


Summary of EN 12975 Test Results,						Licence Number		011-7S2313 F				
annex to Solar KEYMARK Certificate						Issued		2014-09-19				
Company holding the			Solimpeks Solar Energy Corp.			Country		TURKEY				
Brand (optional)			--			Website		www.solimpeks.com				
Street, street number			Fevzi Cakmak Mah. 10753 SOK. NO: 3			E-mail		info@solimpeks.com				
Postal Code / City, province			42050 Karatay - KONYA			Tel/Fax		90 332 444 06 02				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed						
Thermal / photo voltaic hybrid collector? (PVT collector)						No						
Integration in the roof possible? (manufacturers declaration)						Yes						
	Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module					
							G = 1000 W/m ²					
							Tm-Ta					
							0 K	10 K	30 K	50 K	70 K	
		m ²	mm	mm	mm	m ²	W	W	W	W	W	
	WUNDER ANP 1808	1,62	1.929	930	90	1,79	1.153	1.027	763	481	183	
	WUNDER ANP 2108	1,92	1.988	1.218	90	2,07	1.367	1.218	904	570	216	
	WUNDER ANP 2510	2,23	1.988	1.218	92	2,42	1.588	1.414	1.050	662	251	
	WUNDER ANP 2710	2,47	2.214	1.205	92	2,67	1.759	1.566	1.163	733	278	
Performance test method						Glazed liquid heating collector - steady state - indoor						
Performance parameters related to aperture			η_0	a1	a2							
Units			-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1			0,712	7,652	0,013							
Bi-directional incidence angle			No <i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θ)			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Incidence angle modifier not bi-directional - leave fields blank			K θ (θ)					0,92				0,00
Stagnation temperature - Weather conditions see note 2						Tstg	153,6 °C					
Effective thermal capacity						ceff = C/Ag	5,818 kJ/(m ² K)					
Max. intended operation temperature - see note 3						Tmax,op	135 °C					
Max. operation pressure - see note 3						pmax,op	1000 kPa					
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area												
Flow rate	kg/(s m ²)	0,000	0,005	0,012	0,019	0,026	0,033					
Pressure drop, ΔP	Pa	0	20	60	100	150	190					
Optional weather data			Location			Link						
Testing Laboratory			Fundación CENER-CIEMAT, LEST									
Website			www.cener.com									
Test report id. number			30.2452.0-1-1 30.2452.0-2-1			Date of test report			2014/09/15			
			30.2452.0-3-1 30.2452.0									
During the test GDIF/GTOT was always between			0,15	and	0,15							
Comments of testing laboratory:												
The collectors models WUNDER ANP 1808 and WUNDER ANP 2710 were tested according to ISO 9806:2013. According to SKM rules the results of the collector model WUNDER ANP 1808 are representative for the whole WUNDER ANP family.												
Note 1	Flow rate	0,022	kg/(s m ²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m ² ; Ambient temperature, Ta=30 °C											
Note 3	Given by manufacturer											
						 Datasheet version: 4.06, 2014-01-15						
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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2313 F
	Issued	19/09/2014

Annual collector output kWh/module													
Collector name	Location and collector temperature (Tm)												
	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	
WUNDER ANP 1808	1.734	807	268	1.061	451	116	826	335	87	913	360	99	
WUNDER ANP 2108	2.055	957	318	1.257	534	138	979	397	103	1.082	426	118	
WUNDER ANP 2510	2.386	1.111	369	1.460	620	160	1.137	461	120	1.257	495	137	
WUNDER ANP 2710	2.643	1.231	409	1.617	687	177	1.259	511	132	1.392	549	151	

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	Gtot kWh/m ²	Ta °C	Collector orientation or tracking mode
Athens	38	1.765	18,5	South, 25°
Davos	47	1.714	3,2	South, 30°
Stockholm	59	1.166	7,5	South, 45°
Würzburg	50	1.244	9,0	South, 35°

Gtot	Annual total irradiation on collector plane	kWh/m ²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

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	ScenoCalc version: Ver. 4.06 (Jan, 2014)