


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S1600 F				
						Date issued		2018-11-19				
						Issued by		DIN CERTCO				
Licence holder			Citrin Solar GmbH			Country		Deutschland				
Brand (optional)						Web		www.citrin.de				
Street, Number			Böhmerwaldstrasse 32			E-mail		info@citrin.de				
Postcode, City			85368 Moosburg			Tel		+49 (0) 8761 3340-0 / -40				
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 ϑ _m - ϑ _a							
					0 K W	10 K W	30 K W	50 K W	70 K W	103 K W		
CS 150	2.07	1 985	1 045	93	1 548	1 479	1 327	1 157	969	618		
CS 250	2.07	1 044	1 984	93	1 548	1 479	1 327	1 157	969	618		
Power output per m ² gross area					748	715	641	559	468	299		
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		0.748	3.231	0.011								
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	1.00	0.99	0.97	0.94	0.86	0.72	0.47	0.00	
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.97	0.94	0.86	0.72	0.47	0.00	
Heat transfer medium for testing		Water										
Flow rate for testing (per gross area, A _G)		dm/dt	0.086		kg/(sm ²)							
Maximum temperature difference for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	103		K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	205.7		°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	7.471		kJ/(Km ²)							
Maximum operating temperature		ϑ _{max, op}	130		°C							
Maximum operating pressure		p _{max, op}	1000		kPa							
Testing laboratory		TZS, ITW University Stuttgart				www.itw.uni-stuttgart.de						
Test report(s)		P-201012002 P-201109003-K1 from Austria Solar Innovation Center (ASIC)				Dated		08.07.2011 16.04.2012				
Comments of testing laboratory		This data sheet replaces the data sheet issued on 26.09.2016 The collector CS 250 was added.				Datashet version: 5.01, 2016-03-01						
						 TZS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)						
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1600 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
CS 150		2 469	1 813	1 238	1 908	1 365	905	1 397	946	603	1 515	1 022	640
CS 250		2 469	1 813	1 238	1 908	1 365	905	1 397	946	603	1 515	1 022	640
Annual output per m ² gross area		1 193	876	598	922	659	437	675	457	291	732	494	309
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)	C	--
Maximum tested positive load	1000	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}	
CS 150	2.07	Collector efficiency (η_{col})	60 %
CS 250	2.07	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)	0.748 --
		First-order coefficient (a_1)	3.23 W/(m ² K)
		Second-order coefficient (a_2)	0.011 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.94 --
		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.	