


Annex to Solar Keymark Certificate					Licence Number		011-7S2906 F				
					Date issued		2023-12-13				
					Issued by		DINCERTCO				
Licence holder		Ariston S.p.A.			Country		Italy				
Brand (optional)		ARISTON			Web		www.ariston.com				
Street, Number		Via A. Merloni 45			E-mail		marketing@ariston.com				
Postcode, City		60044 Fabriano (AN)			Tel		+39 02763209-1				
Collector Type					Flat plate collector						
Collector name	Gross area (A_G)	Gross length	Gross width	Gross height	Power output per collector						
					$G_b = 850 \text{ W/m}^2$, $G_d = 150 \text{ W/m}^2$ & $u = 1.3 \text{ m/s}$ $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	100 K	
	m ²	mm	mm	mm	W	W	W	W	W	W	
KAIROS DR 2.0-2 B	1.92	1985	967	75	1 268	1 194	1 031	848	644	302	
Power output per m ² gross area					660	622	537	441	336	157	
Performance parameters test method		Quasi dynamic									
Performance parameters (related to A_G)		$\eta_{0,b}$	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		0.666	3.73	0.013	0.000	0.00	11 702	0.000	0.00	0.0E+00	0.94
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	0.99	0.97	0.94	0.89	0.81	0.64	0.32	0.00
Longitudinal		$K_{\theta L, coll}$	1.00	0.99	0.97	0.94	0.89	0.81	0.64	0.32	0.00
Heat transfer medium for testing					Water-Glycol						
Flow rate for testing (per gross area, A_G)					dm/dt	0.053	kg/(sm ²)				
Maximum temperature difference during thermal performance test					$(\vartheta_m - \vartheta_a)_{max}$	70	K				
Standard stagnation temperature ($G = 1000 \text{ W/m}^2$; $\vartheta_a = 30 \text{ °C}$)					ϑ_{stg}	190	°C				
Maximum operating temperature					$\vartheta_{max, op}$	n.n.	°C				
Maximum operating pressure					$p_{max, op}$	800	kPa				
Testing laboratory		TÜV Rheinland Energy GmbH					http://www.tuv.com/solar				
Test report(s)		21244208.001					Dated		24.01.2019		
Comments of testing laboratory					Ver. 6.2 (13.01.2022)						
					 TÜVRheinland® lab Genau. Richtig. TÜV Rheinland Solar GmbH Am Grauen Stein 51105 Köln						
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											

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Supplementary Information						Issued		2023-12-13						
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	
KAIROS DR 2.0-2 B		1 991	1 322	776	1 453	925	508	1 081	650	350	1 183	703	370	
Gross Thermal Yield per m ² gross area		1 037	688	404	757	482	265	563	339	182	616	366	193	
Annual efficiency, η_a		59%	39%	23%	46%	30%	16%	48%	29%	16%	50%	29%	16%	
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										No				
The collector was tested successfully under the following conditions:														
Climate class (A+, A, B or C)										A+		--		
G (W/m ²) >		1100		ϑ_a (°C) >		40		H _x (MJ/m ²) >		700				
Maximum tested positive load										2400		Pa		
Maximum tested negative load										2250		Pa		
Hail resistance using ice balls (diameter)										35		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						Additional Informative Technical Data								
						Reference Area, A _{sol} (m ²)			Hydraulic Designation Code			Aperture Area, A _a (m ²)		
KAIROS DR 2.0-2 B						1.92			6-VH-1234S-A:11.2,1863-C:20.6,996			1.77		
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})						49%								
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.						Zero-loss efficiency (η_0)			0.66			--		
						First-order coefficient (a ₁)			3.73			W/(m ² K)		
						Second-order coefficient (a ₂)			0.013			W/(m ² K ²)		
						Incidence angle modifier IAM (50°)			0.89			--		
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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