

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		011-7S481 F				
						Issued		2015-04-24				
Company holding the			Wagner Solar GmbH			Country		Germany				
Brand (optional)						Website		www.wagner-solar.com				
Street, street number			Sonnenallee 2			E-mail		info@wagner-solar.com				
Postal Code / City, province			D-35274 Kirchhain			Tel/Fax		+49 6421 8007-0 / -22				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed						
Thermal / photo voltaic hybrid collector? (PVT collector)						No						
Integration in the roof possible ? (manufacturers declaration)						No						
Collector name	Aperture area (Aa) m ²	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m ²	Power output per collector module						
						G = 1000 W/m ²						
						Tm-Ta						
						0 K	10 K	30 K	50 K	70 K		
						W	W	W	W	W		
EURO L20 AR	2.36	2 151	1 215	110	2.61	2 001	1 916	1 720	1 493	1 233		
Performance test method			Glazed liquid heating collector - steady state - indoor									
Performance parameters related to aperture area			η_0	a1	a2							
Units			-	W/(m ² K)	W/(m ² K ²)							
Test results - Flow rate and fluid see note 1			0.848	3.460	0.017							
Bi-directional incidence angle modifiers?			No									
			<i>Kθ values are obligatory for 50°.</i>									
Incidence angle modifiers Kθ(θ)			Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
			K θ (θ)	1.00	0.99	0.98	0.97	0.94	0.90	0.81	0.52	0.00
Incidence angle modifier not bi-directional - leave fields blank												
Stagnation temperature - Weather conditions see note 2						Tstg	209	°C				
Effective thermal capacity						ceff = C/Ag	5.3	kJ/(m ² K)				
Max. intende operation temperature - see note 3						Tmax,op	-	°C				
Max. operation pressure - see note 3						pmax,op	1000	kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m² aperture area												
Flow rate	kg/(s m ²)	-										
Pressure drop, ΔP	Pa	-										
Optional weather data		Location					Link					
Testing Laboratory			ISFH - Institut für Solareneerieforschung Hameln									
Website			www.isfh.de									
Test report id. number			107-09/KD; 89-11/KQ				Date of test report		2009-09-15; 2012-06-08			
During the test GDIF/GTOT was always between			0.1	and	0.3							
Comments of testing laboratory:												
The collector efficiency parameters are related to G(DIF)/G(TOT)=0.15.												
The incidence angle modifier was determined outdoor according to a quasi-dynamic test procedure.												
Note 1	Flow rate	0.035	kg/(s m ²)	Fluid	Water							
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C											
Note 3	Given by manufacturer											
						Institut für Solareneerieforschung GmbH Am Ohnborg 1 D-31860 Eintrahel Tel.: 051 51 / 999-100 Fax: 051 51 / 999-600 						
Datashet version: 4.06, 2014-01-15												
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany												
Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de												

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S481 F
	Issued	24.04.2015

Annual collector output kWh/module													
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	
EURO L20 AR	3 216	2 374	1 601	2 492	1 772	1 143	1 829	1 237	769	1 985	1 339	819	

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	G _{tot} kWh/m ²	T _a °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°

G _{tot}	Annual total irradiation on collector plane	kWh/m ²
T _a	Mean annual ambient air temperature	°C
T _m	Constant collector operating temperature (mean of in- and outlet temperatures)	°C

The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool ScenoCalc. The collector output is calculated hour by hour according to the efficiency parameters from the Keymark test using constant collector operating temperature (T_m). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

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	ScenoCalc version: Ver. 4.06 (Jan, 2014)