TÜVRheinland®
DIN CERTCO
Genau. Richtig.

Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate	Licence Number	011-7S2466 R
	Issued	2015-11-19

Company holding the licence	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)	Evacuated tubular collector
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
Junkers VK120-2, 2 Module	0.92	1 947	1 248	87	**2.44**	724	695	629	552	464

Performance test method	Glazed liquid heating collector - steady state - indoor			
Performance parameters related to aperture area	η0	a1	a2	
Units	-	W/(m²K)	W/(m²K²)	
Test results - Flow rate and fluid see note 1	0.787	2.990	0.015	

Bi-directional incidence angle modifiers?	Yes	*Kϑ values are obligatory for 50°.*								
Incidence angle modifiers Kθ(θT) transversal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θT)	1.00	1.03	1.15	1.31	1.56	2.10	2.10	1.05	0.00
Incidence angle modifiers Kθ(θL) longitudinal direction	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
	Kθ(θL)	1.00	0.99	0.98	0.97	0.94	0.90	0.81	0.50	0.00

Stagnation temperature - Weather conditions see note 2	Tstg	210	°C
Effective thermal capacity	ceff = C/Ag	7.34	kJ/(m²K)
Max. intende operation temperature - see note 3	Tmax,op	-	°C
Max. operation pressure - see note 3	pmax,op	1000	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)										
Pressure drop, ΔP	Pa										

Optional weather data	Location		Link	
Testing Laboratory	TÜV Rheinland Energie und Umwelt GmbH			
Website	www.tuc.com/st			
Test report id. number	21229230.002		Date of test report	2015.11.19

During the test GDIF/GTOT was always between	0.11	and	0.28

Comments of testing laboratory:

Because of product size 2 samples were combined for testing.
Dimension of single element (l/w/h) [mm]: 1947 / 624 / 87
Areas of single element (Aa/Ag) [m²]: 0.46 / 1.22

Note 1	**Flow rate**	0.022	kg/(s m²)	**Fluid**	Water
Note 2	**Irradiance, G = 1000 W/m²; 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	011-7S2466 R
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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
Junkers VK120-2, 2 Module	1 484	1 183	880	1 166	890	630	876	650	450	952	708	486

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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Datasheet version: 4.05, 2013-11-07
ScenoCalc version: Ver. 4.05 (Nov, 2013)