TÜVRheinland®
DIN CERTCO
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Annex to Solar Keymark Certificate

Licence Number	011-7S3290 F
Date issued	2025-03-07
Issued by	DINCERTCO

Licence holder	Ariston S.p.A.	Country	Italy
Brand (optional)	NNA	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 Gb = 850 W/m2, Gd = 150 W/m2 & u = 1.3 m/s $\vartheta_m - \vartheta_a$					
					0 K	10 K	30 K	50 K	70 K	120 K
	m²	mm	mm	mm	W	W	W	W	W	W
XP 2.5-1 V	2.53	2 240	1 125	99	1 749	1 674	1 505	1 314	1 101	471
XP 2.5-1 H	2.53	1 125	2 240	99	1 749	1 674	1 505	1 314	1 101	471
Power output per m² gross area					691	661	595	519	435	186

Performance parameters test method	Steady state - indoor									
Performance parameters (related to A_G)	η0, b	a1	a2	a3	a4	a5	a6	a7	a8	Kd
Units	-	W/(m²K)	W/(m²K²)	J/(m³K)	-	J/(m²K)	s/m	W/(m²K⁴)	W/(m²K⁴)	-
Test results	0.702	2.89	0.011	0.000	0.00	5 281	0.000	0.00	0.0E+00	0.90

Incidence angle modifier test method		Steady state - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1.00	1.00	0.99	0.97	0.94	0.88	0.74	0.43	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	1.00	0.99	0.97	0.94	0.88	0.74	0.43	0.00

Heat transfer medium for testing		Water	
Flow rate for testing (per gross area, A_G)		dm/dt	0.020 kg/(sm²)
Maximum temperature difference during thermal performance test		$(\vartheta_m-\vartheta_a)_{max}$	90 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	210 °C
Maximum operating temperature		$\vartheta_{max\ op}$	210 °C
Maximum operating pressure		$p_{max,op}$	600 kPa
Testing laboratory	TÜV Rheinland Solar GmbH	http://www.tuv.com/solar	
Test report(s)	300100419.001 (XP 2.5-1 V) 300100419.002 (XP 2.5-1 H) C1894 (SPF; Thermal Performance XP 2.5-1 V)	Dated	30.03.2023 30.03.2023 08.03.2023

Comments of testing laboratory

Ver. 6.2 (13.01.2022)

TÜVRheinland® lab
Genau. Richtig.
TÜV Rheinland Solar GmbH
Am Grauen Stein
51105 Köln

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Supplementary Information	Issued	2025-03-07

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
XP 2.5-1 V	2 802	2 073	1 422	2 174	1 563	1 038	1 591	1 085	693	1 726	1 173	737
XP 2.5-1 H	2 802	2 073	1 422	2 174	1 563	1 038	1 591	1 085	693	1 726	1 173	737
Gross Thermal Yield per m² gross area	1 108	819	562	859	618	410	629	429	274	682	464	291
Annual efficiency, η_a	63%	46%	32%	53%	38%	25%	54%	37%	23%	55%	37%	23%
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane	1765 kWh/m²			1630 kWh/m²			1166 kWh/m²			1244 kWh/m²		
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 ϑm (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					Yes	
The collector was tested successfully under the following conditions:						
Climate class (A+, A, B or C)					A+	--
G (W/m²) >	1100	ϑ_a (°C) >	40	H_x (MJ/m²) >		700
Maximum tested positive load					2400	Pa
Maximum tested negative load					2400	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

	Reference Area, A_{sol} (m²)
XP 2.5-1 V	2.53
XP 2.5-1 H	2.53

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
1-H-1234S-A:9.2,22608-C:16.4,1127-D	2.24
1-H-1234S-A:9.2,21760-C:16.4,2232-D	2.24

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}

Collector efficiency (η_{col})	56%

Remark: Collector efficiency (ηcol) 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 ηcol is based on reference area (Asol) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.

Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}

Zero-loss efficiency (η_0)	0.69	--
First-order coefficient (a_1)	2.89	W/(m²K)
Second-order coefficient (a_2)	0.011	W/(m²K²)
Incidence angle modifier IAM (50°)	0.93	--

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.