


Annex to Solar Keymark Certificate					Licence Number		011-7S1756 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									
					$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	118 K				
					m ²	mm	mm	mm	mm	mm	mm			
Collettore Solar Piano CP4M					2.02	1 730	1 170	85	1 476	1 394	1 216	1 020	807	223
Power output per m ² gross area					731	690	602	505	400	110				
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		0.734	3.96	0.011	0.000	0.00	11 450	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	0.99	0.98	0.96	0.89	0.71	0.36	0.00			
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.98	0.96	0.89	0.71	0.36	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 ; $\vartheta_a = 30 \text{ °C}$)					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)		20COL1537/1OEM06 20COL1538Q/2OEM06					Dated		08.06.2022 08.06.2022					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
This data sheet replaces the data sheet issued on 03.05.2016 by Fraunhofer ISE 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, 70569 Stuttgart (Vaihingen)									
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Supplementary Information		011-7S1756 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 CP4M		2 397	1 648	1 030	1 780	1 185	708	1 316	826	476	1 440	896	508
Gross Thermal Yield per m ² gross area		1 186	816	510	881	587	350	651	409	235	713	444	251
Annual efficiency, η_a		67%	46%	29%	54%	36%	21%	56%	35%	20%	57%	36%	20%
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 CP4M		2.02		12-V-1234S-7.2,1568-20.4,1215-D				1.84					
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})		55%		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)		3.96		W/(m ² K)							
		Second-order coefficient (a_2)		0.011		W/(m ² K ²)							
		Incidence angle modifier IAM (50°)		0.96		--							
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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