

Annex to Solar Keymark Certificate		Licence Number			011-7S3018 R						
		Date issued			2024-07-02						
		Issued by			DIN CERTCO						
Licence holder		CORDIVARI S.r.l.			Country			Italia			
Brand (optional)					Web			www.cordivari.com www.cordivaridesign.com			
Street, Number		Zona Industriale Pagliare			E-mail			info@cordivari.it			
Postcode, City		64020 Morro D'Oro (TE)			Tel			+39 08580401			
Collector Type				Evacuated tubular 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	84 K	
					m ²	mm	mm	mm	W	W	
CVT10					2.24	1980	1130	133	1,298	1,262	
CVT15					3.33	1980	1680	133	1,930	1,876	
Power output per m ² gross area					580	564	515	444	352	277	
Performance parameters test method		Steady state - outdoor									
Performance parameters (related to A _G)		η _{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		0.583	1.37	0.027	0.000	0.00	12220	0.000	0.00	0	0.97
Incidence angle modifier test method		Steady state - outdoor									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{θT, coll}	1.02	1.03	1.04	1.05	1.12	1.18	0.79	0.39	0.00
Longitudinal		K _{θL, coll}	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	0.00
Heat transfer medium for testing				Water							
Flow rate for testing (per gross area, A _G)				dm/dt	0.020	kg/(sm ²)					
Maximum temperature difference during thermal performance test				($\vartheta_m - \vartheta_a$) _{max}	53.72	K					
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30\text{ °C}$)				ϑ_{stg}	280	°C					
Maximum operating temperature				$\vartheta_{max, op}$	230	°C					
Maximum operating pressure				p _{max, op}	1000	kPa					
Testing laboratory		Intertek Testing Services Shenzhen Ltd. Guangzhou Branch					http://www.intertek.com				
Test report(s)		231031204GZU-002 231031204GZU-001					Dated		2024/7/2 2024/6/21		
Comments of testing laboratory				Draft Ver. 6.2 (22.09.2021)							
Above efficiency parameters come from OEM test type SHC10:				 Stamp & signature							
<p align="center">DIN CERTCO ● Alboinstraße 56 ● 12103 Berlin, Germany</p> <p align="center">Tel: +49 30 7562-1131 ● Fax: +49 30 7562-1141 ● E-Mail: info@dincertco.de ● www.dincertco.de</p>											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S3018 R
	Issued	2024-07-02

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations ϑ_m	Athens			Davos			Stockholm			Würzburg		
		25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
CVT10		2,242	1,779	1,206	1,823	1,333	823	1,331	950	577	1,440	1,032	618
CVT15		3,333	2,645	1,793	2,710	1,982	1,223	1,978	1,412	858	2,141	1,535	919
Gross Thermal Yield per m ² gross area		1,002	795	539	815	596	368	595	424	258	644	461	276
Annual efficiency, η_a		57%	45%	31%	50%	37%	23%	51%	36%	22%	52%	37%	22%
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 Draft Ver. 6.2 (22.09.2021). 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/m ²) >	900	ϑ_a (°C) >	15
Maximum tested positive load			2800 Pa
Maximum tested negative load			1000 Pa
Hail resistance using steel ball (maximum drop height)			0.6 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		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
CVT10	2.24	1-H-12S-C:19,1205-D	1.82
CVT15	3.33	1-H-12S-C:19,1755-D	2.70

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})	48%	Zero-loss efficiency (η_0)	0.58
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)	1.37 W/(m ² K)
		Second-order coefficient (a_2)	0.027 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.02
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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.			