Annex to Solar Keymark Certificate

Licence Number	**23.06.016**
Date issued	**2023-06-29**
Issued by	**EUROVENT CERTITA**

Licence holder	**SYRIUS SOLAR INDUSTRY**	**Country**	France
Brand (optional)	H2000 D8C	**Web**	http://www.syrius-solar.fr
Street, Number	15, rue de Perpignan	**E-mail**	contact@syrius-solar.fr
Postcode, City	34880 Lavérune	**Tel**	+33 467 820 018

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	88 K
	m²	mm	mm	mm	W	W	W	W	W	W
H2000 D8C	2,06	1 015	2 034	98	1 422	1 344	1 138	867	530	169
Power output per m² gross area					690	652	553	421	257	82

Performance parameters test method	Steady state - outdoor									
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	0,703	3,39	0,040	0,000	0,00	6 400	0,000	0,00	0,0E+00	0,88

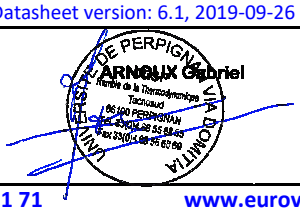
Incidence angle modifier test method		Steady state - outdoor								
Incidence angle modifier	Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal	$K_{\theta T,coll}$	1,00	0,99	0,98	0,96	0,92	0,86	0,73	0,33	0,00
Longitudinal	$K_{\theta L,coll}$	1,00	0,99	0,98	0,96	0,92	0,86	0,73	0,33	0,00

Heat transfer medium for testing		Water-Glycole	
Flow rate for testing (per gross area, A_G)	dm/dt	0,020	kg/(sm²)
Maximum temperature difference during thermal performance test	$(\vartheta_m-\vartheta_a)_{max}$	58	K
Standard stagnation temperature (G = 1000 W/m²; ϑ_a = 30 °C)	ϑ_{stg}	170	°C
Maximum operating temperature	ϑ_{max_op}	200	°C
Maximum operating pressure	$p_{max,op}$	100	kPa

Testing laboratory	CESP	http://www.cesplab.univ-perp.fr	
Test report(s)	PVFRES03004-1-4	**Dated**	28/05/2023

Comments of testing laboratory

Datasheet version: 6.1, 2019-09-26



Annex to Solar Keymark Certificate	Licence Number	23.05.004
Supplementary Information	Issued	2023-05-22

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
H2000 D8C	2 214	1 428	698	1 618	936	377	1 208	677	280	1 318	728	300
Annual output per m² gross area	1 075	693	339	786	454	183	587	329	136	640	354	146
Annual efficiency, η_a	61%	39%	19%	48%	28%	11%	50%	28%	12%	51%	28%	12%
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)				A	--
G (W/m²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m²) >	600
Maximum tested positive load				3000	Pa
Maximum tested negative load				3000	Pa
Hail resistance using steel ball (maximum drop height)				1	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)
H2000 D8C	2,06

Additional Informative Technical Data

Hydraulic Designation Code	Aperature Area, A_a (m²)
20-V-1234S-A:7.2,16700-	1,88

Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Collector efficiency (η_{col})	49%

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)	3,39	W/(m²K)
Second-order coefficient (a_2)	0,040	W/(m²K²)
Incidence angle modifier IAM (50°)	0,92	--

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.