



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2618 F							
					Date issued		2019-02-01							
					Issued by		TÜV Rheinland Energy GmbH							
Licence holder		Ariston Thermo S.p.A.			Country		Italy							
Brand (optional)		Chaffoteaux			Web		http://www.aristonthermo.com							
Street, Number		Via A. Merloni 45			E-mail		public.relation@aristonthermo.com							
Postcode, City		60044 Fabriano			Tel		+39 02763209-1							
Collector Type					Flat plate collector, glazed									
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a									
					0 K	10 K	30 K	50 K	70 K	90 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
Zelios CF 2.0-1					2.01	2 004	1 004	78	1 347	1 274	1 115	937	739	522
Power output per m ² gross area					670	634	555	466	368	260				
Performance parameters test method					Steady state - indoor									
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.670	3.480	0.012							
Incidence angle modifier test method					Quasi dynamic - outdoor									
Bi-directional incidence angle modifiers					No									
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal					K _{GT, coll}	1.00	0.99	0.97	0.94	0.90	0.81	0.64	0.32	0.00
Longitudinal					K _{GL, coll}	1.00	0.99	0.97	0.94	0.90	0.81	0.64	0.32	0.00
Heat transfer medium for testing					Water									
Flow rate for testing (per gross area, A _G)					dm/dt	0.025	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	90	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}	190	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	3.92	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	190	°C							
Maximum operating pressure					p _{max, op}	600	kPa							
Testing laboratory					TÜV Rheinland Energy GmbH			www.tuv.com/solarpower						
Test report(s)					21229451.002			Dated		01.12.2015				
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
The performance values related to 1.833 m ² aperture area are: eta0a=0.740; a1a=3.82; a2a=0.013.					 Genau. Richtig.  TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2618 F
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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			
	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
Collector name													
Zelios CF 2.0-1		2 059	1 403	863	1 532	1 012	596	1 131	707	404	1 229	758	425
Annual output per m ² gross area		1 024	698	429	762	504	297	563	352	201	611	377	211
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	5400	Pa
Maximum tested negative load	3500	Pa
Hail resistance using steel ball (maximum drop height)	35	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Zelios CF 2.0-1	2.01	Collector efficiency (η_{col})	51 %
		<i>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/m², 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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.670 --
		First-order coefficient (a_1)	3.48 W/(m ² K)
		Second-order coefficient (a_2)	0.012 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.90 --
		<i>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.</i>	