Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Certificate No.**	**011-7S292 F**
	Date of issue	16.11.2007

Company	Solimpeks Solar Energy Corp.	**Country**		TURKEY	
Brand (optional)		**Website**		www.solimpeks.com	
Street, number	Fevzi Çakmak Mah. 10753 Sk. No:3	**E-mail**		yusuf.akay@solimpeks.com	
Postal Code	42050	**Tel.**	+90	4 440 602	
City	Konya - Karatay	**Fax**	+90	4 440 608	

Collector Type (flat plate / evacuate tubular / un-glazed)	Evacuated tubular collector
Integration in the roof possible ?	No

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 2510	2.24	1 992	1 222	91	2.43	1 682	1 570	1 346	1 122	898

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
Date of test report	16.11.2007
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**				

TZS Forschungs- und Testzentrum für Solaranlagen
Institut für Thermodynamik und Wärmetechnik
Universität Stuttgart
Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)

VERSION 3.6, 2012.01.13

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S292 F
	Issued	16.11.2007

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	1 771	1 119	673	1 349	850	502	936	556	320	1 019	592	333
Wunder CLS 2008*	2 033	1 285	773	1 549	976	576	1 075	638	367	1 170	680	382
Wunder CLS 2108*	2 099	1 326	798	1 599	1 007	595	1 109	659	379	1 208	702	395
Wunder CLS 2510	2 449	1 547	931	1 865	1 175	694	1 294	769	442	1 409	819	460

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)

DIN CERTCO ● Alboinstraße 56 ● 12103 Berlin
Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de

Datasheet version:
VERSION 3.6, 2012.01.13
Calculation program version:
3.07, October 2011 (SP)