

Annex to Solar Keymark Certificate - Summary of EN 12975-2 Test Results						Licence Number		011-7S2798 R				
						Date issued		2017-10-20				
						Issued by		ISFH CalTeC				
Licence holder	S.A.S. LACAZE ENERGIES					Country	France					
Brand (optional)						Web	www.lacaze-energies.com					
Street, Number	Zone industrielle - BP 2					E-mail	info.lacaze-energies@groupe-cahors.com					
Postcode, City	46120, Leyme					Tel	+33 (0)565403939					
Collector Type						Evacuated tubular collector						
Collector name	Gross area (A _G) m ²	Gross length mm	Gross width mm	Gross height mm	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a							
					0 K W	10 K W	30 K W	50 K W	70 K W	56 K W		
SUN 501.20	2.77	1 952	1 418	93	1 598	1 571	1 504	1 422	-	1 394		
SUN 551.20	2.77	1 952	1 419	93	1 598	1 571	1 504	1 422	1 323	1 394		
SUN 501.30	4.15	1 952	2 127	93	2 395	2 354	2 254	2 130	-	2 088		
SUN 551.30	4.15	1 952	2 127	93	2 395	2 354	2 254	2 130	1 982	2 088		
Power output per m ² gross area					577	567	543	513	478	503		
Performance parameters test method		Steady state - indoor										
Performance parameters (related to A _G)		η _{0,hem}	a ₁	a ₂								
Units		-	W/(m ² K)	W/(m ² K ²)								
Test results		0.577	0.910	0.007								
Incidence angle modifier test method		Quasi dynamic - outdoor										
Bi-directional incidence angle modifiers		Yes										
Incidence angle modifier		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal		K _{θT, coll}	1.01	1.02	1.04	1.04	0.99	0.90			0.00	
Longitudinal		K _{θL, coll}	1.00	0.99	0.97	0.95	0.91	0.83			0.00	
Heat transfer medium for testing		Water										
Flow rate for testing (per gross area, A _G)		dm/dt	0.015	kg/(sm ²)								
Maximum temperature difference for thermal performance calculations		(ϑ _m -ϑ _a) _{max}	56	K								
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)		ϑ _{stg}	167	°C								
Effective thermal capacity, incl. fluid (per gross area, A _G)		C/m ²	3.4	kJ/(Km ²)								
Maximum operating temperature		ϑ _{max, op}	130	°C								
Maximum operating pressure		p _{max, op}	1000	kPa								
Testing laboratory	Institut für Solarenergieforschung Hameln					www.isfh.de						
Test report(s)	55-17/B					Dated	06.10.17					
Comments of testing laboratory						Datasheet version: 5.01, 2016-03-01						
The reported power output values are calculated for normal incidence. For the Sun 501 the condenser of the evacuated tubes has a cut-off mechanism which starts operation at about 70°C and for the SUN 551 according to the manufacturer at about 130°C.						Institut für Solarenergieforschung GmbH Am Ohrberg 1 D-31860 Emmerthal Tel.: 05151/999-100 Fax: 05151/999-500						
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2798 R
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Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on ISO 12975-2 test results

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
SUN 501.20		2 635	2 323	-	2 271	1 948	-	1 623	1 360	-	1 742	1 462	-
SUN 551.20		2 635	2 323	1 965	2 271	1 948	1 613	1 623	1 360	1 097	1 742	1 462	1 176
SUN 501.30		3 948	3 480	-	3 402	2 918	-	2 432	2 038	-	2 610	2 191	-
SUN 551.30		3 948	3 480	2 944	3 402	2 918	2 416	2 432	2 038	1 644	2 610	2 191	1 762
Annual output per m ² gross area		951	839	709	820	703	582	586	491	396	629	528	425
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 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/scenocalc

Additional Information

Collector heat transfer medium	Water-Glycole	
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 9806:2013 under the following conditions:		
Climate class (A, B or C)	--	--
Maximum tested positive load	3000	Pa
Maximum tested negative load	---	Pa
Hail resistance using steel ball (maximum drop height)	---	m

Energy Labelling Information

	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
SUN 501.20	2.77	Collector efficiency (η_{col})	53 %
SUN 551.20	2.77	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 9806:2013.	
SUN 501.30	4.15		
SUN 551.30	4.15		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.577 --
		First-order coefficient (a_1)	0.91 W/(m ² K)
		Second-order coefficient (a_2)	0.007 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.99 --
		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.	

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