Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Certificate No.**	**011-7S2348 F**
	Date of issue	10.04.2014

Company	Solimpeks Solar Energy Corp.	**Country**		TURKEY
Brand (optional)		**Website**		www.solimpeks.com
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Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate collector
Integration in the roof possible ?	Yes

Collector name	Aperture area (Aa) [m²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (Ag) [m²]	Power output per collector unit G = 1000 W/m² Tm-Ta : 0 K [W]	10 K [W]	30 K [W]	50 K [W]	70 K [W]
Wunder CLS 1808	1.62	1 930	930	91	1.79	1 217	1 136	974	812	650
Wunder CLS 2008*	1.86	2 000	1 000	90	2.00	1 397	1 304	1 118	932	746
Wunder CLS 2108*	1.92	1 988	1 041	90	2.07	1 442	1 346	1 154	962	770
Wunder CLS 2509*	2.24	2 325	1 041	90	2.42	1 682	1 570	1 346	1 122	898
Wunder CLS 2510	2.24	1 992	1 222	91	2.43	1 682	1 570	1 346	1 122	898
Wunder CLS 2611*	2.39	2 005	1 290	90	2.59	1 795	1 675	1 436	1 198	959

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.751	-
	a_{1a}	4.999	W/(m²K)
	a_{2a}	0.000	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	203	°C
Effective thermal capacity	$c_{eff} = C/A_a$	12.36	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	1000	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	G_{DIF}/G_{TOT} max	θ_T / θ_L	50°	*10°*	*20°*	*30°*	*40°*	*60°*	*70°*
			$K_\theta(\theta_T)$	0.85	1.00	0.98	0.96	0.92	0.73	0.48
	-	-	$K_\theta(\theta_L)$	0.85	1.00	0.98	0.96	0.92	0.73	0.48

G_{DIF}/G_{TOT}: min&max - while measuring

Optional values

Testing Laboratory	TZS, ITW University of Stuttgart
Website	www.tzs.uni-stuttgart.de
Test report id. number	07COL593/2
Date of test report	10.04.2014
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :

* dimensions according to manufacturer

Note 1	**Fluid**	Water	**Flow rate**	0.015	kg/s per m²
Note 2	**Irradiance, Gs=1000 W/m²** **Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

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VERSION 3.6, 2012.01.13

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S2348 F
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Annual collector output kWh

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 CLS 1808	1 777	1 123	674	1 348	849	501	940	557	322	1 023	593	333
Wunder CLS 2008*	2 040	1 289	774	1 548	975	575	1 079	640	370	1 175	681	382
Wunder CLS 2108*	2 106	1 331	799	1 598	1 006	594	1 114	660	382	1 212	703	395
Wunder CLS 2509*	2 457	1 553	932	1 864	1 174	693	1 300	770	445	1 415	820	460
Wunder CLS 2510	2 457	1 553	932	1 864	1 174	693	1 300	770	445	1 415	820	460
Wunder CLS 2611*	2 622	1 657	994	1 989	1 253	739	1 387	822	475	1 509	875	491

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m²	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/m²
Ta	Mean annual ambient air temperature	°C
Tm	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

Calculation of the annual collector performance is done by the official Solar Keymark spreadsheet tool. Hour by hour the collector output is calculated according to the efficiency parameters from the Keymark test using constant collector operating temperature (Tm). Detailed description with all equations used is available from the Solar Keymark web site (direct link: http://www.estif.org/solarkeymark/annexb1.php)

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Datasheet version:
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Calculation program version:
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