Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2508 F
	Issued	2015-06-16

Company holding the	Westfalen AG	Country	Germany	
Brand (optional)		Website	www.solacept.de	
Street, street number	Harkortstraße 7	E-mail	info@westfalen-ag.de	
Postal Code / City, province	D- 48163 Münster	Tel/Fax	49	251/695-0

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)	Yes

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
Solacept FK 23 AR	2.13	2 037	1 137	80	**2.32**	1 772	1 689	1 503	1 292	1 055

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		0.832	3.760	0.015						

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	0.97	0.94	0.89			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	5.56	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	110	°C
Max. operation pressure - see note 3	pmax,op	100	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)	0.013	0.031	0.050	0.072	0.092					
Pressure drop, ΔP	Pa	740	1830	3160	4640	6410					

Optional weather data	Location		Link	
Testing Laboratory	ISFH			
Website	www.isfh.de			
Test report id. number	70-14/KT, 71-14/KQT	Date of test report	2015.06.15	
During the test GDIF/GTOT was always between	0.1	and	0.2	

Comments of testing laboratory:

Note 1	Flow rate	0.083	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	011-7S2508 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
Solacept FK 23 AR	2 778	1 993	1 306	2 127	1 480	935	1 556	1 028	626	1 691	1 107	665

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)