


Annex to Solar Keymark Certificate					Licence Number		011-7S2819							
					Date issued		2020-11-10							
					Issued by		DIN CERTCO							
Licence holder			GREENoneTEC Solarindustrie GmbH			Country		Austria						
Brand (optional)						Web		www.greenonetec.com						
Street, Number			Industriepark St. Veit, Energieplatz 1			E-mail		info@greenonetec.com						
Postcode, City			9300 St. Veit a.d. Glan			Tel		+43 4212 28136-0 / 4212 28136-250						
Collector Type						Flat plate collector								
Collector name					Power output per collector									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	130 K				
					W	W	W	W	W	W				
GK HT 13,6					13.61	2 280	5 970	185	10 518	10 185	9 370	8 358	7 149	2 339
Power output per m ² gross area					773	748	688	614	525	172				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to A _G)					η _{0, b}	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units					-	W/(m ² K)	W/(m ² K ²)	J/(m ³ K)	-	J/(m ² K)	s/m	W/(m ² K ⁴)	W/(m ² K ⁴)	-
Test results					0.782	2.27	0.018	0.000	0.00	5 980	0.000	0.00	0.0	0.92
Incidence angle modifier test method					Quasi dynamic - outdoor									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{θT, coll}	1.00	1.00	1.00	0.99	0.96	0.88	0.71	0.40	0.00
Longitudinal					K _{θL, coll}	1.00	1.00	1.00	0.99	0.98	0.94	0.84	0.59	0.00
Heat transfer medium for testing					Water-Glycole									
Flow rate for testing (per gross area, A _G)					dm/dt		0.032		kg/(sm ²)					
Maximum temperature difference during thermal performance test					(ϑ _m -ϑ _a) _{max}		100		K					
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}		220		°C					
Maximum operating temperature					ϑ _{max, op}		100		°C					
Maximum operating pressure					p _{max, op}		1000		kPa					
Testing laboratory					Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)									
					http://www.igte.uni-stuttgart.de									
Test report(s)					20COLC1735ISO 20COLC1735ISOQ C1735L, C1781L			Dated		10.11.2020 10.11.2010 06.09.2018				
Comments of testing laboratory					Datashet version: 6.1, 2019-09-26									
The collector can be installed with a mechanical reinforcement kit for higher wind- and snow load resistance up to 2400 Pa (See test reports C1735L and C1781L)					 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2819
	Issued	2020-11-10

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	ϑ_m	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
GK HT 13,6		17 188	13 620	9 875	13 936	10 562	7 330	10 089	7 354	4 931	10 929	7 982	5 283
Annual output per m ² gross area		1 263	1 001	726	1 024	776	539	741	540	362	803	587	388
Annual efficiency, η_a		72%	57%	41%	63%	48%	33%	64%	46%	31%	65%	47%	31%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1630 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. 6.1 (September 2019). A detailed description of the calculations is available at <http://www.estif.org/solarkeymarknew/>

Additional Information			
Collector heat transfer medium	Water-Glycole		
The collector is deemed to be suitable for roof integration	No		
The collector was tested successfully under the following conditions:			
Climate class (A+, A, B or C)	A		--
G (W/m ²) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
Maximum tested positive load	1000 / 2400		Pa
Maximum tested negative load	1000 / 2400		Pa
Hail resistance using ice balls (diameter)	35		mm

Additional collector attribute(s)			
<input type="checkbox"/> Using external power source(s) for normal operation	<input type="checkbox"/> Active or passive measure(s) for self-protection		
<input type="checkbox"/> Co-generating thermal and electrical power	<input type="checkbox"/> Façade collector(s)		

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
GK HAT 13,6	13.61	18-H-12V-A:9.3,5800-C:33,2280	12.56

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
Collector efficiency (η_{col})	65%	Zero-loss efficiency (η_0)	0.77
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 9806:2017.		First-order coefficient (a_1)	2.27
		Second-order coefficient (a_2)	0.018
		Incidence angle modifier IAM (50°)	0.97
			--
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.			