


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2684 F							
					Date issued		2016-08-24							
					Issued by		DIN CERTCO							
Licence holder	Enertech GmbH				Country	Deutschland								
Brand (optional)					Web	http://www.giersch.de								
Street, Number	Postfach 3063				E-mail	info@giersch.de								
Postcode, City	58662 Hemer				Tel	+49	2372 965-0 / 2372 61240							
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	103 K W				
FKS	2.53	2 102	1 202	80	1 874	1 769	1 547	1 309	1 054	599				
Power output per m² gross area					741	699	612	517	417	237				
Performance parameters test method					Quasi dynamic									
Performance parameters (related to AG)					η _{0,b}	c ₁	c ₂	c ₃	c ₄	c ₆	K _d			
Units					-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	s/m	-			
Test results					0.741	4.072	0.008	0.000	0.000	0.000	0.999			
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}	1.00	0.99	0.98	0.95	0.91	0.85	0.70	0.26	0.00
Longitudinal					K _{θL, coll}	1.00	0.99	0.98	0.95	0.91	0.85	0.70	0.26	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}	103	K							
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)					ϑ _{stg}	188	°C							
Effective thermal capacity, incl. fluid (per gross area, A_G)					C/m ²	10.387	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	n.a.	°C							
Maximum operating pressure					p _{max, op}	1000	kPa							
Testing laboratory					TZS, ITW University Stuttgart									
Test report(s)					10COL868/10EM06									
					Dated		02.08.2016							
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
No comment					 <p>TZS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Plattenwaldring 8, 70560 Stuttgart (Vaihingen)</p>									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2684 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
FKS		3 024	2 079	1 320	2 237	1 496	913	1 656	1 044	613	1 817	1 135	656
Annual output per m ² gross area		1 195	822	522	884	591	361	655	413	242	718	449	259
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)	B	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	1000	Pa
Hail resistance using steel ball (maximum drop height)	n.a.	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
FKS	2.53	Collector efficiency (η_{col})	57 %
		<i>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/m², 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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.741 --
		First-order coefficient (a_1)	4.07 W/(m ² K)
		Second-order coefficient (a_2)	0.008 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.91 --
		<i>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.</i>	