


Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Licence Number		<b>011-7S 2216 F</b>				
						Issued		2015-11-09				
Company holding the			Bosch Thermotechnik GmbH			Country		Germany				
Brand (optional)			Junkers			Website		www.bosch-thermotechnik.de				
Street, street number			Junkersstrasse 20-24			E-mail		solarthermie@de.bosch.com				
Postal Code / City, province			73249 Wernau			Tel/Fax		+49 (0)2557 9399-0 / - - -				
Collector Type (flat plate glazed/un-glazed; evacuate tubular)						Flat plate collector - glazed						
Thermal / photo voltaic hybrid collector? (PVT collector)						No						
Integration in the roof possible ? (manufacturers declaration)						Yes						
Collector name	Aperture area (Aa) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Gross area (AG) m <sup>2</sup>	Power output per collector module						
						G = 1000 W/m <sup>2</sup>						
						Tm-Ta						
						0 K	10 K	30 K	50 K	70 K		
						W	W	W	W	W		
Junkers FKC-2w	2.25	1 175	2 017	87	2.37	1 735	1 645	1 450	1 233	996		
Performance test method		Glazed liquid heating collector - steady state - indoor										
Performance parameters related to aperture		η0	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		0.770	3.871	0.012								
Bi-directional incidence angle		No	K $\theta$ values are obligatory for 50°.									
Incidence angle modifiers K $\theta$ ( $\theta$ )		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
		K $\theta$ ( $\theta$ )	1.00	0.99	0.98	0.96	0.92	0.86	0.73	0.37	0.00	
Incidence angle modifier not bi-directional - leave fields blank												
Stagnation temperature - Weather conditions see note 2						Tstg	195	°C				
Effective thermal capacity						ceff = C/Ag	4.79	kJ/(m <sup>2</sup> K)				
Max. intende operation temperature - see note 3						Tmax,op	- - -	°C				
Max. operation pressure - see note 3						pmax,op	600	kPa				
Pressure drop table - for a collector family, the values shall be for the module with highest $\Delta$ P per m <sup>2</sup> aperture area												
Flow rate	kg/(s m <sup>2</sup> )											
Pressure drop, $\Delta$ P	Pa											
Optional weather data	Location				Link							
Testing Laboratory	TÜV Rheinland Energie und Umwelt GmbH											
Website	www.tuv.com/st											
Test report id. number	21218052_EN_Bosch				Date of test report	2011.11.05						
During the test GDIF/GTOT was always between		0.088	and	0.273								
Comments of testing laboratory:												
Note 1	Flow rate	0.023 kg/(s m <sup>2</sup> )	Fluid	Water							 Genau. Richtig. TÜV Rheinland Energie und Umwelt GmbH Am Grauen Stein 51105 Köln	
Note 2	Irradiance, G = 1000 W/m <sup>2</sup> ; Ambient temperature , Ta=30 °C											
Note 3	Given by manufacturer											
Datasheet version: 4.05, 2013-11-07												



Annual collector output based on EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S 2216 F
	Issued	09.11.2015

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		
Junkers FKC-2w	2 715	1 894	1 211	2 040	1 385	854	1 503	964	572	1 635	1 037	606		

Collector mounting: Fixed or tracking	Fixed; slope = latitude - 15° (rounded to nearest 5°)
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Overview of locations				
Location	Latitude °	Gtot kWh/m <sup>2</sup>	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/m <sup>2</sup>
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>.