

Annex to Solar Keymark Certificate - Summary of EN 12975 Test Results						Licence Number		011-7S1489 F																	
						Date issued		2016-05-12																	
						Issued by		ISFH CalTeC																	
Licence holder		KBB Kollektorbau GmbH				Country		Germany																	
Brand (optional)						Web		http://www.kbb-solar.com																	
Street, Number		Bruno-Bürgel-Weg 142-144				E-mail		info@kbb-solar.de																	
Postcode, City		D-12439 Berlin				Tel		+49 678 1789-0																	
Collector Type						Flat plate collector, glazed																			
					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a																				
					0 K		10 K		30 K		50 K		70 K		85 K										
Collector name					m ²		mm		mm		mm		W		W										
Saphirline					2.35		2 225		1 056		73		1 734		1 651										
Saphirline Q					2.35		1 056		2 225		73		1 734		1 651										
Power output per m² gross area						738		703		624		535		436		354									
Performance parameters test method						Steady state - indoor																			
Performance parameters (related to AG)						η _{0,hem}		a ₁		a ₂															
Units						-		W/(m ² K)		W/(m ² K ²)															
Test results						0.738		3.41		0.013															
Incidence angle modifier test method						Steady state - indoor																			
Bi-directional incidence angle modifiers						No																			
Incidence angle modifier						Angle		10°		20°		30°		40°		50°		60°		70°		80°		90°	
Transversal						K _{θT, coll}		1.00		0.99		0.98		0.95		0.91		0.84		0.69				0.00	
Longitudinal						K _{θL, coll}		1.00		0.99		0.98		0.95		0.91		0.84		0.69				0.00	
Heat transfer medium for testing						Water																			
Flow rate for testing (per gross area, A_G)						dm/dt		0.052																	
Maximum temperature difference for thermal performance calculations						(ϑ _m -ϑ _a) _{max}		85																	
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)						ϑ _{stg}		200																	
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m ²		5.5																	
Maximum operating temperature						ϑ _{max, op}		-																	
Maximum operating pressure						p _{max, op}		1000																	
Testing laboratory						ISFH CalTeC						http://www.isfh.de													
Test report(s)						26-16/B						Dated		10.05.2016											
Comments of testing laboratory												Datasheet version: 5.01, 2016-03-01													
												Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500													
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1489 F
	Issued	2016-05-12

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN12975 test results

Collector name	Standard Locations 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
Saphirline		2 699	1 920	1 248	2 054	1 417	887	1 509	987	596	1 638	1 061	631
Saphirline Q		2 699	1 920	1 248	2 054	1 417	887	1 509	987	596	1 638	1 061	631
Annual output per m ² gross area		1 149	817	531	874	603	377	642	420	253	697	452	268
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	Yes
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:	
Climate class (A, B or C)	--
Maximum tested positive load	- Pa
Maximum tested negative load	- Pa
Hail resistance using steel ball (maximum drop height)	- m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Saphirline	2.35	Collector efficiency (η_{col})	58 %
Saphirline Q	2.35	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)	0.738 --
		First-order coefficient (a_1)	3.41 W/(m ² K)
		Second-order coefficient (a_2)	0.013 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.91 --
		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.	

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