


Annex to Solar Keymark Certificate					Licence Number		011-7S2322 F							
					Date issued		2024-08-06							
					Issued by		DINCERTCO							
Licence holder		Solimpeks Enerji San. Ve Tic. A.Ş.			Country		TÜRKIYE							
Brand (optional)					Web		https://www.solimpeks.com.tr/							
Street, Number		Fevzi Çakmak Mh. 10753. Sk. No: 3-3A			E-mail		yusuf.akay@solimpeks.com							
Postcode, City		Karatay/KONYA			Tel		+90 0 533 631 8446							
Collector Type					Flat plate collector									
Collector name					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	10 K	30 K	50 K	70 K	113 K				
					m ²	mm	mm	mm	mm	mm	mm			
Wunder ANSG 1808					1.79	1 927	927	90	1 249	1 182	1 036	876	702	279
Wunder ANSG 2108					2.07	1 988	1 041	90	1 445	1 367	1 198	1 013	812	323
Wunder ANSG 2510					2.42	1 988	1 218	90	1 689	1 598	1 401	1 185	949	378
Power output per m ² gross area					698	660	579	490	392	156				
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		0.703	3.67	0.010	0.000	0.00	10 210	0.000	0.00	0.0	0.95			
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	0.99	0.97	0.88	0.75	0.55	0.28	0.00			
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.97	0.88	0.75	0.55	0.28	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}	83	K										
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)		θ _{stg}	210	°C										
Maximum operating temperature		θ _{max, op}	120	°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)		23COL1736 23COL1737 23COL1736Q					Dated		19.07.2024 19.07.2024 19.07.2024					
Comments of testing laboratory		Documented performance parameters are taken from 23COL1736 (WUNDER ANSG 1808) Standard stagnation temperature is taken from 23COL1737 (WUNDER ANSG 2510)					Ver. 6.2 (13.01.2022)							
							 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70550 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														

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Supplementary Information		011-7S2322 F												
		Issued												
		2024-08-06												
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	
Wunder ANSG 1808		1 982	1 370	868	1 482	996	609	1 088	690	407	1 191	748	432	
Wunder ANSG 2108		2 291	1 584	1 004	1 713	1 152	704	1 259	798	470	1 378	865	500	
Wunder ANSG 2510		2 679	1 852	1 174	2 003	1 347	823	1 472	933	550	1 611	1 011	585	
Gross Thermal Yield per m ² gross area		1 107	765	485	828	556	340	608	385	227	666	418	242	
Annual efficiency, η_a		63%	43%	27%	51%	34%	21%	52%	33%	19%	53%	34%	19%	
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										Yes				
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										3000		Pa		
Maximum tested negative load										2400		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)						
Wunder ANSG 1808		1.79		8-V-1234S-7.1,1839-16.6,973-D				1.62						
Wunder ANSG 2108		2.07		9-V-1234S-7.1,1900-16.6,1087-D				1.93						
Wunder ANSG 2510		2.42		10-V-1234S-7.1,1900-16.6,1264-D				2.23						
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})		54%				Zero-loss efficiency (η_0)		0.70		--				
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)		3.67		W/(m ² K)						
				Second-order coefficient (a ₂)		0.010		W/(m ² K ²)						
				Incidence angle modifier IAM (50°)		0.94		--						
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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