


Annex to Solar Keymark Certificate					Licence Number		011-7S3271 F							
					Date issued		2024-10-25							
					Issued by		DINCERTCO							
Licence holder		DIMAS SA			Country		Greece							
Brand (optional)					Web		https://dimas-solar.gr/							
Street, Number		2nd km Argos – Nafplio road			E-mail		info@dimas-solar.gr							
Postcode, City		212 00 Argos			Tel		+30 275 10209110							
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 $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	102 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
ENERGY+EVO 15 Control					1.51	1 503	1 007	85	1 093	1 037	912	767	603	301
ENERGY+EVO 17 Control					1.68	1 420	1 183	85	1 216	1 154	1 015	854	671	334
ENERGY+EVO 19 Control					1.96	1 503	1 305	85	1 419	1 347	1 184	996	783	390
ENERGY+EVO 20 Control					2.02	2 006	1 007	85	1 462	1 388	1 220	1 026	807	402
ENERGY+EVO 23 Control					2.24	1 893	1 183	85	1 621	1 539	1 353	1 138	895	446
ENERGY+EVO 25 Control					2.52	2 006	1 257	85	1 824	1 731	1 522	1 281	1 007	502
ENERGY+EVO 27 Control					2.67	2 261	1 183	85	1 933	1 834	1 613	1 357	1 067	531
ENERGY+EVO 29 Control					2.92	2 006	1 457	85	2 114	2 006	1 764	1 484	1 167	581
Power output per m ² gross area					724	687	604	508	399	199				
Performance parameters test method		Steady state - indoor												
Performance parameters (related to A _G)		η ₀ , b	a ₁	a ₂	a ₃	a ₄	a ₅	a ₆	a ₇	a ₈	K _d			
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		0.725	3.51	0.016	0.000	0.00	13 660	0.000	0.00	0.0	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 _{θT, coll}	1.00	1.00	1.00	0.99	0.96	0.87	0.63	0.32	0.00			
Longitudinal		K _{θL, coll}	1.00	1.00	1.00	0.99	0.96	0.87	0.63	0.32	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}	72	K										
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)		ϑ_{stg}	200	°C										
Maximum operating temperature		$\vartheta_{max, op}$	-	°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)		23COL1728 21COL1631Q/2					Dated		25.10.2024 25.10.2024					
Comments of testing laboratory		Documented performance parameters are taken from 23COL1728 (ENERGY+EVO 15 Control)					Ver. 6.2 (13.01.2022)							
							 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 8, 70560 Stuttgart (Vaihingen)							
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Annex to Solar Keymark Certificate Supplementary Information		Licence Number		011-7S3271 F									
		Issued		2024-10-25									
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
ENERGY+EVO 15 Control		1 791	1 262	795	1 353	913	543	994	637	366	1 089	693	393
ENERGY+EVO 17 Control		1 992	1 404	885	1 506	1 016	604	1 106	708	407	1 211	771	437
ENERGY+EVO 19 Control		2 324	1 638	1 032	1 757	1 185	705	1 291	826	475	1 413	899	510
ENERGY+EVO 20 Control		2 396	1 689	1 064	1 810	1 221	727	1 330	852	490	1 457	927	526
ENERGY+EVO 23 Control		2 657	1 872	1 180	2 008	1 354	806	1 475	944	543	1 615	1 028	583
ENERGY+EVO 25 Control		2 989	2 106	1 327	2 258	1 524	906	1 660	1 062	611	1 817	1 156	656
ENERGY+EVO 27 Control		3 167	2 232	1 406	2 393	1 614	960	1 758	1 126	647	1 925	1 225	695
ENERGY+EVO 29 Control		3 463	2 441	1 538	2 617	1 765	1 050	1 923	1 231	708	2 106	1 340	760
Gross Thermal Yield per m ² gross area		1 186	836	527	896	605	360	659	422	243	721	459	260
Annual efficiency, η_a		67%	47%	30%	55%	37%	22%	56%	36%	21%	58%	37%	21%
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)										A		--	
G (W/m ²) >		1000		ϑ_a (°C) >		20		H _x (MJ/m ²) >		600			
Maximum tested positive load										2750		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)					
ENERGY+EVO 15 Control		1.51		8-V-1234S-7.2,1383-20.6,1060-D				1.36					
ENERGY+EVO 17 Control		1.68		10-V-1234S-7.2,1303-20.6,1240-D				1.52					
ENERGY+EVO 19 Control		1.96		11-V-1234S-7.2,1383-20.6,1370-D				1.79					
ENERGY+EVO 20 Control		2.02		8-V-1234S-7.2,1888-20.6,1060-D				1.83					
ENERGY+EVO 23 Control		2.24		10-V-1234S-7.2,1773-20.6,1240-D				2.05					
ENERGY+EVO 25 Control		2.52		11-V-1234S-7.2,1888-20.6,1310-D				2.32					
ENERGY+EVO 27 Control		2.67		10-V-1234S-7.2,2143-20.6,1240-D				2.46					
ENERGY+EVO 29 Control		2.92		12-V-1234S-7.2,1888-20.6,1510-D				2.71					
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)		3.51		W/(m ² K)							
		Second-order coefficient (a ₂)		0.016		W/(m ² K ²)							
		Incidence angle modifier IAM (50°)		0.98		--							
		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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