TÜVRheinland®
DIN CERTCO

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S2066 R
	Date of issue	22-01-2013

Company	Pro Eco Solutions Ltd.	**Country**		Great Britain
Brand (optional)	PROECO	**Website**		www.ProEcoSolar.eu
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City	London	**Fax**	+44	0

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

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector unit G = 1000 W/m² Tm-Ta : 0 K	10 K	30 K	50 K	70 K
	[m²]	[mm]	[mm]	[mm]	[m²]	[W]	[W]	[W]	[W]	[W]
JNSC15-58/1800	1.42	1 960	1 180	125	2.31	767	744	693	634	566
JNSC18-58/1800	1.70	1 960	1 405	125	2.75	920	893	831	760	680
JNSC20-58/1800	1.89	1 960	1 555	125	3.05	1 022	992	924	845	755
JNSC24-58/1800	2.37	1 960	1 855	125	3.64	1 278	1 240	1 154	1 056	944
JNSC30-58/1800	2.84	1 960	2 305	125	4.52	1 534	1 488	1 386	1 267	1 133

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.540	-
	a_{1a}	1.526	W/(m²K)
	a_{2a}	0.007	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	234.5	°C
Effective thermal capacity	c_{eff} = C/Aa	16.37	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	600	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	max	θ_T / θ_L	50°	10°	20°	30°	40°	60°	70°
			$K_\theta(\theta_T)$	1.49	1.02	1.07	1.15	1.31	1.75	1.98
	0.09	0.71	$K_\theta(\theta_L)$	0.89	1.00	0.99	0.97	0.94	0.80	0.62
G_{DIF}/G_{TOT}: min&max - while measuring					*Optional values*					

Testing Laboratory	TÜV Energie und Umwelt GmbH
Website	www.eco-tuv.de
Test report id. number	21221527_EN_JNSC30; 21221527_JNSC15
Date of test report	22-01-2013 (all)
Perf. test method	EN 12975-2 6.3 (outdoor)

Comments of testing laboratory :

Note 1	**Fluid**	Water	**Flow rate**	0.030	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 3.5, 2012.01.13

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S2066 R
	Issued	22-01-2013

Annual collector output kWh

Collector name	Location and collector temperature (T_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			
JNSC15-58/1800	1 630	1 386	1 128	1 436	1 195	946	989	794	610	1 080	870	670			
JNSC18-58/1800	1 952	1 659	1 351	1 719	1 431	1 132	1 184	950	730	1 293	1 042	802			
JNSC20-58/1800	2 170	1 844	1 502	1 911	1 591	1 258	1 316	1 056	811	1 437	1 158	891			
JNSC24-58/1800	2 721	2 312	1 883	2 397	1 995	1 578	1 651	1 324	1 017	1 802	1 452	1 118			
JNSC30-58/1800	3 260	2 771	2 256	2 872	2 391	1 891	1 978	1 587	1 219	2 160	1 740	1 339			

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:
3.07, October 2011 (SP)