


Annex to Solar Keymark Certificate					Licence Number		011-7S3052 F							
					Date issued		2021-10-13							
					Issued by		DIN CERTCO							
Licence holder		Atag Italia srl			Country		Italy							
Brand (optional)		JODO			Web		www.atagitalia.com							
Street, Number		Via 11 Settembre, 6/1			E-mail		info@atagitalia.com							
Postcode, City		37019 Peschiera del Garda - Verona			Tel		+39 (0) 30 99048 04							
Collector Type					Flat plate collector									
Collector name					Power output per collector									
					$G_b = 850 \text{ W/m}^2, G_d = 150 \text{ W/m}^2 \text{ \& } u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	118 K				
					m ²	mm	mm	mm	mm	mm	mm			
SOLE250					2.52	2 150	1 170	85	1 866	1 770	1 556	1 316	1 050	305
Power output per m² gross area					741	702	617	522	417	121				
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		0.744	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		$K_{\theta T, coll}$	1.00	1.00	1.00	0.99	0.96	0.90	0.73	0.37	0.00			
Longitudinal		$K_{\theta L, coll}$	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/m²; $\vartheta_a = 30^\circ\text{C}$)					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)		20COL1538/1OEM02 20COL1538Q/2OEM02							13.10.2021 13.10.2021					
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
<i>Thermal performance parameters are given from test report 20COL1538/1 OEM02 (SOLE250)</i>					 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S3052 F
	Issued	2021-10-13

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_m	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
SOLE250		3 053	2 147	1 371	2 300	1 561	951	1 693	1 086	637	1 851	1 180	682
Annual output 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 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. 6.1 (September 2019). 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)			
<input type="checkbox"/> Using external power source(s) for normal operation	<input type="checkbox"/> Active or passive measure(s) for self-protection		
<input type="checkbox"/> Co-generating thermal and electrical power	<input type="checkbox"/> Façade collector(s)		

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
SOLE250	2.52	12-V-1234S-7.2,1988-20.4,1215-D	2.31

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})	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
		Second-order coefficient (a_2)	0.013
		Incidence angle modifier IAM (50°)	0.98
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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.	