Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Licence number**	011-7S1969 F
	Date of issue	12.07.2012

Company holding the licence	Greenonetec Solarindustrie	**Country**		Austria
Brand (optional)		**Website**		www.greenonetec.com
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City	St. Veit/Glan	**Fax**	+43	(0)4212 28136-250

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]
FK 8200 N2A Cu-Al-P	1,922	1732	1170	84	2,026	1478	1402	1237	1056	860
FK 8230 N2A Cu-Al-P	2,220	2000	1170	84	2,340	1.707	1.619	1.429	1.220	993
FK 8250 N2A Cu-Al-P	2,392	2151	1170	84	2,517	1.839	1.744	1.539	1.315	1.070

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0,769	-
	a_{1a}	3,874	W/(m²K)
	a_{2a}	0,0103	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg}	234	°C
Effective thermal capacity	$c_{eff} = C/A_a$	5,63	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	1000	kPa

Incidence angle modifiers $K_\theta(\theta)$	G_{DIF}/G_{TOT} min	G_{DIF}/G_{TOT} max	θ_T / θ_L	50°	*10°*	*20°*	*30°*	*40°*	*60°*	*70°*
	-	-	$K_\theta(\theta_T)$	0,90	*1,00*	*0,99*	*0,98*	*0,95*	*0,80*	*0,65*
			$K_\theta(\theta_L)$	0,90	*1,00*	*0,99*	*0,98*	*0,95*	*0,80*	*0,65*

G_{DIF}/G_{TOT}: min&max - while measuring — ***Optional values***

Testing Laboratory	Fraunhofer ISE, TestLab Solar Thermal Systems
Website	www.kollektortest.de
Test report id. number	ktb-2006-38-en
Date of test report	12.07.2012
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :

Note 1	**Fluid**	Water	**Flow rate**	0,020	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 3.7, 2012.03.22

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence number	RRRRRRRRR
	Issued	25.06.2012

Annual collector output kWh

	Location and collector temperature (Tm)														
	Athens			Davos			Stockholm			Würzburg					
Collector name	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 8200 N2A Cu-Al-P	2.279	1.588	1.021	1.830	1.236	765	1.261	810	487	1.399	869	514			
FK 8230 N2A Cu-Al-P	2.632	1.834	1.179	2.114	1.428	884	1.457	936	563	1.616	1.004	594			
FK 8250 N2A Cu-Al-P	2.836	1.976	1.271	2.278	1.538	952	1.569	1.008	606	1.741	1.082	640			

Collector mounting: Fixed or tracking	No tracking; 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 3.7, 2012.03.22
Calculation program version:
3.07, October 2011 (SP)