


Annex to Solar Keymark Certificate					Licence Number		011-7S3121 F							
					Date issued		2022-06-08							
					Issued by		DIN CERTCO							
Licence holder			Immergas S.P.a		Country		Italy							
Brand (optional)					Web		www.immergas.com							
Street, Number			Via Cisa Ligure 95		E-mail		presales-export@immergas.com							
Postcode, City			42041 Brescello		Tel		+39 (0) 522689011							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	118 K				
					m ²	mm	mm	mm	mm	mm	mm			
Collettore Solar Piano CP4XL					2.52	2 150	1 170	85	1 866	1 770	1 556	1 316	1 050	305
Power output per m ² gross area					741	702	617	522	417	121				
Performance parameters test method			Quasi dynamic											
Performance parameters (related to A _G)			$\eta_{0,b}$	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			0.744	3.72	0.013	0.000	0.00	10 360	0.000	0.00	0.0	0.97		
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	0.90	0.73	0.37	0.00		
Longitudinal			K _{θL, coll}	1.00	1.00	1.00	0.99	0.96	0.90	0.73	0.37	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					($\vartheta_m - \vartheta_a$) _{max}	88	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)			20COL1538/1OEM06 20COL1538Q/2OEM06				Dated		08.06.2022 08.06.2022					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
According to the Solar Keymark Scheme rules the collector was retested after 10 years after the previous test.					 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)									
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Supplementary Information		011-7S3121 F											
		Issued											
		2022-06-08											
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			
Collettore Solar Piano CP4XL		3 053	2 147	1 371	2 300	1 561	951	1 693	1 086	637	1 851	1 180	682
Gross Thermal Yield per m ² gross area		1 211	852	544	913	619	378	672	431	253	734	468	271
Annual efficiency, η_a		69%	48%	31%	56%	38%	23%	58%	37%	22%	59%	38%	22%
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		18.5°C			3.2°C			7.5°C			9.0°C		
Collector orientation or tracking		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										2500		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)					
Collettore Solar Piano CP4XL		2.52		12-V-1234S-7.2,1988-20.4,1215-D				2.31					
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})		57%				Zero-loss efficiency (η_0)		0.74		--			
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)		3.72		W/(m ² K)			
						Second-order coefficient (a_2)		0.013		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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