
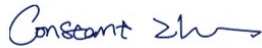


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S3220 F</b>				
					<b>Date issued</b>		<b>2024-02-22</b>				
					<b>Issued by</b>		<b>DIN CERTCO</b>				
<b>Licence holder</b>		<b>SUNERG SOLAR SRL</b>			<b>Country</b>		<b>Italy</b>				
<b>Brand (optional)</b>		<b>Sunerg</b>			<b>Web</b>		<b>http://www.sunergsolar.com</b>				
<b>Street, Number</b>		<b>Via D. Donini 51 – Cinquemiglia</b>			<b>E-mail</b>		<b>luca@sunergsolar.com</b>				
<b>Postcode, City</b>		<b>06012-Città di Castello (PG)</b>			<b>Tel</b>		<b>+39 075 8540018</b>				
<b>Collector Type</b>					<b>Flat plate collector</b>						
<b>Collector name</b>					<b>Power output per collector</b>						
					Gb = 850 W/m <sup>2</sup> , Gd = 150 W/m <sup>2</sup> & u = 1.3 m/s $\vartheta_m - \vartheta_a$						
					0 K	10 K	30 K	50 K	70 K	100 K	
					W	W	W	W	W	W	
<b>RED 20+</b>					1 552	1 476	1 313	1 135	943	629	
<b>RED 30+</b>					2 328	2 214	1 969	1 703	1 415	943	
<b>Power output per m<sup>2</sup> gross area</b>					<b>776</b>	<b>738</b>	<b>656</b>	<b>568</b>	<b>472</b>	<b>314</b>	
<b>Performance parameters test method</b>		<b>Quasi dynamic</b>									
<b>Performance parameters (related to A<sub>G</sub>)</b>		$\eta_0, b$	a1	a2	a3	a4	a5	a6	a7	a8	Kd
<b>Units</b>		-	W/(m <sup>2</sup> K)	W/(m <sup>2</sup> K <sup>2</sup> )	J/(m <sup>3</sup> K)	-	J/(m <sup>2</sup> K)	s/m	W/(m <sup>2</sup> K <sup>4</sup> )	W/(m <sup>2</sup> K <sup>4</sup> )	-
<b>Test results</b>		0.783	3.72	0.009	0.000	0.00	12 180	0.000	0.00	0.00	0.94
<b>Incidence angle modifier test method</b>		<b>Quasi dynamic - outdoor</b>									
<b>Incidence angle modifier</b>		Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
<b>Transversal</b>		K <sub>θT, coll</sub>	1.00	1.00	0.98	0.96	0.93	0.88	0.77	0.00	0.00
<b>Longitudinal</b>		K <sub>θL, coll</sub>	1.00	1.00	0.98	0.96	0.93	0.88	0.77	0.00	0.00
<b>Heat transfer medium for testing</b>					<b>Water</b>						
<b>Flow rate for testing (per gross area, A<sub>G</sub>)</b>					dm/dt	0.020	kg/(sm <sup>2</sup> )				
<b>Maximum temperature difference during thermal performance test</b>					( $\vartheta_m - \vartheta_a$ ) <sub>max</sub>	70	K				
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\vartheta_a = 30</math> °C)</b>					$\vartheta_{stg}$	190	°C				
<b>Maximum operating temperature</b>					$\vartheta_{max, op}$	99	°C				
<b>Maximum operating pressure</b>					p <sub>max, op</sub>	800	kPa				
<b>Testing laboratory</b>		<b>TÜV Rheinland (Guangdong) Ltd.</b>				<b>http://www.tuv.com</b>					
<b>Test report(s)</b>		154150039_Linuo_P-G-2.80_ISO_Report_chen 154150039_Linuo_P-G-1.82_ISO_Report_chen 200715014GZU-001 CN24FLG 001_Document check				<b>Dated</b>		2017-11-08 2017-11-09 2020-10-21 2024-02-22			
<b>Comments of testing laboratory</b>					Ver. 6.2 (13.01.2022)						
No comment					 Precisely Right. 						
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											

Annex to Solar Keymark Certificate Supplementary Information	Licence Number	011-7S3220 F
	Issued	2024-02-22

Gross Thermal Yield in kWh/collector at mean fluid temperature $\vartheta_m$													
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
RED 20+		2 486	1 786	1 197	1 894	1 328	865	1 390	925	577	1 517	1 000	615
RED 30+		3 730	2 679	1 796	2 842	1 992	1 297	2 084	1 387	866	2 275	1 499	922
Gross Thermal Yield per m <sup>2</sup> gross area		1 243	893	599	947	664	432	695	462	289	758	500	307
Annual efficiency, $\eta_a$		70%	51%	34%	58%	41%	27%	60%	40%	25%	61%	40%	25%
Fixed or tracking collector		Fixed (slope = latitude - 15°; rounded to nearest 5°)											
Annual irradiation on collector plane		1765 kWh/m <sup>2</sup>			1630 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. 6.2 (13.01.2022). A detailed description of the calculations is available at <a href="http://www.estif.org/solarkeymarknew/">http://www.estif.org/solarkeymarknew/</a>													

Additional Information					
Collector heat transfer medium	Water-Glycole				
The collector is deemed to be suitable for roof integration	No				
The collector was tested successfully under the following conditions:					
Climate class (A+, A, B or C)	C		--		
G (W/m <sup>2</sup> ) >	800	$\vartheta_a$ (°C) >	10	$H_x$ (MJ/m <sup>2</sup> ) >	600
Maximum tested positive load	2760		Pa		
Maximum tested negative load	1888		Pa		
Hail resistance using steel ball (maximum drop height)	2		m		

Additional collector attribute(s)			
Using external power source(s) for normal operation	No	Active or passive measure(s) for self-protection	No
Co-generating thermal and electrical power	No	Facade collector(s)	No

Energy Labelling Information		Additional Informative Technical Data	
	Reference Area, $A_{sol}$ (m <sup>2</sup> )	Hydraulic Designation Code	Aperture Area, $A_a$ (m <sup>2</sup> )
RED 20+	2.00	9-VH-1234S-A:8,1874-C:20,1050	1.81
RED 30+	3.00	14-VH-1234S-A:8,1874-C:20,1550	2.31

Data required for CDR (EU) No 811/2013 - Reference Area $A_{sol}$		Data required for CDR (EU) No 812/2013 - Reference Area $A_{sol}$	
Collector efficiency ( $\eta_{col}$ )	61%	Zero-loss efficiency ( $\eta_0$ )	0.78
Remark: Collector efficiency ( $\eta_{col}$ ) 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 <sup>2</sup> , expressed in % and rounded to the nearest integer. Deviating from the regulation $\eta_{col}$ is based on reference area ( $A_{sol}$ ) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2017.		First-order coefficient ( $a_1$ )	3.72
		Second-order coefficient ( $a_2$ )	0.009
		Incidence angle modifier IAM (50°)	0.92
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.			