

Annex to Solar Keymark Certificate					Licence Number		011-7S1495 F				
					Date issued		2021-12-17				
					Issued by		ISFH CalTeC				
Licence holder		OEG Oel- und Gasfeuerungsbedarf			Country		Germany				
Brand (optional)					Web		www.oeg.net				
Street, Number		Industriestr. 1			E-mail		info@oeg.net				
Postcode, City		D- 31840 Hessisch Oldendorf			Tel		+49 5152 699-0				
Collector Type					Flat plate collector						
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 = 1.3 m/s θ _m - θ _a					
						0 K W	10 K W	30 K W	50 K W	70 K W	88 K W
2Plus		2.05	1 952	1 052	80	1 487	1 407	1 235	1 046	840	641
Power output per m ² gross area						724	685	601	509	409	312
Performance parameters test method		Steady state - indoor									
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		0.736	3.78	0.010			4 770				0.90
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	0.99	0.98	0.96	0.94	0.88	0.78	0.45	0.00
Longitudinal		K _{θL, coll}	1.00	0.99	0.98	0.96	0.94	0.88	0.78	0.45	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 during thermal performance test						(θ _m -θ _a) _{max}		58	K		
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)						θ _{stg}		200	°C		
Maximum operating temperature						θ _{max op}		100	°C		
Maximum operating pressure						p _{max, op}		1000	kPa		
Testing laboratory		ISFH CalTeC				http://www.isfh.de					
Test report(s)		171-21/B				Dated		16.12.2021			
Comments of testing laboratory						Datasheet version: 6.1, 2019-07-11					
						Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31880 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500					
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Annex to Solar Keymark Certificate Supplementary Information							Licence Number			011-7S1495 F			
							Issued			2021-12-17			
Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Standard Locations		Athens			Davos			Stockholm			Würzburg		
Collector name	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
2Plus		2 348	1 624	1 028	1 752	1 178	718	1 295	821	482	1 410	885	511
Annual output per m ² gross area		1 143	791	501	853	574	350	631	400	235	687	431	249
Annual efficiency, η_a		65%	45%	28%	52%	35%	21%	54%	34%	20%	55%	35%	20%
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 (July 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											3030		Pa
Maximum tested negative load											2800		Pa
Hail resistance using steel ball (maximum drop height)											2		m
Additional collector attribute(s)													
☐ Using external power source(s) for normal operation ☐ Active or passive measure(s) for self-protection													
☐ Co-generating thermal and electrical power ☐ 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)			
2Plus	2.05				1-VH-12S-A:11.3,12027					1.88			
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})		56%			Zero-loss efficiency (η_0)					0.72		--	
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)					3.78		W/(m ² K)	
					Second-order coefficient (a ₂)					0.010		W/(m ² K ²)	
					Incidence angle modifier IAM (50°)					0.92		--	
					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.								
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