


Annex to Solar Keymark Certificate					Licence Number		011-7S1268 F							
					Date issued		2023-12-13							
					Issued by		DIN CERTCO							
Licence holder		EMMETI S.p.A Unipersonale			Country		Italy							
Brand (optional)					Web		https://www.purmogroup.com							
Street, Number		Via Brigata Osoppo, 166			E-mail		alberto.fauzza@purmogroup.com							
Postcode, City		33074 Vigonovo di Fontanafredda (PN)			Tel		+39 0 434 567 830							
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	109 K				
					m ²	mm	mm	mm	mm	mm				
Arcobaleno SXM					2.34	2'000	1'170	73	1'681	1'589	1'387	1'160	909	349
Power output per m² gross area					718	679	593	496	388	149				
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		0.719	3.81	0.013	0.000	0.00	9'668	0.000	0.00	0.00	1.00			
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	0.97	0.88	0.71	0.36	0.00			
Longitudinal		K _{θL, coll}	1.00	1.00	1.00	0.99	0.97	0.88	0.71	0.36	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}	79	K										
Standard stagnation temperature (G = 1000 W/m²; θ_a = 30 °C)		θ _{stg}	190	°C										
Maximum operating temperature		θ _{max, op}	n.s.	°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)		22COL1660OEM02 22COL1660QOEM02						Dated		05.12.2023 05.12.2023				
Comments of testing laboratory		Documented performance parameters are taken from 22COL1660OEM02 (Arcobaleno SXM). This data sheet replaces the data sheet dated December 6 th 2023. The reason for the replacement: incorrect issue date of report 22COL1660QOEM02.						Ver. 6.2 (13.01.2022)						
								 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70569 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														

Annex to Solar Keymark Certificate					Licence Number		011-7S1268 F						
Supplementary Information					Issued		2023-12-13						
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
Arcobaleno SXM		2'758	1'905	1'185	2'056	1'366	805	1'518	953	543	1'663	1'037	581
Gross Thermal Yield per m ² gross area		1'179	814	506	879	584	344	649	407	232	711	443	248
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 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										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)			
Arcobaleno SXM		2.34				12-V-1234S-7.2,1840-16.6,1215-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})		55%				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)				3.81		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.							
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													