



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2523 R							
					Date issued		2017-07-17							
					Issued by		DIN CERTCO							
Licence holder		Photonomi Nominees IP Ltd			Country		United Kingdom							
Brand (optional)		Surface Power			Web		www.photonomi.com							
Street, Number		13-14 Esplanade, Jerse			E-mail		john@photonomi.com							
Postcode, City		JE1 1EE, St Helier			Tel		44 2034115312							
Collector Type					Evacuated tubular collector									
Collector name					Gross area (A _G)	Gross length	Gross width	Gross height	Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² θ _m - θ _a					
					m ²	mm	mm	mm	0 K	10 K	30 K	50 K	70 K	134 K
SP501:4					1.68	1 608	1 045	136	660	639	598	556	514	381
Power output per m ² gross area					393	381	356	331	306	227				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂							
Units					-	W/(m ² K)	W/(m ² K ²)							
Test results					0.393	1.240	0.000							
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	1.06	1.16	1.31	1.61	1.76	1.69	1.45	0.00
Longitudinal					K _{θL, coll}	1.00	0.99	0.98	0.96	0.93	0.87	0.76	0.00	0.00
Heat transfer medium for testing					Water-Glycole									
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}		134	K						
Standard stagnation temperature (G = 1000 W/m ² ; θ _a = 30 °C)					θ _{stg}		254.4	°C						
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²		14.78	kJ/(Km ²)						
Maximum operating temperature					θ _{max, op}		120	°C						
Maximum operating pressure					P _{max, op}		1000	kPa						
Testing laboratory					TÜV Rheinland (Shanghai) Co., Ltd.									
Test report(s)					154080746a_EN_SP501_Report		Dated		2015-07-06					
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01									
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Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2523 R
	Issued	2017-07-17

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on 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
SP501:4		1 328	1 126	948	1 084	909	761	804	655	533	866	705	573
Annual output per m ² gross area		791	670	564	645	541	453	479	390	317	516	420	341
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	Yes	
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:		
Climate class (A, B or C)	C	--
Maximum tested positive load	2400	Pa
Maximum tested negative load	1800	Pa
Hail resistance using steel ball (maximum drop height)	1	m

Energy Labelling Information			
	Reference Area, A_{sol} (m ²)	Data required for CDR (EU) No 811/2013 - Reference Area A_{sol}	
HONE501:4	1.68	Collector efficiency (η_{col})	34 %
		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)	0.393 --
		First-order coefficient (a_1)	1.24 W/(m ² K)
		Second-order coefficient (a_2)	0.000 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	1.26 --
		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.	