
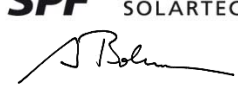


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2797 F					
						Date issued		2017-09-25					
						Issued by							
Licence holder		Riello S.p.A.				Country		Italy					
Brand (optional)		Thermital				Web		www.thermital.it					
Street, Number		Via Ing. Pilade Riello, 7				E-mail		info@thermital.it					
Postcode, City		IT-37045 Legnago (VR)				Tel		+39 0423 620288					
Collector Type						Flat plate collector, glazed							
Collector name	Gross area (A _G)	Gross length	Gross width	Gross height	Power output per collector								
					G _b = 850 W/m ² ; G _d = 150 W/m ²								
					ϑ _m - ϑ _a								
	m ²	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	130 K			
					W	W	W	W	W	W			
TSOL 25/2 PREMIUM	2.30	2'004	1'148	86	1'767	1'671	1'471	1'261	1'040	317			
Power output per m ² gross area					768	726	639	548	452	138			
Performance parameters test method		Steady state - outdoor											
Performance parameters (related to AG)		η _{0,hem}	a ₁	a ₂									
Units		-	W/(m ² K)	W/(m ² K ²)									
Test results		0.768	4.120	0.006									
Incidence angle modifier test method		Steady state - outdoor											
Bi-directional incidence angle modifiers		Yes											
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°		
Transversal		K _{GT, coll}	1.00	1.00	0.99	0.98	0.94	0.87	0.74	0.43	0.00		
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.98	0.94	0.87	0.73	0.47	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 for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	130	K									
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	198	°C									
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	4.91	kJ/(Km ²)									
Maximum operating temperature		ϑ _{max, op}	--	°C									
Maximum operating pressure		p _{max, op}	1000	kPa									
Testing laboratory		SPF, CH-8640 Rapperswil				www.spf.ch							
Test report(s)		C1747LPEN C1747QPEN				Dated		25.09.2017 25.09.2017					
Comments of testing laboratory		Datashet version: 5.01, 2016-03-01											
--		 INSTITUT FÜR SOLARTECHNIK 											
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 Supplementary Information	Licence Number	011-7S2797 F
	Issued	2017-09-25

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN ISO 9806:2013 test results													
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
TSOL 25/2 PREMIUM		2'809	1'957	1'283	2'102	1'444	931	1'548	999	615	1'685	1'076	652
Annual output per m ² gross area		1'221	850	558	914	628	405	673	434	267	732	468	284
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													

Additional Information		
Collector heat transfer medium	Water-Glycole	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	Pa
Hail resistance using ice balls (diameter)	45	mm

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
TSOL 25/2 PREMIUM	2.30	Collector efficiency (η_{col})	59 %
		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 9806:2013.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.768 --
		First-order coefficient (a_1)	4.12 W/(m ² K)
		Second-order coefficient (a_2)	0.006 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.95 --
		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.	