data sheet is issued on the newest version 5.01			 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70550 Stuttgart (Vaihingen)												
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de															

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1941 F
	Issued	2017-04-19

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806:2013 test results													
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
Wunder ALS 1809		2 096	1 501	989	1 591	1 104	699	1 173	770	469	1 278	834	500
Wunder ALS 2110		2 410	1 726	1 137	1 830	1 270	804	1 349	885	539	1 469	959	575
Wunder ALS 2412		2 795	2 001	1 318	2 122	1 472	933	1 564	1 026	625	1 704	1 112	667
Wunder ALS 2512		2 829	2 026	1 335	2 148	1 490	944	1 584	1 039	633	1 725	1 126	675
Annual output per m ² gross area		1 164	834	549	884	613	389	652	428	261	710	463	278
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at 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	Yes	
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	3000	Pa
Maximum tested negative load	2250	Pa
Hail resistance using steel ball (maximum drop height)	n.a	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Wunder ALS 1809	1.80	Collector efficiency (η_{col})	57 %
Wunder ALS 2110	2.07	<i>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/m², 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 9806:2013.</i>	
Wunder ALS 2412	2.40		
Wunder ALS 2512	2.43		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.723 --
		First-order coefficient (a_1)	3.42 W/(m ² K)
		Second-order coefficient (a_2)	0.011 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.94 --
<i>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.</i>			