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IGTE

Annex to Solar Keymark Certificate			
		Licence Number	**011-7S2610 F**
		Date issued	**2021-02-17**
		Issued by	**DIN CERTCO**

Licence holder	**CORDIVARI SRL**	**Country**	Italy
Brand (optional)		**Web**	www.cordivari.it
Street, Number	Zona Industriale Pagliare	**E-mail**	info@cordivari.it
Postcode, City	64020 Morro D'Oro (TE)	**Tel**	+39 085 804 01

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	108 K
	m²	mm	mm	mm	W	W	W	W	W	W
ASA MQ 2.5 OR 2 CONN	2.50	2000	1250	85	1818	1735	1557	1361	1147	691
Power output per m² gross area					727	694	623	545	459	276

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	0.729	3.20	0.009	0.000	0.00	13,608	0.000	0.00	0.0	0.982

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	0.98	0.96	0.93	0.87	0.75	0.38	0.00
Longitudinal	$K_{\theta L,coll}$	1.00	0.99	0.98	0.96	0.93	0.87	0.75	0.38	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	$(\vartheta_m-\vartheta_a)_{max}$	78	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	207	°C
Maximum operating temperature	$\vartheta_{max\ op}$	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)	15COL1316/1 15COL1316Q/1	**Dated**	09.08.2017 09.08.2017

Comments of testing laboratory — Datasheet version: 6.1, 2019-09-26

Update of the data sheet to current version.
This data sheet replaces the data sheet issued on 09.08.2017

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	2021-02-17

Annual collector output 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
ASA MQ 2.5 OR 2 CONN		2,958	2,178	1,500	2,277	1,631	1,089	1,671	1,135	728	1,824	1,235	779
Annual output per m² gross area		1,183	871	600	911	652	435	668	454	291	730	494	312
Annual efficiency, η_a		67%	49%	34%	56%	40%	27%	57%	39%	25%	59%	40%	25%
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. 6.1 (September 2019). 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)					B	--
G (W/m²) >	900	ϑ_a (°C) >	15	H_x (MJ/m²) >		540
Maximum tested positive load					1750	Pa
Maximum tested negative load					1750	Pa
Hail resistance using steel ball (maximum drop height)					2	m

Additional collector attribute(s)

- ☐ Using external power source(s) for normal operation
- ☐ Active or passive measure(s) for self-protection
- ☐ Co-generating thermal and electrical power
- ☐ Façade collector(s)

Energy Labelling Information

	Reference Area, A_{sol} (m²)
ASA MQ 2.5 OR 2 CONN	2.50

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
17-H-12S-A:7.2,19500-C:20.6,3850	2.38

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

Collector efficiency (η_{col})	58%

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)	0.73	--
First-order coefficient (a_1)	3.20	W/(m²K)
Second-order coefficient (a_2)	0.009	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.

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