
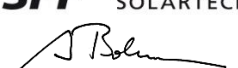


Annex to Solar Keymark Certificate					Licence Number		PSK-005/2020				
Summary of EN ISO 9806 Test Results					Issued		2020-03-06				
Collector test standard		EN ISO 9806									
Licence holder		Jacques Giordano Industries S. A.			Country		France				
Brand (optional)		Giordano Industries			Web		www.giordano.fr				
Street, Number		529 Avenue de la Fleuride, ZI des Paluds			E-mail		contact@giordano.fr				
Postcode, City		FR-13685, Aubagne Cedex			Tel		+33 442 84 58 00				
Collector Type					Flat plate collector, unglazed						
					Power output per collector						
					Gb = 850 W/m ² ; Gd = 150 W/m ² ; $\vartheta_m - \vartheta_a = 2K$ u (m/s)						
Collector name		Gross area (A_g)	Gross length	Gross width	Gross height	1.0		1.5		3.0	
		m ²	mm	mm	mm	W		W		W	
Capteur 4N		4.70	3,175	1,480	115	2,143		2,101		1,973	
Power output per m² gross area						456		447		420	
Performance parameters test method				Steady state - outdoor							
Performance parameters (related to AG)				$\eta_{0,hem}$	b1	b2	bu	ϵ/α			
Units				-	W/(m ² K)	Ws/(m ³ K)	s/m	-			
Test results				0.607	23.87	5.42	0.012	0.85			
Incidence angle modifier test method				Steady state - outdoor							
Bi-directional incidence angle modifiers		Yes									
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
Transversal		K _{GT, coll}	1.00	1.00	0.99	1.01	1.08	1.00	0.82	0.47	0.00
Longitudinal		K _{GL, coll}	1.00	1.00	1.00	0.99	0.98	0.94	0.83	0.58	0.00
Fluid for testing					Water-Glycole						
Flow rate for testing (per gross area, AG)					dm/dt	0.028	kg/(sm ²)				
Maximum temperature difference for thermal performance calculations					$(\vartheta_m - \vartheta_a)_{max}$	50	K				
Standard stagnation temperature (G = 1000 W/m²; $\vartheta_a = 30^\circ C$)					ϑ_{stg}	53	°C				
Effective thermal capacity (per gross area, AG)					C/m ²	17.1	kJ/(Km ²)				
Maximum operating temperature					$\vartheta_{max, op}$	60	°C				
Maximum operating pressure					p _{max, op}	400	kPa				
Testing laboratory		SPF, CH-8640 Rapperswil					www.spf.ch				
Test report(s)		C1673LPEN C1673QPEN					Dated		1-3-2016 1-3-2016		
Comments of testing laboratory											
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 INSTITUT FÜR SOLARTECHNIK 											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	PSK-005/2020
	Issued	2020-03-06

Annual collector output in kWh/collector at mean fluid temperature ϑ_m, based on ISO 9806 Test Results													
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
Capteur 4N		3,157	--	--	309	--	--	597	--	--	745	--	--
Annual output per m ² gross area		672	--	--	66	--	--	127	--	--	158	--	--
Fixed or tracking collector	Fixed (slope = latitude - 15°; rounded to nearest 5°)												
Annual irradiation on collector plane		1765 kWh/m ²			1714 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. 5.01 (July 2015). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc													

Additional Information		
Collector heat transfer medium	Liquid	
Hybrid Thermal and Photo Voltaic collector	No	
The collector is deemed to be suitable for roof integration	No	
The collector was tested successfully according to EN ISO 9806 under the following conditions:		
Climate class (A, B or C)	A	--
Positive Mechanical Load	500	Pa
Negative Mechanical Load	300	Pa
Hail resistance using ice balls (diameter)	35	mm

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
Capteur 4N	4.70	Collector efficiency (η_{col})	-- %
		<i>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/m², 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.</i>	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.600 --
		First-order coefficient (a_1)	29.29 W/(m ² K)
		Second-order coefficient (a_2)	0.000 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.02 --
		<i>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.</i>	