


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results						Licence Number		011-7S2613 F						
						Date issued		2017-01-09						
						Issued by		TÜV Rheinland Energy GmbH						
Licence holder		Ariston Thermo S.p.A.				Country		Italy						
Brand (optional)		Ariston				Web		www.aristonthermo.com						
Street, Number		Via A. Merloni 45				E-mail		public.relations@aristonthermo.com						
Postcode, City		60044, Fabriano				Tel		+39 02763209 -1 / -40						
Collector Type						Flat plate collector, glazed								
					Power output per collector $G_b = 850 \text{ W/m}^2$; $G_d = 150 \text{ W/m}^2$ $\vartheta_m - \vartheta_a$									
					Gross area (A_G)	Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	90 K
Collector name					m ²	mm	mm	mm	W	W	W	W	W	W
DR 2.0					2.01	2 004	1 004	78	1 327	1 252	1 090	911	713	498
DR 2.0 HR					2.01	1 004	2 004	78	1 327	1 252	1 090	911	713	498
Power output per m ² gross area						660	623	542	453	355	248			
Performance parameters test method					Steady state - indoor									
Performance parameters (related to AG)					η_0, hem	a1	a2							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.660	3.590	0.011							
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					$K_{GT, \text{coll}}$	1.00	0.99	0.97	0.95	0.91	0.83	0.65	-	0.00
Longitudinal					$K_{GL, \text{coll}}$	1.00	0.99	0.97	0.95	0.91	0.83	0.65	-	0.00
Heat transfer medium for testing						Water								
Flow rate for testing (per gross area, A_G)						dm/dt	0.023	kg/(sm ²)						
Maximum temperature difference for thermal performance calculations						$(\vartheta_m - \vartheta_a)_{\text{max}}$	90	K						
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$)						ϑ_{stg}	190	°C						
Effective thermal capacity, incl. fluid (per gross area, A_G)						C/m^2	5.61	kJ/(Km ²)						
Maximum operating temperature						$\vartheta_{\text{max, op}}$	105	°C						
Maximum operating pressure						$p_{\text{max, op}}$	600	kPa						
Testing laboratory					TÜV Rheinland Energy GmbH				www.tuv.com/solarpower					
Test report(s)					21229451.001 21239356.003				Dated		01.12.2015 09.01.2017			
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01								
The collectors will also be distributed as: - Ariston Kairos DR 2.0 - Chaffoteaux Zelios DR 2.0 Additional information: Performance parameters (related to A Aperture): 0.72 /// 3.94 /// 0.012						 Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln								
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany														
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2613 F
	Issued	2017-01-09

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on 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
DR 2.0		2 036	1 370	832	1 504	983	571	1 112	686	387	1 210	736	407
DR 2.0 HR		2 036	1 370	832	1 504	983	571	1 112	686	387	1 210	736	407
Annual output per m ² gross area		1 013	682	414	748	489	284	553	341	192	602	366	203
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	No	
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 ice balls (diameter)	35	mm

Energy Labelling Information				
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}		
DR 2.0	2.01	Collector efficiency (η_{col})	50	%
DR 2.0 HR	2.01	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)	0.660	--
		First-order coefficient (a_1)	3.59	W/(m ² K)
		Second-order coefficient (a_2)	0.011	W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.91	--
		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.		