


<b>Annex to Solar Keymark Certificate</b>					<b>Licence Number</b>		<b>011-7S3020 R</b>							
					<b>Date issued</b>		<b>2024-06-21</b>							
					<b>Issued by</b>		<b>DIN CERTCO</b>							
<b>Licence holder</b>		Zhejiang Shentai Solar Energy Co., Ltd			<b>Country</b>		CHINA							
<b>Brand (optional)</b>		Suntask, SHENTAL			<b>Web</b>		www.suntasksolar.com							
<b>Street, Number</b>		199 lianhong road,yuanhua industry zone			<b>E-mail</b>		info@suntasksolar.com							
<b>Postcode, City</b>		314416, haining City, zhejiang Province			<b>Tel</b>		+86 573-87861111							
<b>Collector Type</b>					Evacuated tubular collector									
<b>Collector name</b>					<b>Power output per collector</b> G <sub>b</sub> = 850 W/m <sup>2</sup> , G <sub>d</sub> = 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	84 K				
					m <sup>2</sup>	mm	mm	mm	W	W	W	W	W	W
SHC10					2.24	1980	1130	133	1,298	1,262	1,152	994	788	619
SHC12					2.67	1980	1350	133	1,551	1,507	1,377	1,188	942	740
SHC14					3.11	1980	1570	133	1,804	1,753	1,601	1,382	1,095	860
SHC15					3.33	1980	1680	133	1,930	1,876	1,713	1,479	1,172	920
SHC16					3.54	1980	1790	133	2,057	1,999	1,825	1,575	1,249	981
SHC18					3.98	1980	2010	133	2,309	2,244	2,050	1,769	1,402	1,101
SHC20					4.42	1980	2230	133	2,562	2,490	2,274	1,963	1,556	1,222
SHC21					4.63	1980	2340	133	2,689	2,613	2,386	2,059	1,633	1,282
SHC22					4.85	1980	2450	133	2,815	2,722	2,498	2,156	1,709	1,342
SHC24					5.29	1980	2670	133	3,068	2,981	2,723	2,350	1,863	1,463
SHC25					5.50	1,980	2,780	133	3,194	3,104	2,835	2,447	1,940	1,523
SHC28					6.04	1,980	3,050	133	3,504	3,406	3,110	2,684	2,128	1,671
<b>Power output per m<sup>2</sup> gross area</b>					580	564	515	444	352	277				
<b>Performance parameters test method</b>					Steady state - outdoor									
<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>					0.583	1.37	0.027	0.000	0.00	12220	0.000	0.00	0	0.97
<b>Incidence angle modifier test method</b>					Steady state - outdoor									
<b>Incidence angle modifier</b>					Angle	10°	20°	30°	40°	50°	60°	70°	80°	90°
<b>Transversal</b>					K <sub>θT, coll</sub>	1.02	1.03	1.04	1.05	1.12	1.18	0.79	0.39	0.00
<b>Longitudinal</b>					K <sub>θL, coll</sub>	1.00	1.00	0.99	0.98	0.95	0.88	0.75	0.50	0.00
<b>Heat transfer medium for testing</b>					Water									
<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>	53.72	K							
<b>Standard stagnation temperature (G = 1000 W/m<sup>2</sup>; <math>\vartheta_a = 30</math> °C)</b>					$\vartheta_{stg}$	280	°C							
<b>Maximum operating temperature</b>					$\vartheta_{max, op}$	230	°C							
<b>Maximum operating pressure</b>					p <sub>max, op</sub>	1000	kPa							
<b>Testing laboratory</b>					Intertek Testing Services Shenzhen Ltd. Guangzhou Branch				http://www.intertek.com					
<b>Test report(s)</b>					231031204GZU-001 131016040GZU-001				<b>Dated</b>		2024/6/21 2014/1/7			
<b>Comments of testing laboratory</b>					Draft Ver. 6.2 (22.09.2021)									
<i>Above efficiency parameters come from test type SHC10:</i>														
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														

<b>Annex to Solar Keymark Certificate</b> <b>Supplementary Information</b>	<b>Licence Number</b>	<b>011-7S3020 R</b>
	<b>Issued</b>	<b>2024-06-21</b>

<b>Gross Thermal Yield in kWh/collector at mean fluid temperature <math>\vartheta_m</math></b>													
Collector name	Standard Locations	Athens			Davos			Stockholm			Würzburg		
	$\vartheta_m$	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C	25°C	50°C	75°C
SHC10		2,242	1,779	1,206	1,823	1,333	823	1,331	950	577	1,440	1,032	618
SHC12		2,678	2,126	1,441	2,177	1,593	983	1,590	1,135	689	1,720	1,233	738
SHC14		3,114	2,472	1,676	2,532	1,852	1,143	1,849	1,319	802	2,001	1,434	859
SHC15		3,333	2,645	1,793	2,710	1,982	1,223	1,978	1,412	858	2,141	1,535	919
SHC16		3,551	2,819	1,911	2,887	2,112	1,303	2,108	1,504	914	2,281	1,636	979
SHC18		3,987	3,165	2,146	3,242	2,371	1,463	2,367	1,689	1,026	2,561	1,837	1,100
SHC20		4,424	3,511	2,380	3,597	2,631	1,623	2,626	1,874	1,139	2,842	2,038	1,220
SHC21		4,642	3,685	2,498	3,774	2,760	1,704	2,755	1,966	1,195	2,982	2,138	1,280
SHC22		4,860	3,858	2,615	3,952	2,890	1,784	2,885	2,059	1,251	3,122	2,239	1,340
SHC24		5,296	4,204	2,850	4,307	3,150	1,944	3,144	2,244	1,363	3,402	2,440	1,461
SHC25		5,515	4,378	2,968	4,484	3,280	2,024	3,273	2,336	1,419	3,542	2,540	1,521
SHC28		6,050	4,803	3,256	4,920	3,598	2,220	3,591	2,563	1,557	3,886	2,787	1,668
Gross Thermal Yield per m <sup>2</sup> gross area		1,002	795	539	815	596	368	595	424	258	644	461	276
Annual efficiency, $\eta_a$		57%	45%	31%	50%	37%	23%	51%	36%	22%	52%	37%	22%
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 Draft Ver. 6.2 (22.09.2021). A detailed description of the calculations is available at <http://www.estif.org/solarkeymarknew/>

#### 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)	B		--
G (W/m <sup>2</sup> ) >	900	$\vartheta_a$ (°C) >	15
Maximum tested positive load	2800		Pa
Maximum tested negative load	1000		Pa
Hail resistance using steel ball (maximum drop height)	0.6		m
<b>Additional collector attribute(s)</b>			
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	Façade 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> )
SHC10	2.24	1-H-12S-C:19,1205-D	1.82
SHC12	2.67	1-H-12S-C:19,1425-D	2.16
SHC14	3.11	1-H-12S-C:19,1645-D	2.52
SHC15	3.33	1-H-12S-C:19,1755-D	2.70
SHC16	3.54	1-H-12S-C:19,1865-D	2.87
SHC18	3.98	1-H-12S-C:19,2085-D	3.23
SHC20	4.42	1-H-12S-C:19,2305-D	3.59
SHC21	4.63	1-H-12S-C:19,2415-D	3.77
SHC22	4.85	1-H-12S-C:19,2525-D	3.95
SHC24	5.29	1-H-12S-C:19,2745-D	4.41
SHC25	5.50	1-H-12S-C:19,2855-D	4.59
SHC28	6.04	1-H-12S-C:19,3185-D	5.24

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 ( $\eta_{col}$ )	48%	Zero-loss efficiency ( $\eta_0$ )	0.58
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 ( $a_1$ )	1.37
		Second-order coefficient ( $a_2$ )	0.027
		Incidence angle modifier IAM (50°)	1.02
		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.	