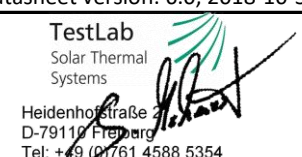


Annex to Solar Keymark Certificate						Licence Number		011-7S2945 P				
						Date issued		2019-08-01				
						Issued by						
Licence holder		GREENoneTEC Solarindustrie GmbH				Country		Österreich				
Brand (optional)		-				Web		www.greenonetec.com				
Street, Number		Energieplatz 1				E-mail		info@greenonetec.com				
Postcode, City		9300 St.Veit.a.d.Glan				Tel		+43 (0) 4212 281 36 0				
Collector Type						Flat plate collector						
Collector name		Gross height	Gross area (A_G)	Gross length	Gross width	Aperture area (A_a)	Power output per collector					
							G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
		mm	m ²	mm	mm	m ²	0 K	10 K	30 K	50 K	70 K	60 K
							W	W	W	W	W	W
FK 6164N 4H		58	1,67	1.674	998	1,56	574	427	87	0	0	0
Power output per m² gross area						344	256	52	0	0	0	
Performance parameters test method		Steady state - outdoor										
Performance parameters (related to A_G)		$\eta_{0, b}$	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		0,303	9,78	0,045	0,829	0,00	20.600	0,028	0,00	0,0E+00	0,85	
Incidence angle modifier test method		Steady state - outdoor										
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	0,89	0,80	0,64	0,40	0,00	
Longitudinal		K _{θL, coll}	1,00	0,99	0,98	0,95	0,89	0,80	0,64	0,40	0,00	
Heat transfer medium for testing						Water-Glycole						
Flow rate for testing (per gross area, A_G)						dm/dt		0,020	kg/(sm ²)			
Maximum temperature difference during thermal performance test						(ϑ _m -ϑ _a) _{max}		30	K			
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)						ϑ _{stg}		92	°C			
Maximum operating temperature						ϑ _{max, op}		80	°C			
Maximum operating pressure						p _{max, op}		1000	kPa			
Testing laboratory		TestLab Solar Thermal Systems, Fraunhofer ISE				http://www.collectortest.com						
Test report(s)		KTB 2019-05 FUE18604				Dated		06.06.2019 31.07.2019				
Comments of testing laboratory						Datasheet version: 6.0, 2018-10-30						
Thermal performance parameters are given for the PV-module working with max. electrical power output ('MPP mode')						 TestLab Solar Thermal Systems Heidenhofstraße 2 D-79110 Freiburg Tel: +49 (0)761 4588 5354						
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	011-7S2945 P
	Issued	2019-08-01

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
FK 6164N 4H		720	56	0	259	4		257	10		305	17	
Annual output per m ² gross area		431	33	0	155	3		154	6		183	10	
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. 6.0 (October 2018). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

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	5400		Pa		
Maximum tested negative load	3000		Pa		
Hail resistance using steel ball (maximum drop height)	25		m		

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 checked="" type="checkbox"/>	Co-generating thermal and electrical power	<input checked="" type="checkbox"/>	Wind and/or infrared sensitive collector(s) (WISC)	
<input type="checkbox"/>	Façade collector(s)			

Energy Labelling Information				
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code		
FK 6164N 4H	1,67	10-V-1234S-A:7.2,1578-C:16.4,1004		
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})	-6%	Zero-loss efficiency (η_0)	0,34	--
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)	8,37	W/(m ² K)
		Second-order coefficient (a_2)	0,045	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0,89	--
		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.		