TÜVRheinland®
DIN CERTCO

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S2450 F
		Issued	2014-12-04

Company holding the	Enertech GmbH		Country	Germany	
Brand (optional)	-		Website	www.giersch.de	
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Postal Code / City, province	58675	Hemer	Tel/Fax	+49	(0)2372 -9650/ -61240

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
FKM	2.30	2 168	1 158	75	2.51	1 841	1 743	1 530	1 293	1 031

Performance test method	Glazed liquid heating collector - steady state - indoor								
Performance parameters related to aperture	η0	a1	a2						
Units	-	W/(m²K)	W/(m²K²)						
Test results - Flow rate and fluid see note 1	0.802	4.11	0.013						

Bi-directional incidence angle	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	0.99	0.98	0.96	0.92	0.86	0.73	0.33	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	5.9	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	-	°C
Max. operation pressure - see note 3	pmax,op	1000	kPa

Optional weather data	Location		Link	
Testing Laboratory	Institut für Solarenergieforschung Hameln			
Website	www.isfh.de			
Test report id. number	77-14/KD, 78-14/KQ	Date of test report	04.12.2014, 04.12.2014	
During the test GDIF/GTOT was always between	-	and	-	

Comments of testing laboratory:

1) The collector efficiency parameter and incidence angle modifiers are related to G(DIF)/G(TOT)=0.15.
2) The incidence angle modifier was determined outdoor according to a quasi-dynamic test procedure.
3) Flow rate: According to the manufacturer, normally multiple collectors are installed in a series connection.

Note 1	**Flow rate**	0.033 kg/(s m²)	**Fluid**	Water	
Note 2	**Irradiance, G = 1000 W/m²; Ambient temperature , Ta=30 °C**				
Note 3	**Given by manufacturer**				

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Datasheet version: 4.06, 2014-01-15

Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2450 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
FKM	2 873	1 984	1 245	2 149	1 440	867	1 585	1 003	583	1 724	1 080	617

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.

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ScenoCalc version: Ver. 4.06 (Jan, 2014)