Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence number	011-7S408 R
	Date of issue	01.03.2012

Company holding the licence	Watt S.A.	**Country**		Poland
Brand (optional)		**Website**		http://www.watt.pl/en/
Street, number	ul. Watta 6	**E-mail**		info@watt.pl
Postal Code	41-208	**Tel.**	+48	32 287 66 80
City	Sosnowiec	**Fax**	+48	32 287 66 84

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 (A_G) [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]
Watt CPC 9	1.90	1 937	1 105	121	2.14	1 071	1 054	1 017	975	929
Watt CPC 9 L	1.90	1 937	1 105	121	2.14	1 071	1 054	1 017	975	929
Watt CPC 15	3.17	1 930	1 837	124	3.54	1 790	1 762	1 700	1 630	1 552
Watt CPC 15 L	3.17	1 930	1 837	124	3.54	1 790	1 762	1 700	1 630	1 552

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.564	-
	a_{1a}	0.86	W/(m²K)
	a_{2a}	0.003	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	tstg	304	°C
Effective thermal capacity	ceff = C/Aa	13.3	kJ/(m²K)
Max. operation pressure - see note 3	pmax	1000	kPa

Incidence angle modifiers $K_\theta(\theta)$			θ_T / θ_L	50°	10°	20°	30°	40°	60°
	$K_{\theta d}$	0.83	$K_\theta(\theta_T)$	1.08	*1.02*	*1.03*	*1.03*	*1.03*	*1.23*
			$K_\theta(\theta_L)$	0.94	*1.00*	*0.99*	*0.98*	*0.97*	*0.89*
G_{DIF}/G_{TOT}: min&max - while measuring					***Optional values***				

Testing Laboratory	Institut für Solarenergieforschung Hameln
Website	www.isfh.de
Test report id. number	23-12/KD, 24-12/KD, 25-12/KQ
Date of test report	28.02.2012
Perf. test method	EN 12975-2 6.1.5 (indoor)

Comments of testing laboratory :

The smaller collector type CPC 9 was tested indoor according to EN 12975-2 6.1.5; the larger type CPC 15 was tested outdoor according to EN 12975-2 6.1.4.

Note 1	**Fluid**	Water	**Flow rate**	0.050	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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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence number	011-7S408 R
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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			
Watt CPC 9	1 857	1 675	1 485	1 710	1 532	1 348	1 154	1 002	860	1 239	1 078	925			
Watt CPC 9 L	1 857	1 675	1 485	1 710	1 532	1 348	1 154	1 002	860	1 239	1 078	925			
Watt CPC 15	3 099	2 794	2 477	2 854	2 556	2 250	1 925	1 673	1 435	2 068	1 799	1 543			
Watt CPC 15 L	3 099	2 794	2 477	2 854	2 556	2 250	1 925	1 673	1 435	2 068	1 799	1 543			

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:
VERSION 3.6, 2012.01.20
Calculation program version:
3.07, October 2011 (SP)