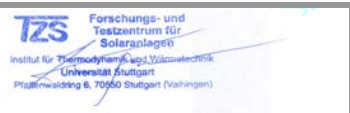




Summary of EN 12975 Test Results, annex to Solar KEYMARK Certificate						Certificate No. 011-7S2321 F															
						Date of issue		20.03.2014													
Company			B&S Wärmetechnik und Wohnen			Country			Deutschland												
Brand (optional)			Reinhard Bege			Website			www.waerme-wohnen.info												
Street, number			Theresienstraße 1			E-mail			mail@waerme-wohnen.info												
Postal Code			85399			Tel.		+49		811 9986258-0											
City			Hallbergmoos			Fax		+49		81 194 206											
Collector Type (flat plate / evacuate tubular / un-glazed)						Flat plate collector															
Integration in the roof possible ?						No															
		Aperture area (Aa)		Gross length		Gross width		Gross height		Gross area (Ag)		Power output per collector unit G = 1000 W/m² Tm-Ta :									
Collector name		[m²]		[mm]		[mm]		[mm]		[m²]		0 K	10 K	30 K	50 K	70 K					
BS Solid Green SSK 20*		1.92		1 988		1 041		90		2.07		1 392	1 323	1 174	1 007	823					
Collector efficiency parameters related to aperture area (Aa) Type of fluid and flow rate see note 1												η_{0a}		0.725		-					
												a_{1a}		3.461		W/(m²K)					
												a_{2a}		0.011		W/(m²K²)					
Stagnation temperature - Weather conditions see note 2												t_{stg}		203		°C					
Effective thermal capacity												$c_{eff} = C/Aa$		16.39		kJ/(m²K)					
Max. operation pressure - see note 3												p_{max}		1000		kPa					
Incidence angle modifiers $K_{\theta}(\theta)$		G_{DIF}/G_{TOT}		θ_T / θ_L		50°		10°		20°		30°		40°		60°		70°			
		min		max		$K_{\theta}(\theta_T)$		0.93		1.00		0.99		0.98		0.96		0.87		0.76	
		-		-		$K_{\theta}(\theta_L)$		0.93		1.00		0.99		0.98		0.96		0.87		0.76	
G_{DIF}/G_{TOT} : min&max - while measuring										Optional values											
Testing Laboratory						TZS, ITW University of Stuttgart															
Website						www.tzs.uni-stuttgart.de															
Test report id. number						08COL731OEM06															
Date of test report						20.03.2014															
Perf. test method						EN 12975-2 6.1.4 (outdoor)															
Comments of testing laboratory : * dimensions according to manufacturer																					
Note 1		Fluid		Water		Flow rate		0.020 kg/s per m²													
Note 2		Irradiance , $G_s=1000 \text{ W/m}^2$		Ambient temperature , $T_a=30 \text{ °C}$																	
Note 3		Given by manufacturer																			





Annual collector output based on EN 12975 Test Results,
annex to Solar KEYMARK Certificate

Certificate No.

011-7S2321 F

Issued

20.03.2014

Annual collector output kWh

Location and collector temperature (T_m)

Collector name	Location and collector temperature (T _m)														
	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			
BS Solid Green SSK 20*	2 195	1 559	1 019	1 783	1 223	763	1 225	801	486	1 331	863	515			

Collector mounting: Fixed or tracking

Fixed; slope = latitude - 15° (rounded to nearest 5°)

Overview of locations

Location	Latitude °	Gtot kWh/m ²	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 ²
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 (T_m). Detailed description with all equations used is available from the Solar Keymark web site (direct link: <http://www.estif.org/solarkeymark/annexb1.php>)

<p>DIN CERTCO • Alboinstraße 56 • 12103 Berlin Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de</p>	Datasheet version:
	VERSION 3.6, 2012.01.13
	Calculation program version:
	3.07, October 2011 (SP)