



Annex to Solar Keymark Certificate - Summary of EN ISO 9806:2013 Test Results					Licence Number		011-7S2867 L							
					Date issued		2018-06-21							
					Issued by		DIN CERTCO							
Licence holder	Oscar Science & Technology Co., Ltd.				Country	China								
Brand (optional)	Oscar				Web	www.oscarsolar.com								
Street, Number	No. 5 Xingda 3rd				E-mail	alan@oscarsolar.com								
Postcode, City	321300, Yongkang City, Zhejiang Province,				Tel	+86 13588619668								
Collector Type					Flat plate collector, glazed									
Collector name	Gross area (A <sub>G</sub> ) m <sup>2</sup>	Gross length mm	Gross width mm	Gross height mm	Power output per collector G <sub>b</sub> = 850 W/m <sup>2</sup> ; G <sub>d</sub> = 150 W/m <sup>2</sup> ϑ <sub>m</sub> - ϑ <sub>a</sub>									
					0 K W	10 K W	30 K W	50 K W	70 K W	40 K W				
OS22	0.73	1 010	720	62	488	378	145	0	0	23				
OS32	1.11	1 210	920	62	743	575	221	0	0	34				
OS42	1.97	1 970	1 000	62	1 318	1 020	392	0	0	61				
Power output per m <sup>2</sup> gross area					669	518	199	0	0	31				
Performance parameters test method					Steady state - outdoor									
Performance parameters (related to AG)					η <sub>0,hem</sub>	a <sub>1</sub>	a <sub>2</sub>							
Units					-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )							
Test results					0.669	14.829	0.028							
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 <sub>θT, coll</sub>			0.97	0.93	0.85				0.00
Longitudinal					K <sub>θL, coll</sub>			0.97	0.93	0.85				0.00
Heat transfer medium for testing					Air									
Flow rate for testing (per gross area, A <sub>G</sub> )					dm/dt	see 1	kg/(sm <sup>2</sup> )							
Maximum temperature difference for thermal performance calculations					(ϑ <sub>m</sub> -ϑ <sub>a</sub> ) <sub>max</sub>	40	K							
Standard stagnation temperature (G = 1000 W/m <sup>2</sup> ; ϑ <sub>a</sub> = 30 °C)					ϑ <sub>stg</sub>	149.5	°C							
Effective thermal capacity, incl. fluid (per gross area, A <sub>G</sub> )					C/m <sup>2</sup>	2.1	kJ/(Km <sup>2</sup> )							
Maximum operating temperature					ϑ <sub>max, op</sub>	-	°C							
Maximum operating pressure					p <sub>max, op</sub>	60	kPa							
Testing laboratory					TÜV Rheinland (Shanghai) Co., Ltd.			www.tuv.com						
Test report(s)					50152939-001 50152941-001			Dated		6/21/2018 6/21/2018				
Comments of testing laboratory					Datashet version: 5.01, 2016-03-01									
1 There are three different flow rate used during the testing. More information are given within test report 50152941-001.					Stamp & signature of test lab									
<b>DIN CERTCO • Alboinstraße 56 • 12103 Berlin</b> Tel: +49 30 7562-1131 • Fax: +49 30 7562-1141 • E-Mail: info@dincertco.de • www.dincertco.de														



Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S2867 L
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Annual collector output in kWh/collector at mean fluid temperature  $\vartheta_m$ , based on ISO 9806:2013 test results

Collector name	Standard Locations $\vartheta_m$	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
OS22		650	111	0	260	22		238	24		268	28	
OS32		989	169	0	396	33		362	36		407	43	
OS42		1755	300	1	702	59		642	64		722	77	
Annual output per m <sup>2</sup> gross area		891	152	0	356	30		326	33		367	39	
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1714 kWh/m <sup>2</sup>			1166 kWh/m <sup>2</sup>			1244 kWh/m <sup>2</sup>		
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  $\vartheta_m$  (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](http://www.solarkeymark.org/scenocalc)

Additional Information

Collector heat transfer medium	Air
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)	B --
Maximum tested positive load	2400 Pa
Maximum tested negative load	1600 Pa
Hail resistance using steel ball (maximum drop height)	1.2 m

Energy Labelling Information

	Reference Area, A <sub>sol</sub> (m <sup>2</sup> )	Data required for CDR (EU) No 811/2013 - Reference Area A <sub>sol</sub>	
OS22	0.73	Collector efficiency ( $\eta_{col}$ )	3 %
OS32	1.11	<i>Remark: Collector efficiency (<math>\eta_{col}</math>) 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<sup>2</sup>, expressed in % and rounded to the nearest integer. Deviating from the regulation <math>\eta_{col}</math> is based on reference area (A<sub>sol</sub>) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.</i>	
OS42	1.97		
		Data required for CDR (EU) No 812/2013 - Reference Area A <sub>sol</sub>	
		Zero-loss efficiency ( $\eta_0$ )	0.669 --
		First-order coefficient (a <sub>1</sub> )	14.83 W/(m <sup>2</sup> K)
		Second-order coefficient (a <sub>2</sub> )	0.028 W/(m <sup>2</sup> K <sup>2</sup> )
		Incidence angle modifier IAM (50°)	0.85 --
<i>Remark: The data given in this section are related to collector reference area (A<sub>sol</sub>) 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>			