

Annex to Solar Keymark Certificate					Licence Number		011-7S3300 R				
					Date issued		2025-06-04				
					Issued by		DINCERTCO				
Licence holder		PLANTEK di Bigon Jacopo			Country		Italy				
Brand (optional)					Web		www.plantek.it				
Street, Number		Via Artigianato, 6/A			E-mail		plantek2000@plantek.it				
Postcode, City		30031 Arino di Dolo (VE)			Tel		+39 0415160723				
Collector Type					Evacuated tubular 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 W	10 K W	30 K W	50 K W	70 K W	138 K W	
KTS10	2.38	2 040	1 166	122	1 525	1 502	1 449	1 389	1 321	1 034	
Power output per m ² gross area					641	631	609	584	555	434	
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		0.637	0.943	0.004	0.000	0.00	28 610	0.000	0.00	0.0	1.039
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	1.00	1.10	1.14	1.30	0.65	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	1.00	0.98	0.95	0.89	0.81	0.65	0.33	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					$(\vartheta_m - \vartheta_a)_{max}$		108		K		
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)					ϑ_{stg}		310		°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)		16COL1355OEM03 16COL1356QOEM03					Dated		07.05.2025 07.05.2025		
Comments of testing laboratory					Ver. 6.2 (13.01.2022)						
Documented performance parameters are taken from 16COL1355OEM03 (KTS10)											
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Supplementary Information										Issued		2025-06-04		
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	
KTS10		2 704	2 446	2 167	2 328	2 068	1 803	1 688	1 469	1 257	1 818	1 585	1 357	
Gross Thermal Yield per m ² gross area		1 136	1 028	911	978	869	758	709	617	528	764	666	570	
Annual efficiency, η_a		64%	58%	52%	60%	53%	46%	61%	53%	45%	61%	54%	46%	
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				
The collector is deemed to be suitable for roof integration										No				
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										1000		Pa		
Maximum tested negative load										1650		Pa		
Hail resistance using ice balls (diameter)										25		mm		
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														
		Reference Area, A_{sol} (m ²)		Hydraulic Designation Code		Aperture Area, A_a (m ²)								
KTS10		2.38		1-V-12S-7,3800		2.09								
Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}														
Collector efficiency (η_{col})		60%		Zero-loss efficiency (η_0)		0.64		--						
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)		0.94		W/(m ² K)								
		Second-order coefficient (a_2)		0.004		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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