


Annex to Solar Keymark Certificate					Licence Number		011-7S2907 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					Power output per collector									
					Gb = 850 W/m ² , Gd = 150 W/m ² & u = 1.3 m/s $\vartheta_m - \vartheta_a$									
					0 K	10 K	30 K	50 K	70 K	100 K				
					m ²	mm	mm	mm	mm	mm	mm			
KAIROS DR 2.0-2 N					1.92	1985	967	75	1 228	1 150	978	784	570	207
Power output per m² gross area					639	599	509	409	297	108				
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		0.642	3.92	0.014	0.000	0.00	11 317	0.000	0.00	0.0E+00	0.97			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{θT, coll}	1.00	0.99	0.97	0.94	0.90	0.81	0.64	0.32	0.00			
Longitudinal		K _{θL, 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-Glycol									
Flow rate for testing (per gross area, A_G)					dm/dt	0.059	kg/(sm ²)							
Maximum temperature difference during thermal performance test					($\vartheta_m - \vartheta_a$) _{max}	70	K							
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30$ °C)					ϑ_{stg}	180	°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)		21244208.002					Dated		24.01.2019					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
					 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 N		1 939	1 243	689	1 388	846	430	1 038	599	300	1 140	649	319
Gross Thermal Yield per m ² gross area		1 010	648	359	723	441	224	541	312	157	594	338	166
Annual efficiency, η_a		57%	37%	20%	44%	27%	14%	46%	27%	13%	48%	27%	13%
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 N						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})						46%			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)		3.92		W/(m ² K)			
						Second-order coefficient (a ₂)		0.014		W/(m ² K ²)			
						Incidence angle modifier IAM (50°)		0.90		--			
						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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