

Annex to Solar Keymark Certificate					Licence Number		25.01.004							
					Date issued		2024-12-18							
					Issued by		ECC							
Licence holder		GIORDANO R Energy			Country		France							
Brand (optional)		CEV8/12			Web		http://www.giordano.fr							
Street, Number		880 avenue de la Fleuride - Zi Paluds			E-mail		contact@giordano.fr							
Postcode, City		13400 Aubagne			Tel		33 442 845 800							
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	94 K				
					m ²	mm	mm	mm	mm	mm	mm			
CEV8/12 2,5 m ²					2,50	2 148	1 166	76	1 625	1 511	1 227	869	437	0
CEV8/12 2,0 m ²					2,01	1 728	1 166	76	1 307	1 215	986	699	351	0
Power output per m ² gross area					650	604	491	348	175	0				
Performance parameters test method		Steady state - outdoor												
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		0,665	4,20	0,037	0,000	0,00	6 040	0,000	0,00	0,0E+00	0,85			
Incidence angle modifier test method		Quasi dynamic - outdoor												
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°			
Transversal		K _{gT, coll}	1,00	0,99	0,97	0,95	0,90	0,82	0,66	0,16	0,00			
Longitudinal		K _{gL, coll}	1,00	0,99	0,97	0,95	0,90	0,82	0,66	0,16	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}	64	K							
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)					ϑ_{stg}	189	°C							
Maximum operating temperature					$\vartheta_{max, op}$	85	°C							
Maximum operating pressure					p _{max, op}	70	kPa							
Testing laboratory		CESP (Université de Perpignan)					https://cesplab.univ-perp.fr/							
Test report(s)		PVFRES09001-1 PVFRES09001-4					Dated		12/12/2024 12/12/2024					
Comments of testing laboratory					Ver. 6.2 (13.01.2022)									
EUROVENT CERTITA CERTIFICATION SAS - 34 rue de Laffitte 75009 PARIS France Tél.:+33(0)1 75 44 71 71 - 513 133 637 RCS Paris - SIRET 513 133 637 000 35 - TVA FR 59513133637 www.eurovent-certification.com														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	25.01.004
	Issued	2024-12-18

Gross Thermal Yield in kWh/collector at mean fluid temperature ϑ_m													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	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
CEV8/12 2,5 m2		2 452	1 418	592	1 698	875	286	1 282	640	218	1 403	687	238
CEV8/12 2,0 m2		1 971	1 140	476	1 365	704	230	1 030	515	175	1 128	553	192
Gross Thermal Yield per m ² gross area		981	567	237	679	350	114	513	256	87	561	275	95
Annual efficiency, η_a		56%	32%	13%	42%	21%	7%	44%	22%	7%	45%	22%	8%
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) >	1000	ϑ_a (°C) >	20
		H_x (MJ/m ²) >	600
Maximum tested positive load	3100		Pa
Maximum tested negative load	3100		Pa
Hail resistance using steel ball (maximum drop height)	1,6		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)
CEV8/12 2,5 m2	2,50	8-VH-CL1234S-A:11,2020-	2,38
CEV8/12 2,0 m2	2,01	8-V-1234S-A:11,1600-C:20.6,1226-	1,91

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})	42%	Zero-loss efficiency (η_0)	0,65
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)	4,20
		Second-order coefficient (a_2)	0,037
		Incidence angle modifier IAM (50°)	0,89
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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.	