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IGTE

Annex to Solar Keymark Certificate		Licence Number	011-7S3235 F
		Date issued	2024-03-25
		Issued by	DINCERTCO

Licence holder	CORDIVARI SRL	Country	ITALIA
Brand (optional)		Web	http://www.cordivari.it
Street, Number	ZONA INDUSTRIALE PAGLIARE	E-mail	info@cordivari.it
Postcode, City	64020 MORRO D'ORO (TE)	Tel	+39 085 80 40 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	110 K
	m²	mm	mm	mm	W	W	W	W	W	W
ASAK MQ 2.5 VT 2 CONN	2.52	2 006	1 257	85	1 932	1 846	1 653	1 432	1 183	599
Power output per m² gross area					767	732	656	568	469	238

Performance parameters test method	Quasi dynamic									
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	0.768	3.27	0.014	0.000	0.00	10 970	0.000	0.00	0.0	0.99

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	1.00	0.99	0.98	0.95	0.88	0.70	0.35	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	1.00	0.99	0.98	0.95	0.88	0.70	0.35	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		$(\vartheta_m-\vartheta_a)_{max}$	80 K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)		ϑ_{stg}	210 °C
Maximum operating temperature		ϑ_{max_op}	199 °C
Maximum operating pressure		$p_{max,op}$	1000 kPa

Testing laboratory	Institut für Gebäudeenergetik, Thermotechnik und Energiespeicherung (IGTE)	http://www.igte.uni-stuttgart.de	
Test report(s)	23COL1718OEM01 22COL1674QOEM01	Dated	14.02.2024 14.02.2024

Comments of testing laboratory	Ver. 6.2 (13.01.2022)
Documented performance parameters are taken from 23COL1718OEM01 (ASAK MQ 2.5 VT 2 CONN) This data sheet replaces the SK data sheet issued on March 3rd 2024. Reason for replacement: Correction of values for maximum tested positve and negative load.	TZS Forschungs- und Testzentrum für Solaranlagen Institut für Thermodynamik und Wärmetechnik Universität Stuttgart Pfaffenwaldring 6, 70550 Stuttgart (Vaihingen)

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Supplementary Information	Issued	2024-03-25

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
ASAK MQ 2.5 VT 2 CONN		3 170	2 339	1 580	2 453	1 742	1 128	1 796	1 213	756	1 961	1 321	812
Gross Thermal Yield per m² gross area		1 258	928	627	973	691	448	713	481	300	778	524	322
Annual efficiency, η_a		71%	53%	36%	60%	42%	27%	61%	41%	26%	63%	42%	26%
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				No	
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)				A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m²) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				2400	Pa
Hail resistance using steel ball (maximum drop height)				1.8	m

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)
ASAK MQ 2.5 VT 2 CONN	2.52

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

Collector efficiency (η_{col})	61%

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.

Additional Informative Technical Data

Hydraulic Designation Code	Aperture Area, A_a (m²)
6,5-V-12S-7.2,1897-20.6,1310	2.32

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

Zero-loss efficiency (η_0)	0.77	--
First-order coefficient (a_1)	3.27	W/(m²K)
Second-order coefficient (a_2)	0.014	W/(m²K²)
Incidence angle modifier IAM (50°)	0.96	--

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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