


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2687 F							
						Date issued		2017-04-19							
						Issued by		DIN CERTCO							
Licence holder		HDG Bavaria GmbH				Country		Deutschland							
Brand (optional)						Web		www.hdg-bavaria.com							
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Postcode, City		84323 Massing				Tel		+49 (0) 8742 803 / (0) 8742 888803							
Collector Type						Flat plate collector, glazed									
Collector name						Power output per collector Gb = 850 W/m ² ; Gd = 150 W/m ² $\vartheta_m - \vartheta_a$									
						Gross area (A_G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	100 K
						m ²	mm	mm	mm	W	W	W	W	W	W
HDG SK 350						2.53	2 186	1 158	80	1 882	1 798	1 609	1 394	1 152	741
Power output per m² gross area						744	711	636	551	455	293				
Performance parameters test method						Steady state - indoor									
Performance parameters (related to AG)						$\eta_{0,hem}$	a1	a2							
Units						-	W/(m ² K)	W/(m ² K ²)							
Test results						0.744	3.212	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						$K_{\theta T, coll}$	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.49	0.00
Longitudinal						$K_{\theta L, coll}$	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.49	0.00
Heat transfer medium for testing						Water									
Flow rate for testing (per gross area, A_G)						dm/dt	0.044				kg/(sm²)				
Maximum temperature difference for thermal performance calculations						$(\vartheta_m - \vartheta_a)_{max}$	100				K				
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30^\circ\text{C}$)						ϑ_{stg}	214				°C				
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m²	10.213				kJ/(Km²)				
Maximum operating temperature						$\vartheta_{max, op}$	130				°C				
Maximum operating pressure						$p_{max, op}$	1000				kPa				
Testing laboratory						TZS, ITW University Stuttgart									
Test report(s)						16COLP-20150101OEM01									
						Dated		13.09.2016							
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01									
This data sheet replaces the data sheet issued on 04.10.2016 Performenced parameters and Effective thermal capacity were corrected: $\eta_{0,hem}$ from 0.733 to 0.744 a1 from 3.162 to 3.212 C/m ² from 10.054 to 10.213 kJ/(Km ²) Data sheet and test report based on results of test reports P-20150101 (06.02.2015, ASIC), C1355QPEN (26.10.2011, SPF) and C1355LPEN (26.10.2011, SPF)						 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70560 Stuttgart (Vaihingen)									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2687 F
	Issued	2017-04-19

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
HDG SK 350		3 024	2 212	1 489	2 333	1 654	1 073	1 710	1 149	717	1 856	1 242	763
Annual output per m ² gross area		1 195	874	588	922	654	424	676	454	283	734	491	301
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	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}	
HDG SK 350	2.53	Collector efficiency (η_{col})	59 %
		<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)	0.744 --
		First-order coefficient (a_1)	3.21 W/(m ² K)
		Second-order coefficient (a_2)	0.013 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.95 --
		<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>	