

Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2898 F							
					Date issued		2018-11-14							
					Issued by		DIN CERTCO							
Licence holder	KBB Kollektorbau GmbH				Country	Deutschland								
Brand (optional)	-				Web	http://www.kbb-solar.com								
Street, Number	Bruno-Bürgel-Weg 142 - 144				E-mail	info@kbb-solar.com								
Postcode, City	D 12439 Berlin				Tel	+49 (0)30 - 678 17 89 - 0								
Collector Type					Flat plate collector, glazed									
Collector name	Gross area (A_G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ; u = 3 m/s ϑ _m - ϑ _a									
					0 K W	10 K W	30 K W	50 K W	70 K W	107 K W				
K716-TS-D15	1.62	1 564	1 035	77	1 113	1 050	913	761	595	251				
K720-TS-D15	1.95	1 884	1 035	77	1 340	1 264	1 098	916	717	302				
Power output per m² gross area					687	648	563	470	367	155				
Performance parameters test method					Quasi dynamic									
Performance parameters (related to A_G)					η _{0,b}	c1	c2	c3	c4	c6	Kd			
Units					-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results					0.695	3.796	0.011	0.000	0.000	0.000	0.924			
Incidence angle modifier test method					Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers					No									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{θT, coll}	0.99	0.98	0.97	0.96	0.93	0.85	0.60	0.30	0.00
Longitudinal					K _{θL, coll}	0.99	0.98	0.97	0.96	0.93	0.85	0.60	0.30	0.00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A_G)					dm/dt	0.020	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	107	K							
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ _{stg}	200	°C							
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	28.82	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	150	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory					TZS, ITW University Stuttgart									
Test report(s)					www.itw.uni-stuttgart.de									
					Dated		14.11.2018							
							14.11.2018							
							14.11.2018							
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
Documented performance parameters are taken from 18COL1430 (K716-TS-D15)														
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2898 F
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 9806:2013 test results

Standard Locations Collector name	ϑ_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
K716-TS-D15		1 741	1 172	710	1 282	835	481	948	583	326	1 038	630	346
K720-TS-D15		2 096	1 411	855	1 543	1 005	580	1 141	701	392	1 249	759	417
Annual output per m ² gross area		1 075	724	438	791	515	297	585	360	201	641	389	214
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 kWh/m ²			1166 kWh/m ²			1244 kWh/m ²		
Mean annual ambient air temperature		18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking mode		South, 25°			South, 30°			South, 45°			South, 35°		

The collector is operated at constant temperature ϑ_m (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Scenocalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	3000	Pa
Hail resistance using steel ball (maximum drop height)	1.2	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
K716-TS-D15	1.62	Collector efficiency (η_{col})	52 %
K720-TS-D15	1.95	Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m ² , expressed in % and rounded to the nearest integer. Deviating from the regulation η_{col} is based on reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.687 --
		First-order coefficient (a_1)	3.80 W/(m ² K)
		Second-order coefficient (a_2)	0.011 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
		Remark: The data given in this section are related to collector reference area (A_{sol}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.	