


Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2170 F								
					Date issued		2018-05-04								
					Issued by		TÜV Rheinland Energy GmbH								
Licence holder		ÖkofEN France			Country		France								
Brand (optional)					Web		www.okofen.fe								
Street, Number		Rue des Tenettes			E-mail		info@okofen.fr								
Postcode, City		73190 Saint Baldoph			Tel		+33 04 79 65 01 71								
Collector Type					Flat plate collector, glazed										
Collector name					Power output per collector G _b = 850 W/m ² ; G _d = 150 W/m ² ϑ _m - ϑ _a										
					Gross area (A _G)		Gross length	Gross width	Gross height	0 K	10 K	30 K	50 K	70 K	90 K
					m ²	mm	mm	mm	W	W	W	W	W	W	
PELLESOL-a					2.25	2 100	1 070	106	1 541	1 473	1 325	1 161	980	784	
PELLESOL-a(i)					2.25	2 100	1 070	106	1 541	1 473	1 325	1 161	980	784	
PELLESOL-a horizontal					2.25	1 070	2 100	106	1 541	1 473	1 325	1 161	980	784	
PELLESOL-a horizontal (i)					2.25	1 070	2 100	106	1 541	1 473	1 325	1 161	980	784	
Power output per m ² gross area					685	655	589	516	436	348					
Performance parameters test method					Steady state - indoor										
Performance parameters (related to AG)					η _{0,hem}	a ₁	a ₂								
Units					-	W/(m ² K)	W/(m ² K ²)								
Test results					0.685	2.931	0.009								
Incidence angle modifier test method					Quasi dynamic - outdoor										
Bi-directional incidence angle modifiers					No										
Incidence angle modifier					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°	
Transversal					K _{θT, coll}					0.93				0.00	
Longitudinal					K _{θL, coll}					0.93				0.00	
Heat transfer medium for testing					Water										
Flow rate for testing (per gross area, A _G)					dm/dt		0.050	kg/(sm ²)							
Maximum temperature difference for thermal performance calculations					(ϑ _m -ϑ _a) _{max}		90	K							
Standard stagnation temperature (G = 1000 W/m ² ; ϑ _a = 30 °C)					ϑ _{stg}		196	°C							
Effective thermal capacity, incl. fluid (per gross area, A _G)					C/m ²		15.69	kJ/(Km ²)							
Maximum operating temperature					ϑ _{max, op}		224	°C							
Maximum operating pressure					p _{max, op}		1000	kPa							
Testing laboratory					TÜV Rheinland Energy GmbH			www.tuv.com/solarpower							
Test report(s)					2.04.01243.1.0-3-LT (AIT; Thermal Performance) 2.04.01243.1.0-3-QT (AIT; Reliability) 2.04.00312.1.0-1(13)/ 2.04.00327.1.0(13) (AIT; document check)			Dated		16.03.2015 16.03.2015 04.06.2013					
Comments of testing laboratory					Datasheet version: 5.01, 2016-03-01										
<p>The values related to 2.02 m² aperture area are: eta0a=0.765; a1a=3.277; a2a=0.010. TÜV Rheinland Energy GmbH is not responsible for the test reports and the results issued by AIT Austrian Institute of Technology.</p>					 <p>TÜVRheinland® Genau. Richtig. TÜV Rheinland Energy GmbH Am Grauen Stein 51105 Köln</p>										
<p>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</p>															

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2170 F
	Issued	2018-05-04

Annual collector output in kWh/collector at mean fluid temperature ϑ_m , based on EN ISO 9806:2013 test results

Standard Locations 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
PELLESOL-a		2 448	1 804	1 245	1 893	1 362	914	1 387	946	610	1 503	1 021	647
PELLESOL-a(i)		2 448	1 804	1 245	1 893	1 362	914	1 387	946	610	1 503	1 021	647
PELLESOL-a horizontal		2 448	1 804	1 245	1 893	1 362	914	1 387	946	610	1 503	1 021	647
PELLESOL-a horizontal (i)		2 448	1 804	1 245	1 893	1 362	914	1 387	946	610	1 503	1 021	647
Annual output per m ² gross area		1 088	802	553	841	605	406	616	420	271	668	454	288
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)	C	--
Maximum tested positive load	2000	Pa
Maximum tested negative load	1500	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}	
PELLESOL-a	2.25	Collector efficiency (η_{col})	55 %
PELLESOL-a(i)	2.25	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.	
PELLESOL-a horizontal	2.25		
PELLESOL-a horizontal (i)	2.25		
		Data required for CDR (EU) No 812/2013 - Reference Area A_{sol}	
		Zero-loss efficiency (η_0)	0.685 --
		First-order coefficient (a_1)	2.93 W/(m ² K)
		Second-order coefficient (a_2)	0.009 W/(m ² K ²)
		Incidence angle modifier IAM (50°)	0.93 --
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.			