

Annex to Solar Keymark Certificate					Licence Number		011-7S2483 F				
					Date issued		2024-03-28				
					Issued by		DINCERTCO				
Licence holder		Meier Tobler AG			Country		Schweiz				
Brand (optional)					Web		https://www.meiertobler.ch				
Street, Number		Bahnstr. 24			E-mail		info@meiertobler.ch				
Postcode, City		8603 Schwerzenbach			Tel		+44 735 52 61				
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 G _b = 850 W/m ² , G _d = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	111 K	
					W	W	W	W	W	W	
TERZA 251-V2	2.51	2 148	1 168	83	1 837	1 757	1 555	1 297	982	162	
TERZA 251-H2	2.51	1 168	2 148	83	1 837	1 757	1 555	1 297	982	162	
Power output per m ² gross area					732	700	620	517	391	65	
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	2.904	0.028	0.000	0.000	8 107	0.000	0.000	0.000	0.981
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	0.92	0.77	0.59	0.30	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	1.00	0.99	0.92	0.77	0.59	0.30	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}	81		K						
Standard stagnation temperature (G = 1000 W/m ² ; ϑ_a = 30 °C)		ϑ_{stg}	210		°C						
Maximum operating temperature		$\vartheta_{max, op}$	210		°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)		23COL1702OEM01 23COL1702Q/10EM01					Dated		24.01.2024 24.01.2024		
Comments of testing laboratory		Ver. 6.2 (13.01.2022)									
Documented performance parameters are taken from 23COL1702OEM01 (TERZA 251-V2)		 Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)									
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Supplementary Information										Issued		2024-03-28							
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						
TERZA 251-V2		2 989	2 154	1 322	2 305	1 547	867	1 687	1 086	597	1 844	1 185	640						
TERZA 251-H2		2 989	2 154	1 322	2 305	1 547	867	1 687	1 086	597	1 844	1 185	640						
Gross Thermal Yield per m ² gross area		1 191	858	527	918	616	345	672	433	238	735	472	255						
Annual efficiency, η_a		67%	49%	30%	56%	38%	21%	58%	37%	20%	59%	38%	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										3000		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)										
TERZA 251-V2	2.51			1-H-1234S-7.2,22800-16.6,1153-D					2.35										
TERZA 251-H2	2.51			1-H-1234S-7.2,21200-16.6,2133-D					2.35										
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)		0.73		--	
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)		2.90		W/(m ² K)	
														Second-order coefficient (a_2)		0.028		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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