TÜVRheinland®
DIN CERTCO

Fraunhofer ISE

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S538 F
		Issued	2013-09-19

Company holding the	GREENoneTEC Solarindustrie GmbH	Country	Austria
Brand (optional)		Website	www.greenonetec.com
Street, street number	Industriepark St. Veit, Energieplatz 1	E-mail	info@greenonetec.com
Postal Code / City, province	9300 St. Viet/Glan	Tel/Fax	43 4241 281 36-0

Collector Type (flat plate glazed/un-glazed; evacuate tubular)	Flat plate collector - glazed
Thermal / photo voltaic hybid collector? (PVT collector)	No
Integration in the roof possible ? (manufacturers declaration)	No

Collector name	Aperture area (Aa)	Gross length	Gross width	Gross height	Gross area (AG)	Power output per collector module 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
FK 8201 N4H FG	1,92	1.730	1.170	73	2,02	1.451	1.376	1.209	1.019	806
FK 8231 N4H FG	2,24	2,000	1.170	73	2,34	1.688	1.601	1.407	1.186	938

Performance test method		Glazed liquid heating collector - steady state - outdoor								
Performance parameters related to aperture area		η0	a1	a2						
Units		-	W/(m²K)	W/(m²K²)						
Test results - Flow rate and fluid see note 1		0,755	3,745	0,015						
Bi-directional incidence angle modifiers?	No	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θ)	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θ)	1,00	1,00	1,00	0,99	0,96	0,91	0,78	0,53	0,00
Incidence angle modifier not bi-directional - leave fields blank										

Stagnation temperature - Weather conditions see note 2	Tstg	197	°C
Effective thermal capacity	ceff = C/Ag	4,95	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	100	°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 m²)	0,007	0,014	0,021	0,028	0,035	0,042	0,049	0,056	0,063	0,070
Pressure drop, ΔP	Pa	80	170	260	360	460	560	690	810	940	1070

Optional weather data	Location		Link	
Testing Laboratory		TestLab Solar Thermal Systems, Fraunhofer ISE		
Website		www.kollektortest.de		
Test report id. number		ktb-2012-09; ktb2013-09	Date of test report	04.12.2012; 19.09.2013
During the test GDIF/GTOT was always between		0,1	and	0,2

Comments of testing laboratory:

Note 1	Flow rate	0,020	kg/(s m²)	Fluid	Water
Note 2	Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C				
Note 3	Given by manufacturer				

TestLab
Solar Thermal
Systems
Heidenhofstraße 2
D-79110 Freiburg
Tel: +49 (0)761 4588 5354

Datasheet version: 4.04, 2013-04-22

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S538 F
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Annual collector output kWh/module

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
FK 8201 N4H FG	2.345	1.643	1.036	1.766	1.191	714	1.302	830	479	1.418	898	511
FK 8231 N4H FG	2.728	1.911	1.205	2.055	1.386	831	1.514	965	558	1.650	1.045	595

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

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 (Tm). A detailed description of the calculations is available at http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx.

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

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ScenoCalc version: Ver. 4.04 (Jun, 2013)