Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence number	011-7S1524 F
	Date of issue	28.11.2012

Company holding the licence	Wagner & Co. Solartechnik GmbH	**Country**		Germany
Brand (optional)	-	**Website**		www.wagner-solar.com
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City	Cölbe	**Fax**	+49	(0)6421 8007-22

Collector Type (flat plate / evacuate tubular / un-glazed)	Flat plate 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]
EURO L20 AR-C	**2.36**	**2 151**	**1 215**	**110**	**2.61**	1 944	1 858	1 661	1 432	1 171

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.823	-
	a_{1a}	3.49	W/(m²K)
	a_{2a}	0.0169	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	194	°C
Effective thermal capacity	$c_{eff} = C/A_a$	**5.5**	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	**1000**	kPa

Incidence angle modifiers $K_\theta(\theta)$			θ_T / θ_L	50°			
	$K_{\theta d}$	**0.87**	$K_\theta(\theta)$	**0.94**	at G_{DIF}/G_{TOT}	**0.15**	
	b_0	**0.13**					

Testing Laboratory	**Institut für Solarenergieforschung Hameln**
Website	**www.isfh.de**
Test report id. number	**44-11/KD; 45-11/KQ**
Date of test report	**05.07.2011; 15.07.2011**
Perf. test method	**EN 12975-2 6.1.5 (indoor)**

Comments of testing laboratory :

Note 1	**Fluid**	Water	**Flow rate**	0.039	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	011-7S1524 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			
EURO L20 AR-C	3 075	2 238	1 481	2 537	1 770	1 106	1 738	1 158	707	1 885	1 250	750			

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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Calculation program version:
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