



ICIM S.p.A. a socio unico

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Capitale Soc EUR. 260.000,00 int. versato ed esistente
C.F./P. IVA e Iscriz. Reg. Imprese di Milano n. 12908230159 - R.E.A. n. 1596292

Annex to Solar Keymark Certificate					Licence Number	115BN									
					Date issued	2023-11-02									
					Issued by	ICIM S.p.A.									
Licence holder	Costruzioni Solari s.r.l.				Country	Italy									
Brand (optional)					Web	www.costruzionisolari.com									
Street, Number	Via Rosario Romeo 4, Zona P.I.P.				E-mail	info@costruzionisolari.it									
Postcode, City	IT- 73020 Cavallino (LE)				Tel	+39 0832 402937									
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 Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s θ _m - θ _a										
					0 K W	10 K W	30 K W	50 K W	70 K W	122 K W					
Panda 2.0	2,04	1.796	1.130	110	1.447	1.374	1.225	1.070	911	475					
Panda 2.3	2,25	1.996	1.130	110	1.596	1.515	1.351	1.181	1.005	524					
Panda 2.7	2,70	2.380	1.130	110	1.915	1.818	1.621	1.417	1.206	628					
Power output per m² gross area					709	674	600	525	447	233					
Performance parameters test method					Steady state - outdoor										
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					0,720	3,54	0,003	0,000	0,00	5.294	0,000	0,00	0,0E+00	0,90	
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	1,00	0,99	0,97	0,95	0,89	0,69	0,37	0,00	
Longitudinal					K _{θL, coll}	1,00	1,00	0,99	0,97	0,95	0,89	0,69	0,37	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}		92		K						
Standard stagnation temperature (G = 1000 W/m²; θ_a = 30 °C)					θ _{stg}		230		°C						
Maximum operating temperature					θ _{max op}		180		°C						
Maximum operating pressure					ρ _{max, op}		1000		kPa						
Testing laboratory					SPF Institute for Solar Technology					www.spf.ch					
Test report(s)					C1907 C1908					Dated		20/10/2023 20/10/2023			
Comments of testing laboratory											Draft Ver. 6.2 (22.09.2021)				
(ICIM) prima emissione / first issue: 30/04/2013											 INSTITUT FÜR SOLARTECHNIK				
					<p align="center">ICIM S.p.A. a socio unico</p> <p>Piazza Don Enrico Mapelli, 75 - 20099 Sesto San Giovanni (MI)</p>										

Annex to Solar Keymark Certificate Supplementary Information								Licence Number			ABCDEFGH						
								Issued			2023-10-20						
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				
Panda 2.0		2.305	1.655	1.140	1.753	1.249	854	1.284	861	562	1.397	928	596				
Panda 2.3		2.542	1.826	1.257	1.933	1.377	942	1.417	950	619	1.540	1.023	658				
Panda 2.7		3.050	2.191	1.508	2.320	1.653	1.131	1.700	1.139	743	1.848	1.228	789				
Gross Thermal Yield per m ² gross area		1.130	811	559	859	612	419	630	422	275	685	455	292				
Annual efficiency, η_a		64%	46%	32%	53%	38%	26%	54%	36%	24%	55%	37%	24%				
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 Draft Ver. 6.2 (22.09.2021). 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										2400		Pa					
Maximum tested negative load										2400		Pa					
Hail resistance using ice balls (diameter)										45		mm					
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)			
Panda 2.0						2,04				12-V-1234S-6,1712-20,1095-D				1,81			
Panda 2.3						2,25				12-V-1234S-6,1912-20,1158-D				2,02			
Panda 2.7						2,70				12-V-1234S-6,2206-20,1158-D				2,43			
Data required for CDR (EU) No 811/2013 - Reference Area						Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}											
Collector efficiency (η_{col})						56%				Zero-loss efficiency (η_0)				0,71		--	
										First-order coefficient (a_1)				3,54		W/(m ² K)	
Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013										Second-order coefficient (a_2)				0,003		W/(m ² K ²)	

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/m², 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.

Incidence angle modifier IAM (50°)	0,93	--
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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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