

Annex to Solar Keymark Certificate					Licence Number		011-7S3164 F				
					Date issued		2023-01-30				
					Issued by		DIN CERTCO				
Licence holder		Eklor			Country		France				
Brand (optional)					Web		www.eklor.fr				
Street, Number		2, allée de l'Abbaye			E-mail		n.savariaux@eklor.fr				
Postcode, City		FR 79410 Saint-Maxire			Tel		+33 549284897				
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 $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	109 K	
					W	W	W	W	W	W	
C.SOL 1809 ALS	1,79	1.927	927	90	1.298	1.230	1.088	937	777	441	
C.SOL 2110 ALS	2,07	1.988	1.041	90	1.501	1.422	1.258	1.083	899	510	
C.SOL 2512 ALS	2,42	1.988	1.218	90	1.755	1.663	1.470	1.266	1.051	597	
Power output per m ² gross area					725	687	608	523	434	247	
Performance parameters test method		Quasi dynamic									
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		0,726	3,74	0,006	0,000	0,00	9.746	0,000	0,00	0,00	0,99
Incidence angle modifier test method		Quasi dynamic - outdoor									
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	0,81	0,58	0,29	0,00
Longitudinal		$K_{\theta L, coll}$	1,00	1,00	0,99	0,98	0,95	0,81	0,58	0,29	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		$(\vartheta_m - \vartheta_a)_{max}$	79		K						
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30^\circ\text{C}$)		ϑ_{stg}	210		°C						
Maximum operating temperature		$\vartheta_{max, op}$	135		°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)		22COL1657OEM03 22COL1658QOEM03					Dated		30.01.2023 30.01.2023		
Comments of testing laboratory		Ver. 6.2 (13.01.2022)									
Documented performance parameters are taken from 22COL1657OEM03		 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70560 Stuttgart (Vaihingen)									
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Supplementary Information							Issued		2023-01-30							
Gross Thermal Yield 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			
C.SOL 1809 ALS		2.110	1.495	996	1.592	1.107	723	1.168	765	478	1.279	831	511			
C.SOL 2110 ALS		2.440	1.729	1.152	1.841	1.280	836	1.350	885	552	1.479	961	591			
C.SOL 2512 ALS		2.852	2.022	1.347	2.152	1.497	977	1.579	1.034	646	1.729	1.124	691			
Gross Thermal Yield per m ² gross area		1.179	835	556	889	618	404	652	427	267	714	464	286			
Annual efficiency, η_a		67%	47%	32%	55%	38%	25%	56%	37%	23%	57%	37%	23%			
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. 6.2 (13.01.2022). 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)											B		--			
G (W/m ²) >		900		ϑ_a (°C) >		15		H_x (MJ/m ²) >		540						
Maximum tested positive load											2500		Pa			
Maximum tested negative load											1600		Pa			
Hail resistance using steel ball (maximum drop height)											2		m			
Additional collector attribute(s)																
Using external power source(s) for normal operation											No		Active or passive measure(s) for self-protection	No		
Co-generating thermal and electrical power											No		Façade collector(s)	No		
Energy Labelling Information							Additional Informative Technical Data									
Reference Area, A_{sol} (m ²)							Hydraulic Designation Code							Aperture Area, A_a (m ²)		
C.SOL 1809 ALS							1,79							9-V-1234S-7.1,1833-16.6,973-D	1,62	
C.SOL 2110 ALS							2,07							10-V-1234S-7.1,1894-16.6,1087-D	1,89	
C.SOL 2512 ALS							2,42							12-V-1234S-7.1,1894-16.6,1264-D	2,27	
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})							57%							Zero-loss efficiency (η_0)	0,73	--
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)							3,74		W/(m ² K)
							Second-order coefficient (a_2)							0,006		W/(m ² K ²)
							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.									
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