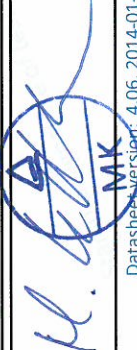


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate		Licence Number	011-7S2353 F 22 April 2014	
Company holding the Brand (optional)		Jiangsu Sunpower Solar Technology Co., Ltd. Sunpower	Country	P.R. China
Street, street number		2969# Longcheng Rd, Xinbei District	Website	www.sunpower-solar.com
Postal Code / City, province		213133 Changzhou, Jiangsu Province	E-mail	keyway@sunpower-solar.com
Collector Type (flat plate glazed/un-glazed; evacuate tubular)			Tel/Fax	+86 (0)519 8508 3226 / 3220
Thermal / photo voltaic hybrid collector? (PVT collector) No				
Integration in the roof possible? (manufacturers declaration) No				
Aperture area (Aa) m <sup>2</sup>		1.89	Gross length mm	2 000
Gross width mm		1 000	Gross height mm	80
Gross area (Ag) m <sup>2</sup>		2.00	Power output per collector module G = 1000 W/m <sup>2</sup>	
Collector name		SPFP-ALANOD/0.6-AL/Cu-80	Tm-Ta	
			0 K	10 K
			W	W
			1 355	1 287
			1 151	1 015
			879	
Performance test method Glazed liquid heating collector - steady state - outdoor				
Performance parameters related to aperture area		a1	a2	
Units		W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	
Test results - Flow rate and fluid see note 1		0.717	0.000	
Bi-directional incidence angle modifiers? Yes				
Incidence angle modifiers K0(θ)		Angle	10°	20°
		K0(θ)	1.00	0.99
			0.96	0.93
			0.87	0.77
			0.56	0.00
			0.00	
Stagnation temperature - Weather conditions see note 2				
Effective thermal capacity		Tstg	178 °C	
Max. intende operation temperature - see note 3		ceff = C/Ag	10	kl/(m <sup>2</sup> k)
Max. operation pressure - see note 3		Tmax,op	99 °C	
		pmax,op	600 kPa	
Pressure drop table - for a collector family, the values shall be for the module with highest ΔP per m <sup>2</sup> aperture area				
Flow rate	kg/(s m <sup>2</sup> )	-	-	-
Pressure drop, ΔP	Pa	-	-	-
Optional weather data		Location	Link	
Testing Laboratory		TUV Rheinland (Shanghai) Co., Ltd.		
Website		www.tuv.com		
Test report id. number		154040941_EN_SPFC_Report_Gao	Date of test report	22 April 2014
During the test GDIF/GTOT was always between 9.50% and 52.70%				
Comments of testing laboratory:				
Example comment:				
Note 1	Flow rate	0.020 kg/(s m <sup>2</sup> )	Fluid	Water
Note 2	Irradiance, G = 1000 W/m <sup>2</sup> ; Ambient temperature, Ta=30 °C			
Note 3	Given by manufacturer			
				
				MK
				Datashet version: 4.06, 2014-01-15
DIN CERTCO • Alboinstraße 56 • 12103 Berlin				
Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de				

<b>Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate</b>	<b>Licence Number</b> Issued	<b>022-7S2353 F</b> 22 April 2014
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Annual collector output kWh/module												
Location and collector temperature (T <sub>m</sub> )												
Collector name	Athens		Davos		Stockholm		Würzburg					
	25°C	50°C	25°C	50°C	25°C	50°C	25°C	50°C				
SPPF-ALANOD/0.6-AL/Cu-80	1 649	1 099	719	1 196	810	531	917	594	387	972	611	387

**Collector mounting: Fixed or tracking**      Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations			
Location	Latitude °	G <sub>tot</sub> kWh/m <sup>2</sup>	T <sub>a</sub> °C
Athens	38	1 765	18.5
Davos	47	1 714	3.2
Stockholm	59	1 166	7.5
Würzburg	50	1 244	9.0

G <sub>tot</sub> Annual total irradiation on collector plane	kWh/m <sup>2</sup>
T <sub>a</sub> Mean annual ambient air temperature	°C
T <sub>m</sub> 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 (T<sub>m</sub>). A detailed description of the calculations is available at <http://www.sp.se/en/index/services/solar/ScenoCalc/Sidor/default.aspx>.

<p><b>DIN CERTCO • Alboinstraße 56 • 12103 Berlin</b></p> <p>Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: <a href="mailto:info@dincertco.de">info@dincertco.de</a> • <a href="http://www.dincertco.de">www.dincertco.de</a></p>	<p>Datasheet version: 4.06, 2014-01-15</p> <p>ScenoCalc version: Ver. 4.06 (Jan, 2014)</p>
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