
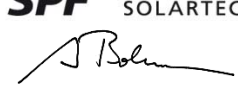


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S1804 R							
					Date issued		2016-05-25							
					Issued by		SPF							
Licence holder		EuroSun Solarsystem GmbH			Country		Germany							
Brand (optional)		--			Web		www.eurosunsolar.de							
Street, Number		An der Bahn 5b			E-mail		info@eurosunsolar.de							
Postcode, City		DE-89434, Blindheim			Tel		+49 9074 9220 371							
Collector Type					Evacuated tubular collector									
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a									
					0 K	10 K	30 K	50 K	70 K	230 K				
					m ²	mm	mm	mm	W	W	W	W	W	W
DF120-6					2.37	2'735	866	179	1'355	1'336	1'293	1'242	1'183	433
Power output per m ² gross area					572	564	546	524	499	183				
Performance parameters test method					Steady state - outdoor									
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					0.572	0.75	0.0041							
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}	1.01	1.03	1.07	1.10	1.07	0.99	0.82	0.46	0.00
Longitudinal					K _{GL, coll}	1.00	1.00	0.99	0.97	0.93	0.85	0.71	0.46	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 for thermal performance calculations					(ϑ _m -ϑ _a) _{max}	230	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}	350	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²	4.89	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}	--	°C							
Maximum operating pressure					p _{max, op}	1300	kPa							
Testing laboratory					SPF, CH-8640 Rapperswil			www.spf.ch						
Test report(s)					C1655LPEN C1655QPEN			Dated		27.04.2016 27.04.2016				
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
Can be operated with water and thermal oil					 INSTITUT FÜR SOLARTECHNIK 									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S1804 R
	Issued	2016-05-25

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN ISO 9806:2013 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
DF120-6		2'351	2'140	1'904	2'054	1'837	1'609	1'470	1'287	1'106	1'577	1'384	1'190
Annual output per m ² gross area		992	903	804	867	775	679	620	543	467	666	584	502
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-Propyleneglycol	
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)	A	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	2400	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}	
DF120-6	2.37	Collector efficiency (η_{col})	54 %
		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.	
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.572 --
		First-order coefficient (a_1)	0.75 W/(m ² K)
		Second-order coefficient (a_2)	0.004 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.06 --
		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.	