
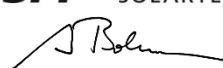


Annex to Solar Keymark Certificate					Licence Number		011-7S2998 F							
					Date issued		2021-01-05							
					Issued by		DIN CERTCO							
Licence holder			FAFCO SAS		Country		France							
Brand (optional)			-		Web		www.fafco.fr							
Street, Number			5C, Rue du point du jour		E-mail		info@fafco.fr							
Postcode, City			FR 21800 Chevigny-Saint-Sauveur		Tel		+33 3 80 44 90 60							
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	47 K				
					m ²	mm	mm	mm	mm	mm				
FAFCO Atmosolar 4N					4.05	3'140	1'290	84	2'316	937	0	--	--	0
Power output per m ² gross area					572	231	0	--	--	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			0.610	51.09	0.000	10.018	0.49	2'254	0.009	0.01	0.0E+00	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 _{gT, coll}	0.99	0.97	1.00	1.08	1.09	0.99	1.06	0.70	0.00		
Longitudinal			K _{gL, coll}	1.00	1.00	1.00	0.99	0.97	0.92	0.81	0.56	0.00		
Heat transfer medium for testing					Water-Glycole									
Flow rate for testing (per gross area, A _G)					dm/dt	0.036	kg/(sm ²)							
Maximum temperature difference during thermal performance test					($\vartheta_m - \vartheta_a$) _{max}	23	K							
Standard stagnation temperature (G = 1000 W/m ² ; $\vartheta_a = 30$ °C)					ϑ_{stg}	60	°C							
Maximum operating temperature					$\vartheta_{max, op}$	60	°C							
Maximum operating pressure					p _{max, op}	240	kPa							
Testing laboratory			SPF Testing, CH-8640 Rapperswil, Switzerland					www.spf.ch						
Test report(s)			C1672LPEN, C1672QPEN C1672ISO					Dated		08.11.2020 08.11.2020				
Comments of testing laboratory					Datasheet version: 6.1, 2019-09-26									
					 INSTITUT FÜR SOLARTECHNIK 									
DIN CERTCO • Alboinstraße 56 • 12103 Berlin, Germany Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2998 F
	Issued	2021-01-05

Annual collector output in kWh/collector at mean fluid temperature ϑ_m													
Collector name	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
FAFCO Atmosolar 4N		3'422			318			620			784		
Annual output per m ² gross area		845	--	--	79	--	--	153	--	--	194	--	--
Annual efficiency, η_a		48%	--	--	5%	--	--	13%	--	--	16%	--	--
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. 6.1 (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/m ²) >	1000	ϑ_a (°C) >	20	H_x (MJ/m ²) >	600
Maximum tested positive load			1200	Pa	
Maximum tested negative load			700	Pa	
Hail resistance using steel ball (maximum drop height)			35	m	

Additional collector attribute(s)			
<input type="checkbox"/>	Using external power source(s) for normal operation	<input type="checkbox"/>	Active or passive measure(s) for self-protection
<input type="checkbox"/>	Co-generating thermal and electrical power	<input checked="" type="checkbox"/>	Façade collector(s)

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, A_{sol} (m ²)	Hydraulic Designation Code	Aperture Area, A_a (m ²)
FAFCO Atmosolar 4N	4.05	204-VH-1234S-A:5,2990-C:45,1290	3.78

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})	0%	Zero-loss efficiency (η_0)	0.57	
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)	34.06	
		Second-order coefficient (a_2)	0.000	
		Incidence angle modifier IAM (50°)	1.05	--
		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.		