TÜVRheinland®
DIN CERTCO

SPF Solartechnik Prüfung Forschung

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	**Certificate No.**	**011-7S684 R**
	Date of issue	06.08.2012

Company	R/Z Solartechnik	**Country**	Germany
Brand (optional)	--	**Website**	www.rz-solartechnik.de
Street, number	An der Bahn 5b	**E-mail**	rzsolartechnik-zangl@gmx.de
Postal Code	DE-89434	**Tel.**	+49 9074 9220371
City	Blindheim	**Fax**	+49 9074 9220370

Collector Type (flat plate / evacuate tubular / un-glazed)	Evacuated tubular collector
Integration in the roof possible ?	No

Collector name	Aperture area (A_a) [m²]	Gross length [mm]	Gross width [mm]	Gross height [mm]	Gross area (A_G) [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]
DF120-6	1.684	2'825	866	179	2.446	1'354	1'331	1'282	1'230	1'175

Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1	η_{0a}	0.804	-
	a_{1a}	1.36	W/(m²K)
	a_{2a}	0.0022	W/(m²K²)
Stagnation temperature - Weather conditions see note 2	t_{stg} *)	139	°C
Effective thermal capacity	$c_{eff} = C/A_a$	6.2	kJ/(m²K)
Max. operation pressure - see note 3	p_{max}	600	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°*
	0.13	0.16	$K_\theta(\theta_T)$	1.05	*1.01*	*1.03*	*1.05*	*1.07*	*0.99*	*0.77*
			$K_\theta(\theta_L)$	0.93	*1.00*	*1.00*	*0.99*	*0.97*	*0.85*	*0.71*
G_{DIF}/G_{TOT}: min&max - while measuring					***Optional values***					

Testing Laboratory	SPF, CH-8640 Rapperswil
Website	www.solarenergy.ch
Test report id. number	C953LPEN-A1, C953QPEN-A1
Date of test report	27.07.2012 / 27.07.2012
Perf. test method	EN 12975-2 6.1.4 (outdoor)

Comments of testing laboratory :

*) Temperatur des Sammelrohres / Temperature of the manifold pipe / Température du tube collecteur

Note 1	**Fluid**	Water-Glycole	**Flow rate**	0.017	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 3.5, 2012.01.13

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Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Certificate No.	011-7S684 R
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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
DF120-6	2'319	2'079	1'845	2'125	1'899	1'680	1'434	1'241	1'070	1'541	1'335	1'150

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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Datasheet version:
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Calculation program version:
3.07, October 2011 (SP)